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ILLUSTRATIONS

OF

CLINICAL SURGERY.

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ILLUSTRATIONS

OF

CLINICAL SURGERY

CONSISTING OF

PLATES, PHOTOGRAPHS, WOODCUTS

DIAGRAMS, ETC.

ILLUSTRATING SURGICAL DISEASES, SYMPTOMS AND ACCIDENTS
ALSO OPERATIVE AND OTHER METHODS OF TREATMENT

WITH DESCRIPTIVE LETTERPRESS

BY

JONATHAN HUTCHINSON, F.R.C.S.

SENIOR SURGEON TO THE LONDON HOSPITAL AND FORMERLY LECTURER ON THE PRINCIPLES AND PRACTICE OF SURGERY;
SURGEON TO THE MOORFIELDS OPHTHALMIC HOSPITAL AND TO THE BLACKFRIARS HOSPITAL FOR
DISEASES OF THE SKIN; HON. FELLOW OF THE SOCIETY OF SURGERY OF PARIS,
AND OF THE DERMATOLOGICAL SOCIETY OF NEW YORK

LONDON
J. & A. CHURCHILL, NEW BURLINGTON STREET
1875

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ENCEPHALOCELE.

E. Bourgeois du Génod. nat.

W. Wesl & Cie imp.

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PLATE I.

FRONTAL ENCEPHALOCELE.

(Three Portraits from different Subjects.)

The terms Encephalocele and Meningocele are given to congenital protrusions of the contents of the skull. If the tumour consists of a bag of arachnoid fluid only, the latter designation is applicable; if parts of the brain or cerebellum are also contained, it is an Encephalocele.

These tumours are met with more frequently at the back of the head than elsewhere, and in this position the tumour frequently hangs so low on the neck as to be taken for a cervical spina bifida. The latter condition is, however, so rare that it is always safe to assume that a congenital tumour in the nape of the neck is in all probability from within the skull. In these cases the occipital bone is usually deficient in the middle line, just above the foramen magnum, and through this opening a pedunculated tumour, often containing part or the whole of the cerebellum, escapes. The neck of the tumour is separated from the foramen magnum by a ligamentous band. The cerebellum, if extruded, is usually much altered as to arrangement of lobes, and with it are large bags of subarachnoid fluid. It is seldom that the child's lower extremities are well developed.

The occipital encephalocele is moderately common, and I possess numerous photographs and portraits of different examples of it which will form the subjects for a future Plate. The form illustrated in Plate I is the far more rare variety in which the deficiency in ossification is of the frontal and ethmoid bones, and the tumour protrudes at the root of the nose. I have myself seen but three or four examples of this form. They are remarkably like each other, and it might, indeed, be difficult without careful inspection to feel certain that the two upper portraits in the Plate were not from the same patient. This sameness in appearance makes the diagnosis easy to any one who has once seen either a living example or a good portrait. The coloured portrait is that of the first case which came under my own observation, but I had previously seen a photograph, and I cannot forbear mentioning, as a proof of the value of pictorial representation, the circumstances under which this child came under

my notice. Its head was resting on the knees of a surgeon, who had an armed needle in his hand, and was about to transfix the tumour through its base in the belief that it was a vascular growth. The close resemblance to a photograph which I had formerly seen struck me at once, and I suggested further examination, the result of which was that no operation was done. The child was, I believe, subsequently operated on (by puncture) by another surgeon and narrowly escaped. After very serious symptoms of arachnitis, however, it recovered, and I know that it was living and well several years later. The tumour increased somewhat, but not much. As shown in the portrait the skin over the tumour was very vascular.

The upper uncoloured portraits are from two infants, one of which was shown by Mr. Shaw at the Pathological Society in 1857,[1] whilst the other came under care at the London Hospital. I am indebted to my former colleague, the late Mr. Nathaniel Ward, for the photograph which has been here copied.

In respect to diagnosis it may be remarked that the presence at birth, the peculiar position, the somewhat lobulated surface, the fluctuation, the distension during crying, are facts which abundantly suffice. Although sometimes very florid, and at first glance like nævus, yet it may always be noticed that the florid skin is smooth and glossy, and that the vessels only cross it and by no means make up the thickness. Further, with the rarest exception, there is no true nævus structure to be found at the base of the tumour or on the surrounding skin. There is usually a double pulsation; a feeble one (often absent) which is arterial and synchronous with the pulse, and a more forcible one felt only during crying, &c., which is synchronous with expiration.

With the occipital forms of encephalocele, as often with spina bifida, there is not uncommonly some defect in the innervation of the lower extremities, and talipes calcaneus is frequently present. In these nasal forms, however, no defect as regards any of the cerebro-spinal functions is, as far as I am aware, noticed. The sense of smell is, no doubt, the one in greatest danger, but I am not aware of any observations which have been made in respect to it. All the patients that I have seen were too young to permit of its being tested.

I have never had an opportunity for examining a frontal encephalocele after death,[2] nor, as I believe, does a specimen of one exist in any of our London museums, nor in the chief

[1] See 'Transactions of Path. Soc.,' vol. ix.

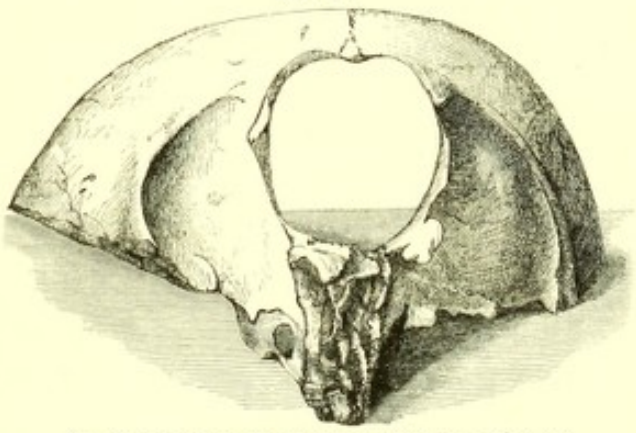
[2] For an account of the dissection of the head of a still-born infant with this form of encephalocele see 'Bruns' Handbook,' p. 709.

Continental ones. I had never seen the frontal bone from such a case until the occasion was offered at the Annual Meeting of the British Medical Association at Birmingham in 1872. Amongst the very interesting collection of specimens, &c., which were then got together was the one which forms the subject of the accompanying woodcut. Mr. C. J. Bracey, by whom it had been obtained, was kind enough to make a sketch of the bone for me, and also to give me a photograph of the infant and notes of the case. The child was a boy, two years and a half old, healthy and intelligent. None of his five brothers and sisters showed any malformation. Mr. Bracey writes, "The larger portion of the tumour consisted of a protrusion of the anterior lobes of the brain covered by the membranes and the integument (which was natural in appearance). The smaller portion was formed by a sac of membrane, apparently dura mater, crossed by bands of areolar tissue, and filled with clear fluid (subarachnoid). This, too, was covered with skin, which was here thin and rather bluish. This portion could be nearly emptied by firm and continuous pressure. The pulsations of the brain could be felt and seen in the larger tumour. The whole increased in size when the child cried. The child's appearance was so hideous that its friends were very anxious that something should be done." Mr. Bracey, urged thus to attempt something, placed a silver wire, moderately tight, round the neck of the smaller tumour, and allowed it gradually to ulcerate through, hoping that the serous surfaces would adhere before they were divided. The mass in time sloughed, but inflammation extended to the arachnoid, and the child sank. Fig. 2 shows

Fig. 1.

Portrait of Mr. C. J. Bracey's patient (from a photograph).

Fig. 2.



Front part of base of skull from Mr. Bracey's case.

[1] The tumour may in rare cases be larger than those shown in the portraits, and may even hang down over the child's face. It is seldom that it is smaller. Although almost invariably in the middle line, yet a few cases are on record in which it bulged only on one side, at the root of the nose, close to the angle of the eye.

the size of the aperture in the dry bones. The frontal ethmoid and nasal bones were implicated, and the hole, which had everted lips, was large enough to admit two thumbs.

As regards the prospect of life in these cases, I believe that if all interference be abstained from there is no danger connected with the deformity. The tumour may, possibly, enlarge considerably during the first few years of life. In Mr. Shaw's case, however, there was but little change in the relative size of the parts between the ages of three and five years. I have never seen an adult who was the subject of this deformity, but I am not aware that any of the three patients whose portraits are given in my Plate are dead; one of them was, I know, alive at the age of six years, and in good bodily and mental health.

Although the deformity is such that the death of the sufferer in infancy is scarcely a matter for regret, yet there can be little doubt that it should be the rule of practice to abstain entirely from interference. There is nothing for treatment to do beyond protecting the tumour from external injury. It is scarcely possible that any attempt at a radical operation can be otherwise than fatal.

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E. Burgess del. et lith.

W. West & Co. imp.

IVORY EXOSTOSIS OF ORBIT.

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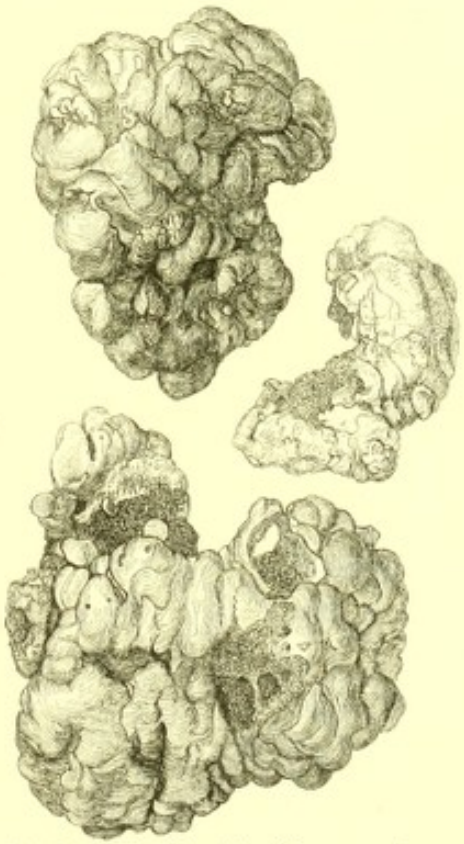
PLATE II.

LARGE IVORY EXOSTOSIS OF THE ORBIT.

This portrait was taken from an Irish woman, aged about 50, who was under the care of Mr. Borlase Childs, in 1859, when we were colleagues at the Metropolitan Free Hospital. The eye had been destroyed, and a large nodular mass of ivory-like bone is seen to fill the orbit, projecting over the cheek and being quite bare of soft tissues. This was the last stage of the growth; it had undergone necrosis and become loose. The fact that it was loose was not, however, discovered until the patient had been put under chloroform for an operation. It was then found to be moveable, having no bony connections and being simply embedded in the distended orbit. The walls of the latter had been destroyed by absorption, and nothing but fibrous structures (dura mater) separated the mass from the brain. The orbit was greatly enlarged and would have contained a fist. After the exostosis had been lifted from its bed, the pulsations of the brain could be felt over the whole of the upper and inner boundaries of the cavity. The frontal sinus on the right side appeared to have been destroyed, and two fistulæ passed above it, and opened near the middle of the forehead.

FIG. 3.



Portions of the Exostosis after removal.

The appended woodcut shows the two halves of the mass as removed at the first and second operations.

After the removal the patient did quite well, and the cavity underwent considerable diminution.

This patient had been under our observation about a year before

the final removal of the necrosed mass, and at that time the growth was firmly fixed. It completely filled the orbit, accurately fitting its margins, and after ineffectual attempts to get at its base, Mr. Childs was obliged to content himself with sawing off all that projected. Its structure was so hard that several saws were broken, and several operators tired their hands before the section was complete. Very probably it was the violence done to the growth at this operation which led to its subsequent necrosis and separation. The saw-marks on its surface can still be seen. At the time the portrait was taken, the loosened tumour had been to some extent extruded from the orbit, that is, it projected in front of the level which it occupied after the first operation.

The history was that it had begun to grow in early life, and had projected first from the nasal side. It had displaced and gradually destroyed the eye, and finally occupied the whole orbit. No attempt at its removal had ever been made, until the woman came under Mr. Childs' care. The conjecture is not improbable that it had originally grown in the frontal sinus. Such at least was the site of the growth in a somewhat similar case which came under my observation a few years later. In this instance a young man named Brown became the subject of fulness in the position of the sinus, which, progressing, intruded into the orbit and displaced the eye downwards and outwards. I trephined the sinus and cut away its walls, exposing a large white ivory growth much nodulated on its surface. The pedicle was without much trouble broken through, and the mass was taken away. On this occasion a good recovery ensued, and the wound healed without much trouble. About two years later, however, the man came to me again on account of a similar growth on the opposite side, and in removing this the dura mater behind the mass sustained a slight injury, and death from arachnitis followed. In this instance it was clearly demonstrated that both the growths were in the frontal sinuses, and in both absorption of the bone behind had resulted, leaving nothing but the dura mater.

FIG. 4.

Ivory Exostosis removed from the Frontal Sinus.

I have seen several other cases of ivory exostosis from the walls of the orbit, and several also in which the growth was from the superior maxilla or ethmoid, and projected into the nasal cavities.

Fig. 5 shows an interesting example of the curiously symmetrical deformity produced in a case of double ivory exostosis projecting into the nostrils. The patient, a man of about 30, came

under my observation at Moorfields. The tumours could be easily felt from the nostrils, and were as hard as stone. He was not anxious for treatment, and knowing the uncertainty as to where the growths might spring from, I did not urge it on him.

About the same time I had under care another man of middle age who had an exostosis of similar kind, but on one side only.

Fig. 5.

Symmetrical Exostoses from the Superior Maxillæ.

Recently I have had under care a man whose physiognomy was disfigured in an almost precisely similar manner to that shown in Fig. 5. The growths, although symmetrically placed, were not of equal size, that on the left side being the larger. They appeared to grow by broad bases from the upper maxillæ, and had so completely closed the nostrils that he could not draw air through them. The obstruction had given rise to an abscess in one lachrymal sac, for which he came to me. The exostoses had been slowly growing for thirty years.

As a rule exostoses in the orbit which have attained any size, and which threaten to displace the eye, should be removed. Almost always a narrow pedicle will be found which may be broken through without material risk. If, however, the tumour do not disturb the eye or cause material pain, it is a matter which must be left to the patient's own decision, whether it is worth while for the sake of removal of a cause of deformity to encounter a certain small amount of danger to life.

The growth which was removed in Mr. Childs' case is now in the Museum of the College of Surgeons (Pathological Series, No. 794B). The front part of the skull from my own patient is in that of the London Hospital.

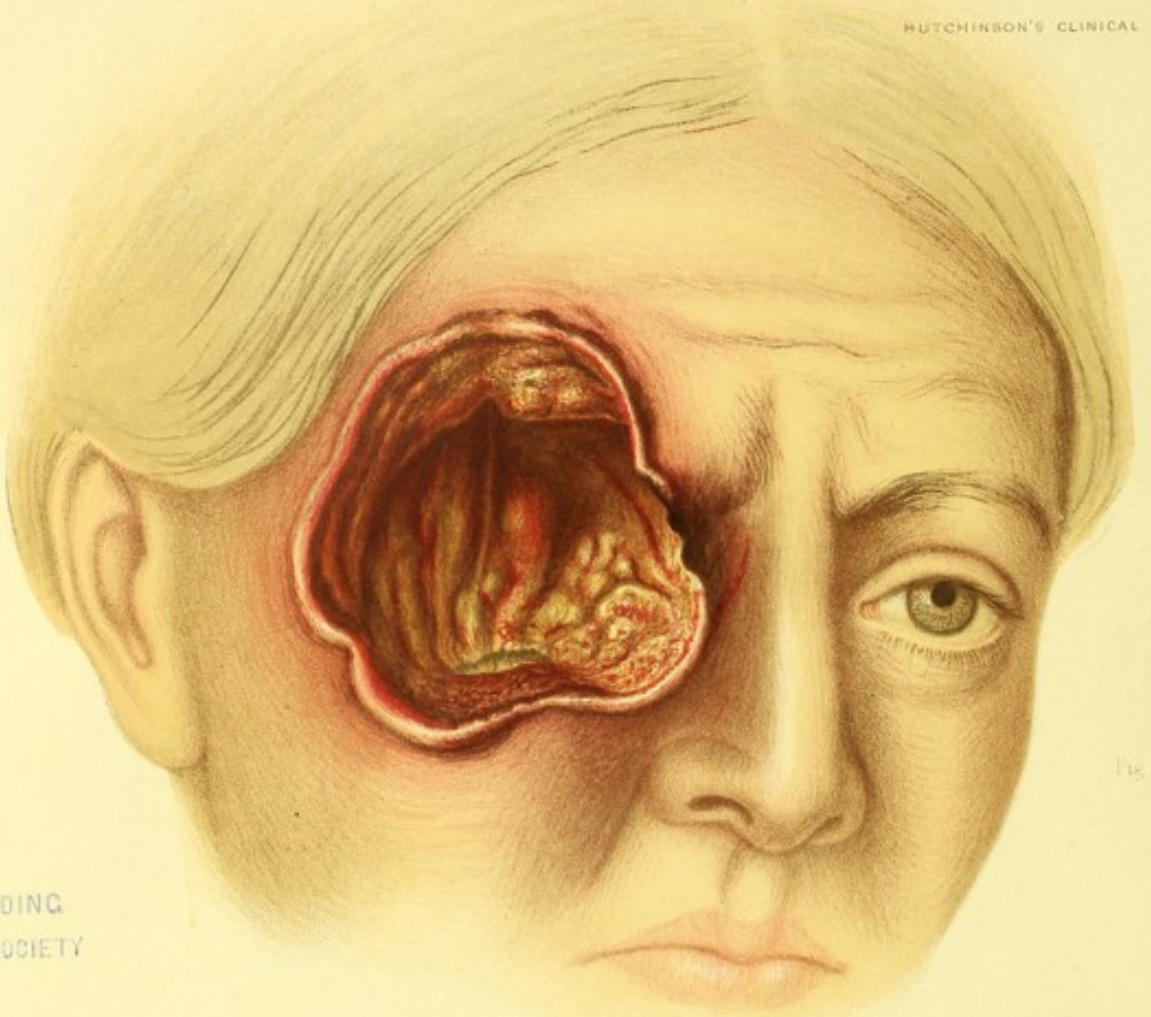


Fig I.

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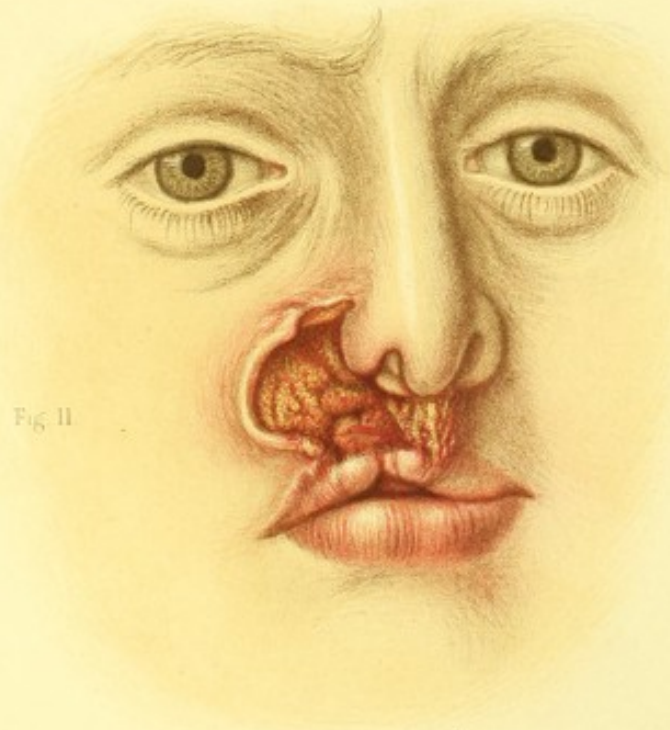

Fig II

Fig III

RODENT ULCER.

E. Burgess ch. lith. ad nat.

W. West & Co. imp.

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PLATE III.

RODENT CANCER OR JACOB'S ULCER.

In this Plate are comprised three illustrations of the more common conditions under which we meet with the disease first described by Dr. Jacob, of Dublin, as "an ulcer of a peculiar character which attacks the eyelids and other parts of the face," and afterwards long known as "Jacob's ulcer." It was named by Lebert "rodent ulcer," and more recently the fact that, although it differs in some important points from other forms of malignant disease, it yet undoubtedly belongs to the carcinoma family has been recognised in the term "rodent cancer."

Fig. 1 shows the disease in an advanced stage, the eye having been destroyed and the orbit excavated. At the lower part a portion of exposed bone is seen. The peculiar character of the edge of the ulcer is here well shown. It is elevated, hard, sinuous and glossy, while quite devoid of the warty growths which are usually present in epithelial cancer. The comparative absence of evidence of growth must indeed be noted; in all parts it is destruction, not growth, which is the conspicuous feature. In this instance the disease had begun on the eyelid, and it was only after ten or twelve years of slow progress that it had reached its present condition. The patient was a woman aged about fifty. I excised the edge of the ulcer and freely cauterised the whole of the rest with the result of very much improving the condition of things. The disease, however, returned. The patient died a few years later in a lunatic asylum, but I believe from causes apart from the local malady.

Fig. 2 shows a patch of rodent on the cheek, at the side of the ala of the nose. Here, as in Fig. 1, the rolled indurated edge and the clean surface of the sore are very characteristic, and there are no warts. The disease is much less common in this part of the cheek than it is upon the eyelids, and there is usually a little more need for caution in the diagnosis. I have known the appearance of rodent in this position very closely simulated by sores which were syphilitic. The patient was a man of about fifty-three, in whom the disease had existed some years.

Fig. 3 shows the state of things in an old man, who for six years past had been the subject of slowly advancing rodent ulceration of the upper eyelids. The clean surface and nodular bossy edges are again well seen. The man was unfortunately blind of the other eye, and it became of great importance to preserve the usefulness of this. I freely excised the diseased parts, and transplanted a large flap of skin from the temple to make a new eyelid. The result was very satisfactory. I know that the man remained for some years without return of the disease, and I believe the cure was permanent.

The three portraits given illustrate the most common form of rodent ulcer, that, namely, in which the edge is hard but not warty, and in which the growth is far less than the ulcerative destruction. It must not be supposed, however, that all varieties of rodent are alike in these features. On the contrary, we occasionally see sores of a locally malignant nature on the same parts and with the same clinical history, but in which the tendency to growth is far greater, and in which even a fungating and bleeding mass may be produced. Some of these more rare forms I shall illustrate in a future Plate.

Without attempting here anything like a complete account of rodent cancer, I may ask attention to the following points:

First, that it is undoubtedly a form of cancer. It differs chiefly from epithelial cancer, in that it scarcely ever causes enlargement of the lymphatic glands and that it advances very slowly. Thus it will take as many years to destroy life as epithelial cancer requires months. In its histology, in the fact that there is new growth before there is ulceration, in its power of invading and implicating all tissues with which it comes in contact, bone, muscles, blood-vessels, &c., &c., in its incurability excepting by extirpation, in its remarkable tendency to return after removal, and in the fact that it never occurs in the young while it is most common in the aged, it conforms to the character of cancer and differs from that of all types of chronic inflammation. There can I think be little doubt that its peculiarities in distinction from cognate forms of cancer depend upon the tissue in which it commences. It is, in fact, almost the only form of cancerous action to which as a primary disease the skin of the face, and especially the parts about the eyelids, are liable. If cancerous action begins in the prolabium epithelial cancer will be the result, if on the eyelids "rodent cancer." Rodent cancer is never seen in children or young persons. I have seen it in a few instances under the age of thirty, but as a rule it does not begin till middle life. If neglected it may cause terrible destruction of parts; thus I have seen the whole of the nose, the lips, and

lower eyelids entirely removed, yet, although in this case it had been more than twenty years in progress, there was no tendency to gland disease. It may occasionally cause death by hæmorrhage, but only in very advanced cases.

The fact that it is quite incurable excepting by removal and that it extends steadily if let alone, and may produce great suffering and deformity, renders the importance of early treatment very great. In the early stages it may usually be extirpated easily and with a good hope of permanent cure. At any rate if the patient will consent to remain under observation, and to allow measures to be adopted immediately if any recurrence shows itself, a cure, for all practical purposes permanent and complete, may be promised. Even in advanced cases, by excision and the liberal use of chloride of zinc paste, great good may be done. In some cases the actual cautery, as more manageable, may be preferable to the paste, but it must be used unflinchingly and it is not so efficient as the latter. In cases in which the conjunctiva is implicated it will usually be wiser at once to remove the eyeball. In certain positions the free transplantation of skin may effect much in diminishing deformity.

In its earliest stage rodent cancer resembles a flat-topped wart or "chronic pimple." All such growths on the cheeks or eyelids of elderly persons ought to be immediately destroyed. By acting on this rule many a person might be saved the misery of an incurable rodent cancer. It is indeed quite impossible to exaggerate the importance of early treatment in this as in all other forms of local cancer.

[1] In a clinical report on the rodent ulcer which I wrote in 1860 I expressed a preference for the term rodent ulcer over that of cancer on the ground that in this disease the glands and internal organs never become affected. My opinions as to the facts have not undergone the least change, for I had at the time not the slightest doubt that the disease was locally malignant. I now think, however, that it is far better that it should be called cancer, since it clearly results from a similar kind of altered cell-growth to that under which the other forms of malignant disease are produced. Thus, in the regions which are liable to be attacked by rodent cancer, as a rule, we do not get a disease showing the peculiarities of what is usually denominated epithelial cancer; the difference is, I think, caused by difference of the tissue in which the cancerous action, so to speak, begins. Mr. Cæsar Hawkins had written of the disease as cancer long ago, and since the publication of my report the late Mr. Chas. H. Moore published a very able little monograph on the disease, one special object of which was to vindicate its claim to a place in the list of cancers. Those interested in the histology of the disease I may refer to a woodcut illustration given in my report, or, much better, to a report by Mr. Hulke, with three woodcuts, in the 'Pathological Transactions' for 1871, or to a still more elaborate and able investigation of the subject by Dr. Collins Warren, of Boston, U.S. Dr. Warren found nested cells; in other respects his delineations closely correspond with those previously given by Mr. Hulke and myself. His paper on the subject was published as the Boylston Prize Essay for 1872.

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Fig I.

Fig II.

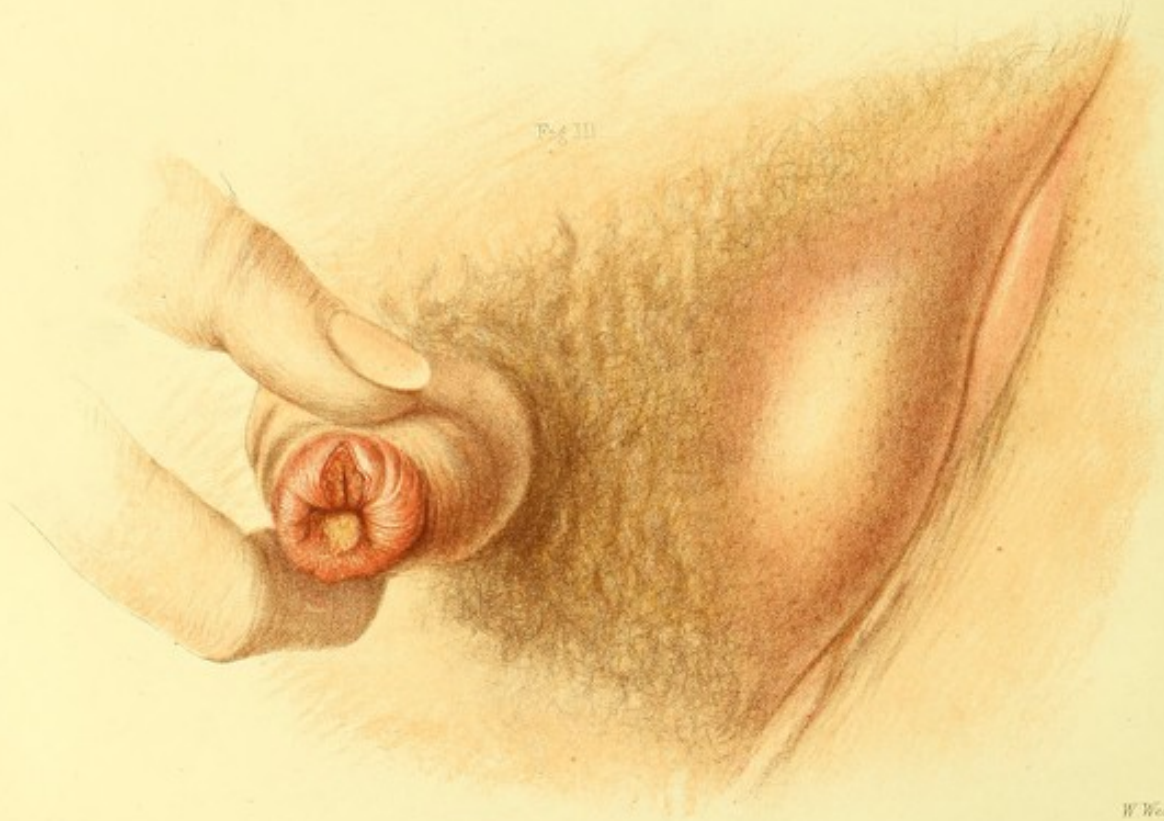

Fig III.

E. Burgess del. et lith.

W. West & Co. imp.

VARIOUS FORMS OF CHANCRE.

PLATE IV.

DIFFERENT VARIETIES OF CHANCRE.

In Fig. 1 we have an example of an acutely inflamed indurated sore at about the sixth week after contagion. There is specific induration both in the roll of the reflected prepuce and in the corona. In the latter position the sore has inflamed to the verge of phagedæna, and its surface shows an ashy superficial slough. The man had an indurated bubo and secondary symptoms followed.

Fig. 2 is from a case in which a very unusually large mass of induration was present. The lump was as large as half a walnut, and almost as hard as cartilage. On the skin of the penis a little higher up was another sore which had a distinctly indurated base, although the amount of deposit was slight in comparison with the one in the prepuce. The surface of the latter, clean, florid, almost free from secretion and with a healing edge, is very characteristic of what is often seen on indurated sores. The surface of the other shows more inflammation ; there is more secretion and the edge is more ragged. It is undoubted that indurated sores may present very various degrees of inflammation, from a perfectly secretionless healing surface to the worst type of sloughing phagedæna. In this figure we have an interesting illustration of the fact that two sores in the same patient, both indurated, may differ considerably in appearance. This sketch was taken in the tenth week after contagion. Under mercurial treatment the induration disappeared, but the man suffered subsequently from secondary symptoms, which, indeed, had already commenced when he came under treatment.

Fig. 3 shows a variety of chancre not unfrequently met with in practice, in which a number of soft sores are situate at a point within the orifice of the prepuce. As in other examples of soft sore, it is never safe to give any opinion as to whether the sore will prove an infecting one until six weeks have elapsed from the date of contagion. Although soft in the first instance, there is no security against the appearance of specific induration at the expiration of the incubation period. In the present instance, the upper sore is just taking on induration. A large suppurated bubo is seen in the left groin.

Sores of this kind in the edge of the prepuce are very apt to pucker it when they heal, and leave a condition of phymosis.

Fig. I.

Fig II

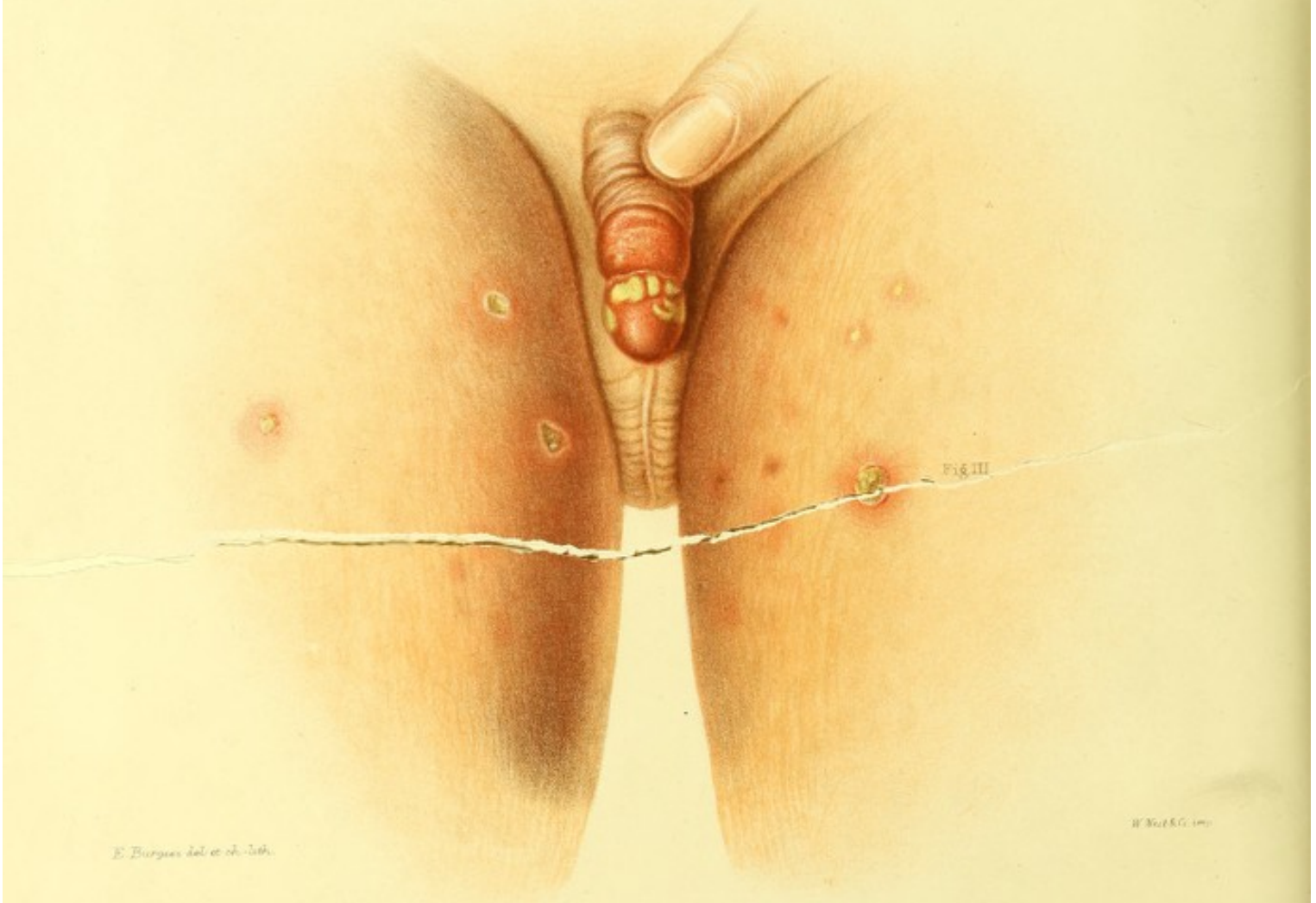

Fig III

E. Burgess del et ch. Lith.

W. West & G. imp.

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PLATE V.

VARIETIES OF SOFT SORE, BALANITIS, &c.

(*Three Portraits.*)

Fig. 1 shows a good example of multiple soft sores on the frænum, roll of prepuce and corona. The sketch was taken nearly five weeks after contagion, and some of the sores had been present almost from the beginning. The first was on the frænum and most of the others had probably been produced by the contagion of its discharge. The multiplicity of the sores, their free secretion and inflamed edges, with the entire absence of induration, sufficiently denote their non-specific character. I must again remark, however, that even with such sores as these, until the incubation period is well passed (three to five weeks), the surgeon can entertain no confidence that induration may not occur, and he would act most unwisely to give his patient any opinion on the matter. The relationship of soft to hard sores is probably simply this, that the soft are due to the contagion of the pus produced by syphilitic inflammation, and the hard to that of the specific virus of syphilis.[1] The pus acts almost immediately after its implantation, whilst the virus requires an interval before its effects can be recognised. Either may be implanted alone, or both together, and if the latter happens, then a sore which was for the first month quite definitely soft may at length take on induration. In this instance there is one sore to the extreme left which presents features very suspicious of commencing induration.

The patient was a young man who had never had any kind of sore previously. Unfortunately after the sketch was made he never attended again, so that I cannot state the result of treatment.

Fig. 2 exhibits Balanitis Figurata in a well characterised condition. Red, abruptly margined patches are seen over the whole glans and reflected prepuce. The edges of the meatus are also

[1] See a Clinical Lecture by the Author on the "Relations between Soft and Hard Chancres," in the 'Lancet' for September, 1875.

excoriated. It is to be observed that the diffuse inflammation of the glans and corona commonly seen in those forms of balanitis which are due to retained secretion or dyspepsia is not here present. I believe that in these last-named forms the map-like patches shown in the portrait seldom or never occur, and that when these are well marked, as in this case, they may usually be taken as proof of contagion from venereal secretions. In some instances, probably, they are a variety of soft chancre, and in others they may be part of a secondary eruption. In the present case the patient had gonorrhœa, and the history would support the hypothesis that the patches were of the nature of soft sores. Their multiplicity is, no doubt, to be explained by the contagion of the secretion from one to another.

Fig. 3 is a very valuable illustration of the occurrence of sores on the penis of a young boy which looked exactly like soft chancres, and from the secretion of which an eruption had been produced on the thighs. Whether the starting-point was a sore due to contagion from a soft chancre or not, I could not determine, but all the subsequent ones, both on the glans and on the thighs, were undoubtedly due to the contagion of pus from the first. The spots on the skin prove nothing whatever as to the syphilitic nature of the secretion, but are precisely such as occur in common porrigo, in which the pus produced by one sore is transferred to other parts and reproduces similar results. Such sores are usually very superficial and show themselves at first as mere vesications; subsequently a considerable pus scab may result.

It is seldom that non-specific balanitis produces multiple, abruptly margined sores like these, and it is yet more seldom that any eruption is caused on the skin of adjacent parts. The child was only four years old. Although I inquired carefully, I could obtain no proof that any risk of contamination with venereal discharges had occurred. The sores got well after a time under the use of lead lotion and the ammonio-chloride ointment, and so far as I know nothing of a syphilitic nature ever followed. It is of interest to remark that the history of such a combination of symptoms, sores on the penis and eruption on the thighs, given by a non-professional person might easily be taken as almost conclusive evidence that the patient of whom it was narrated had suffered from syphilis.

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GENERAL RULES FOR THE DIAGNOSIS OF CHANCRES.

These two plates are all that I purpose, for the present, to give as illustrations of primary chancres and the conditions which may be confounded with them.

Plates XXII and XXIII will exhibit the conditions which attend vaccination-chancres, and I intend before very long to give illustrations of chancres on other parts; the tongue, the lips, eyelids, fingers, &c. (*syphilis sine coitu*). Other plates may probably be produced at a later stage of my work, which will exhibit some of the less frequent conditions of primary sores on the genitals; but as for the present I here dismiss the subject, it may, perhaps, be convenient to introduce now a few brief general rules intended to help in diagnosis.

First. Never give any opinion as to the nature of a sore until the incubation period is fairly passed. The period of incubation lasts from the date of contagion to the beginning of induration, and is seldom less, and often more, than three weeks. During this period there is never anything characteristic. There may be no sore at all, or there may be a little red pimple or abrasion, or there may be a suppurating ulcer.

Second. Never give any opinion as to the nature of a sore within a short period of the use of caustics. A bastard kind of induration, extremely deceptive in character, is often produced by caustics.

Third. When sores are multiple, their multiplicity is usually the result of local pus-contagion. Such sores are usually soft and do not infect the constitution. There is nothing, however, in their character which renders it certain that the parent sore may not show induration when the incubation period is over, and the caution enjoined in Rule 1 must not be forgotten. When *hard* sores are multiple it may be taken as proof that more than one spot was inoculated at first.

Fourth. The sign which indicates specificity, and implies constitutional infection is *induration*. The hardness referred to

rarely begins until the end of the third week, and often not till that of the fifth, and, unless interfered with by mercury, it will usually go on increasing for several weeks, and may last for several months. It may vary very much both in degree and extent in different cases, and may be attended by very various degrees of inflammatory action in the surrounding tissues. Sometimes the induration resembles that of a mass of cartilage and is almost wholly free from inflammatory action; there is little or no ulceration on its surface and no surrounding swelling or redness. These chancres are most easy of recognition. In many others, however, there is inflammation, and not only is the character of the induration much concealed by the ill-defined, softer swelling of the surrounding parts, but its surface may ulcerate, suppurate, or even slough. In these cases much care must be exercised in diagnosis, and valuable assistance may be obtained by ascertaining, when practicable, the precise dates of contagion and development of the sore.

Fifth. The character of the induration of a primary sore will vary somewhat according to the structure in which it is produced. The most characteristic forms are usually met with in the mucous membrane of the prepuce close to the corona. Here what are known as "collared" chancres, the induration of which is easily recognised by the eye as well as the finger, are very often seen. Chancres of the skin of the penis, or of the skin of other parts of the body, almost invariably show a degree of induration which it is not difficult to recognise; but it is often, in these situations, more or less concealed by surrounding inflammatory effusion, and the same remark applies with still greater force to chancres on the lips, eyelids, &c. On the glans penis, induration is rarely characteristic, excepting at the meatus or on the corona. The indurated chancre of the meatus is very peculiar, and must be carefully distinguished from the pouting of the part which often attends gonorrhœa.

Sixth. Although it is certainly erroneous to say that specific chancres never suppurate, yet it is quite true that they suppurate but little, and but seldom, as compared with soft sores, and that the fluid secretion from them is rarely well-formed pus.

Seventh. The bubo which attends the indurated chancre usually consists of moderate enlargement, with great induration, of a few lymphatic glands. These glands are not glued together, but remain movable under the skin and often give the patient so little trouble that he is unaware of their presence. Their induration is often so definite as to almost justify the name which they have received of "bullet-bubo."

Eighth. The bubo which attends the soft chancre is usually characterised by considerable inflammation, and by glueing of the glands to each other and to the skin. In this there is great risk of suppuration.

Ninth. Although it is the rule for the bubo of the indurated chancre not to suppurate, and that of the soft sore to go on to abscess, yet wide limits must be allowed for deviations from what is common in this respect. Practically, a suppurated bubo is not unfrequently met with in connection with an indurated and infecting chancre. In some cases, no doubt, this is to be explained by the fact that the chancre is mixed, or that a soft chancre has preceded a hard one.

Tenth. It is a peculiar property of the syphilitic virus to excite in individuals of a certain constitution ulcerative and destructive forms of inflammation. When chancres take on phagedæna, it may generally be inferred that they were of the specific or infecting character and constitutional symptoms may be confidently expected. In proof that the peculiarities of the chancre are probably due to something peculiar in the patient's state, and not to the virus, it will usually be observed that the secondary symptoms show also a tendency to excess of inflammation and suppuration.

Eleventh. The time for the adoption of specific treatment is the earliest date of recognition of specific hardness in the sore. It is probably a good rule to wait until this is quite certain, since otherwise we might often give mercury unnecessarily, or might feel uncertain as to the necessity for continuing a long course.

Twelfth. The induration of a chancre is probably in most cases simultaneous with the completion of the incubation period and the first infection of the blood. It usually, however, precedes by from one to three or four weeks the appearance of the more conspicuous constitutional or secondary symptoms, rash, sore throat, &c.; and by the prompt exhibition of mercury the latter may very often be prevented.

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I have introduced on the next sheet a scheme of the stages and sequelæ of acquired syphilis, in which it is endeavoured to state as explicitly as our knowledge permits the usual course and duration of each. We must recollect that whenever the antidote to syphilis has been used the ordinary development of the malady will be modified, and that it is never safe to attempt to study the natural

history of the disease from cases which have at any stage been treated by mercury. When mercury does not wholly subdue and cure, it may retard and protract. It is probable that the current opinions as to the evolution of syphilis being irregular and its stages of uncertain duration are, to a large extent, due to the fact that we have studied chiefly cases in which it has been modified by mercury.

SCHEME OF THE COURSE, STAGES, AND SEQUELÆ OF ACQUIRED SYPHILIS.

(*This scheme is arranged on the supposition that all antidotal treatment is abstained from.*)

INCUBATION PERIOD.—Usual duration, three to five weeks. Extreme periods, ten days to six weeks.	This stage dates from the exposure to contagion to the first sign of induration in the sore. The condition of the spot inoculated will, during this period, vary according to the degree of purity of the poison used. If syphilitic virus be conveyed free from admixture with pus it is probable that little or no local irritation would result until just before the occurrence of induration, when the spot would become, for the first time, red and itchy. If, however, as is usually the case in ordinary modes of contagion, pus be mixed with the virus, then the results of pus-poisoning (soft sore) may be witnessed almost from the first.
DEVELOPMENT PERIOD, OR STAGE OF PRIMARY SYMPTOMS. — Usual duration, two to four weeks.	This stage lasts from the first appearance of induration in the sore to the full development of secondary symptoms—rash, fever, and sore throat. It is really the first part of the exanthem stage. Its usual length to the full development of the exanthem is from two to four weeks. The symptoms present are one or more indurated sores and indurated glands in the groin, which latter are usually free from inflammation.
STAGE OF SECONDARY SYMPTOMS, OR EXANTHEM PERIOD.—All the symptoms in this stage are usually general and symmetrical. The duration varies from a fortnight to eight months or more.	The sore having been indurated for two to four weeks, and the induration usually still persisting, the patient becomes liable to the following phenomena, any of which, or the whole, may be omitted:—Slight febrile disturbance, with rise of temperature, headache, and greater or less feeling of discomfort; aching pains in joints and bones, with but little swelling; a roseolous eruption over the trunk, followed in a few days or weeks by an eruption of papules, pimples, or blotches, which sometimes ulcerate and become rupial; ulcers in the tonsils, usually with white borders, and sometimes with white superficial sores on the pillars and velum of palate; condylomata in throat, on tongue, or at anus; iritis; retinitis, with implication of the vitreous; loss of hair; slight general enlargement of lymphatic glands.
POST-EXANTHEM PERIOD = STAGE OF LATENCY WITH REMINDERS.—The symptoms in this stage are only exceptionally symmetrical. It extends from the cessation of the secondary to the beginning of the tertiary stage.	The general health is restored, but, in exceptional cases, the patient remains liable to sores in the throat, bald patches or sores on the tongue, palmar psoriasis, &c. Sometimes the secondary skin eruption is never wholly got rid of; but if so, it always becomes irregular. Sometimes there are deep or even phagedænic ulcerations, and sometimes a peculiar form of relapsing punctate retinitis is seen. Chronic sarcocele may occur. The patient may beget healthy children.
TERTIARY STAGE = PERIOD OF REMOTE SEQUELÆ. — In this stage the symptoms are very rarely symmetrical. It begins from three to five to ten or even thirty years after the secondary stage.	Gummous swellings occur in cellular tissue, periosteum, or muscle, which may ulcerate and spread deeply. They are persistent and show no tendency to spontaneous cure. Diseases of the nervous system (arterial disease or gumma) are frequent, and affections of the viscera occur. The tendency to phagedænic inflammation, which may be seen at any stage of syphilis, is also frequent now.

CHRONOLOGICAL STATEMENT OF EVENTS DURING THE FIRST YEAR OF ACQUIRED SYPHILIS,

On the supposition that no Antidotal Treatment has been adopted.

1st Month	*Date of Contagion.*—A little pustule or abrasion, lasting a few days, then healing and very likely forgotten. Nothing to be seen, or perhaps a soft sore, secreting pus.
2nd Month	An insignificant pimple, or perhaps nothing whatever to be found. An itching red papule, which begins to indurate. Induration increasing. Induration well marked.
3rd Month	A roseolous rash; chancre very hard; bullet bubo in groin. A papular or scaly or pustular eruption, sores in tonsils, and other secondary symptoms.
4th Month	Rash and other secondary phenomena continued and aggravated. Iritis or retinitis may occur.
5th Month	Secondary symptoms continued in some cases, disappearing in others. Chancre and bubo beginning to diminish. Iritis or retinitis may occur.
6th Month	Secondary symptoms continued. Repeated crops of eruption. Chancre probably gone. In many cases patient quite well.
7th Month	Secondary symptoms continued or beginning to fade.
8th Month	Secondary symptoms slowly diminishing, or perhaps recurring in repeated relapses.
9th Month	Patient probably well, but possibly still with rash out; liability in certain cases to psoriasis palmaris, to sores in throat, and to irregular eruptions in skin.
10th Month	Same as preceding month, but probably with diminution of symptoms.
11th Month	Symptoms diminishing if any have remained.
12th Month	In a large majority of cases the patient will have been for several months quite well; in a few he will still be suffering from sore throat, sores, with irregular skin eruption; in exceptional cases he may still suffer severely from all the secondary symptoms.

The state of latency or of reminders now begins, after which at very uncertain date tertiary symptoms may follow.

A CHRONOLOGICAL STATEMENT OF THE COURSE OF SYPHILIS,

Arranged in One-year Periods and under the supposition that Mercury is not given.

1st Year	Infection, indurated sore, bullet bubo, and after two months a rash. Roseolous eruption; grey-edged sores in tonsils; febrile disturbance; rheumatoid pains in joints; papular rash, possibly ulcerating; iritis; sores in mouth; condylomata at anus and on tongue; loss of hair.
2nd Year	Is probably free from the exanthem group of symptoms unless they have been unusually severe. May possibly still show superficial sores on palate and on tongue; palmar psoriasis, &c.
3rd Year	Probably well. Liable in rare instances to disease of the choroid (choroiditis disseminata) and to disease of arteries of brain, resulting in paralysis. Relapses of secondary symptoms, more especially of phagedæna; sores on skin and in mouth may still occur.
4th Year	Probably well. If a man, and if he have been two years free from symptoms, may be allowed to marry. Risks as in third year.
5th Year	Probably well. Liability to syphilitic orchitis, palmar psoriasis, scar-leaving acne; necrosis of bones in the nose, &c., is now, perhaps, at its greatest.
6th Year	Probably well. Same liability as in fifth year.
7th Year	Probably without relapse. Risk increases of gummous growths in cellular tissue, periosteum, nerves, and meninges.
8th Year	In the large majority of cases the patient has remained well, from the beginning of the second year, and still does so; his liabilities, however, increase to the maladies mentioned in the seventh year.
9th Year	" " " Is still liable, perhaps increasingly so, to the events mentioned in the seventh year.
10th Year	" " " " " "
11th Year	" " " " " "
12th Year	Is still liable to suffer, it may be for the first time, from symptoms of the late tertiary class. This liability will last through life, and tertiary symptoms may occur for the first time thirty years after the secondary stage, the interval having been one of absolute latency.

Fig. I.

Fig. II.

Fig. III.

Fig. IV.

Fig. V.

Fig. VI.

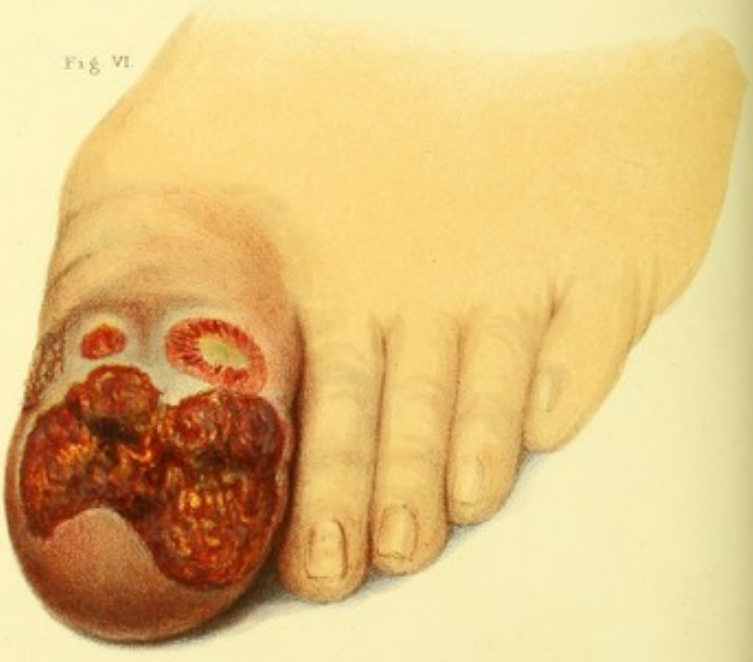

Fig. VII.

E. Burgess del. et ch. lith.

W. West & Co. imp.

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PLATE VI.

MELANOSIS.

(*Seven Portraits.*)

We may, I suppose, regard melanosis simply as a cancerous growth beginning in pigmented tissue. The choroid of the eye and the rete mucosum of the skin are the almost only positions in which we meet with it. If in the latter structure abnormal accumulations of pigment have chanced to be congenitally present, such, for instance, as black moles, these are especially likely to be attacked. Nor is there any other form of cancer which better illustrates the important law that all forms of new growth derive their chief peculiarities from the tissue in which they originate. Melanosis is a most peculiar disease, and we cannot wonder that it should have been for long distinguished from its relatives in the great cancer family by a special name. When we meet with it in its pure form it is of uniform black tint, like a mass of extract of liquorice, and is often encapsuled, and, as shown in at least one of my portraits, exceedingly well defined. It shows far less tendency than many other forms of cancer to attack adjacent parts, and it rarely fungates or bleeds. The original growth may, indeed, have attained only a small size and have occasioned no anxiety, when already the whole body has become infected. Its germs pass from the original growth into the adjacent tissue and may there be found as numerous, small, black, seed-like masses. They pass also, probably by the blood-vessels, into the most distant parts of the body; and in the liver, the lungs, the kidneys, or speckled over the great omentum, the mesentery, or in the serous investments of the viscera, growths, from the size of a pin's head to that of a walnut, may be encountered. The number of them in a single corpse may be countless, and everywhere they are coal-black, just like their parent. Usually, these secondary growths are found in non-pigmented structures and are

simply transplanted, but sometimes a pigmented tissue is their chief seat, and what is known "as multiple melanosis of the skin" is the result. In these latter cases, it is sometimes less easy to feel certain that the growths are all really secondary, and that they may not have originated independently. I have seen, I think, at least four examples of this condition, in which the patient's skin was thickly spotted over with black growths.

In the uniformly black form of melanosis, "pure melanosis," it is not common for the glands to suffer, and in this respect, as well as the local character of exhibiting but little tendency to involve adjacent structures, it conforms to the type of sarcoma rather than carcinoma. There is, however, no form of cancer which is more definitely malignant or more rapidly and certainly fatal. As just hinted, it is often very insidious in its course, and the subject may die of internal melanosis, attacking a hundred different parts, almost before he has felt alarm as to the primary one. I have several times found after death the patient's liver and other viscera most extensively affected within a few months after his first application for treatment.

Occasionally the primary growth of melanosis remains throughout so small that it never gains the patient's attention, and has to be carefully sought for by the surgeon. This is especially likely to happen when the toes and fingers are attacked or when it occurs in the substance of a mole. In these positions it is often not a pure melanosis, but coloured and uncoloured portions of growth are met with together in the same mass, and in these cases disease of the glands is common, and is often the first ailment noticed by the patient. Whenever large malignant masses are met with in the glands of Scarpa's triangle without obvious primary cause, the skin of the toes should be carefully examined and the probable result will be the discovery of a small melanotic mole.

Figure VII in the plate shows melanosis of the skin of the toes, and with extremely little tendency to ulcerate or to grow. It existed simply as a thin layer of black structure, infiltrating the skin and here and there superficially ulcerated. There was exceedingly little of what is popularly regarded as cancerous-looking about it; and concealed, as the conditions at first were, it needed a good washing and very careful inspection of the part before the diagnosis could be made out. The patient was a healthy man of about forty, who came up from the country and was under my care in the London Hospital. I amputated part of his foot and he returned home well; whether or not he remained so I have not been able to ascertain. This sketch, however, by no means illustrates the most

inconspicuous forms of melanosis. I have seen it more than once as little black stains or minute patches about the root of the nail, which looked, at first sight, just like those due to nitrate of silver, and of which the true nature only became suspected after attempts to remove them by washing and scraping the epidermis had failed.

Sometimes, with small growths of the character just adverted to under the nail-edge, the nail may inflame and loosen, and in conditions produced by the paronychia the true character of the original disease may be lost, or it may, perhaps, be that the stages are reversed and that an inflammation of the nail-bed precedes and excites the malignant growth. One of these, and probably the former, occurred in the subject of Fig. VI. It was not until some time after the nail had been detached that I recognised the true character of the disease. The patient was a woman a little past middle age, who was under my care in the Metropolitan Free Hospital. I amputated the toe and subsequently removed some glands in the lower parts of Scarpa's triangle, but she eventually died of a recurrence in the glands higher up. It was not a pure melanosis, but an example of soft cancer with portions of pigmented growth interspersed.

The case will be found in detail in the 'Transactions of the Pathological Society,' vol. viii, p. 404. The following is an abstract:

M. D—, an Irish charwoman, about 60, was under care during a great part of 1855 for an ulcer following an ungual whitlow of many months' duration, the original trouble having been begun by wearing a tight boot. Various ointments locally, and iodide of potassium internally, did no good. In February, 1857, she came again, with the condition here shown. The toe was greatly enlarged, and some suspicious bossy masses of induration were present; one of them was ulcerated. There was no attempt to reproduce the nail, nor any indication of healing; the parts were very painful. At about the middle of the thigh, just over the vessels, I found a softish mass about the size of a small apple, movable both on the deeper parts and the skin; the seat of this lump was exactly that at which, with primary melanosis of some part of the foot, I have several times seen the first glandular enlargement occur. The glands in the groin were not enlarged.

I amputated the toe and removed the enlarged glands in the thigh. The subcutaneous tissues about the sore on the toe were infiltrated with melanotic and medullary cancer, some parts being quite black, others colourless; the diseased glands were wholly melanotic, and in parts had softened and contained a thick black fluid. In *October* (eight months later) I operated again for a recurrence of disease in the groin; the growth, however, again recurred and proved fatal. The foot remained soundly healed after the amputation, but two small nodules of melanotic growth had formed near the cicatrix at the time of the operation in the groin.

In Figures III and IV we have another example of the mixed form, or rather, perhaps, of a partially pigmented medullary sar-

coma. In this instance the growth originated in the choroid, and at the time of removal of the eyeball it had perforated the sclerotic, and a considerable mass, as shown in the sketch, had developed externally to that structure. This mixed form is much more frequent in the eyeball than true melanosis, but I have met with the latter on several occasions.

Mrs. F— was 46 years of age when she came to Moorfields on *September* 4, 1862, with a cataract in the affected eye; it was supposed to be secondary to chronic glaucoma, and on *September* 25*th* iridectomy was performed. The eye had begun to fail two years before her admission, the earliest symptom having been pain across the forehead. On *January* 21, 1863, her symptoms continuing unrelieved, the eye was excised, and the condition depicted in the plate was found. It was then noted that her aspect had not suggested cancer to any who had seen her, and that she did not consider that she had materially lost flesh of late, but that her friends had told her she looked ill. She had dark hair and grey irides. On *November* 27*th* of the same year I removed numerous nodules of recurring melanotic growth from the orbit. These were scattered like small black spots in the cellular tissue and fat. She had been quite unaware of their presence, as the conjunctiva was soundly healed. Although she had been charged to present herself for inspection from time to time, she had, believing herself quite well, failed to do so, and I had to write to her to bring her up. I then noticed a little black spot just under the conjunctiva, but on excising it I found that the soft parts behind contained hundreds such. I had to clear the orbit completely.

Subsequently I had reason to fear that there were some nodules in the liver, but I lost sight of the patient, and do not know how long she lived.

The case illustrates well the deceptive resemblance to chronic glaucoma sometimes assumed by eyes in the comparatively early stages of melanotic growth, and the importance of advising excision of the globe in all cases where such a cause of the symptoms is probable, *viz.* in cases of long-standing glaucoma of one eye only, with opacity of the media and loss or all but complete loss of sight. The specimen is also useful as showing the proneness of intra-ocular cancers to grow outwards long before the eyeball is filled, and without the occurrence of any thinning or alteration of the sclerotic visible to the unaided eye. It may be stated, with reference to malignant tumours of the choroid, whether pigmented or not, that extension through the sclerotic may occur at any stage of the growth, and that it may indeed constitute by far the larger part of the entire growth, the strictly intra-ocular portion being sometimes no more than a general thickening of a certain part of the choroid, even though there may be a large tumour corresponding to it external to the globe.

Figures I and II show an example of true melanosis; and the abrupt limitations of the black growth, its cellular capsule, and its entire freedom from ulceration, are well seen. Figure II is the tumour cut across after excision. The operation consisted in dissecting freely away the ala of nose and adjacent parts of cheek. The patient was an elderly man. He recovered well from the operation, but from what we know of the nature of the disease I did not expect he would remain long free from manifestation of internal disease. It is rare that a primary tuber of melanosis attains the

size shown in this figure without absorption and internal contamination having already occurred.

Robert A. W—, æt. 68. The history of its origin was not quite clear; he stated that a small black patch or spot had been present for many years, and he attributed it to injury by a splinter of gun-cap whilst shooting, but of this occurrence there was no good evidence. It slowly increased, and in 1868 he applied at the Hospital for Skin Diseases; unfortunately I have been unable to find any notes of the case, but the patient, a very intelligent man, believed that the disease was then called "rodent ulcer of the nose." In *January*, 1872, he again came to the Skin Hospital with the condition represented in the plate, the right ala nasi being occupied by a black, firm, nearly spherical tumour, the size of a large grape, projecting equally inwards and outwards. It was entirely covered by thinned skin and mucous membrane, and nowhere ulcerated; on its outer surface were the enlarged orifices of sebaceous glands, flattened out and plugged by dirty inspissated secretion. No enlarged lymphatics were detected, nor was there any evidence of secondary growths. He was a robust, healthy old man, with brown-grey hair; he did not know of any cases of malignant disease amongst his relatives.

The growth was freely removed by the knife, and after a severe attack of erysipelas of the face and scalp he made a good recovery.

I heard from him in August (seven months after the operation), and he was then apprehensive of another growth "near the eye." I did not see him again, but I learnt two years later that he had recently died of strangulated hernia, having had no certain evidence of recurrence of the disease.

Microscopical examination of the tumour showed that it was a sarcoma composed of rather large cells, which were at first colourless and afterwards became highly pigmented. The prevailing forms were fusiform and spindle-shaped, the cells being arranged, as usual, in fasciculi interlacing with one another in various directions; many of the cells, however, were more or less spherical, and in parts these were arranged in groups, showing a tendency to the alveolar structure. The morbid growth had extended by infiltration into the papillæ of the skin immediately adjoining the tumour, and could readily be traced from base to apex of the papillæ by the presence of scattered pigmented cells. These cells, and also numerous unpigmented ones, were present in the tissue immediately beneath the cells of the rete mucosum, but there was no evidence in any part that the epithelial layer had had any share in their origin; both the tumour itself and the neighbouring infected papillæ were covered by a uniform layer of healthy epidermis, the transition from which to the diseased connective tissue beneath was as abrupt as possible. In regard to the origin of the pigment it may be noted that the growth did not contain many blood-vessels, nor were there any extravasations. In one of the minute vessels of an infected papilla a flattish pigmented cell was lying, which appeared to have been just separated from its inner surface, but with this exception no evidence was seen of the commencement of pigmentation in the endothelium of the vessels. All the pigment was within the cells; none lay free between them. The examination was made for me by Mr. Nettleship.

An example of melanosis, not very dissimilar from this last, occurred in the foot of an elderly woman who was sent to me by my colleague Dr. Herbert Davies, and whom I subsequently attended with Dr. Butler, of Woolwich. In this case the growth was as large as an egg, and apparently abruptly circumscribed. It had passed a stage further than that shown in Fig. I. The skin had inflamed and given way. A considerable part of the new

growth was in a state of gangrene. As the patient was elderly and in feeble health, I preferred to attempt a local destruction of the growth by chloride of zinc* to amputation of the limb. It will be seen that the proneness to infection of the internal organs at an early stage in melanosis is a reason for unwillingness to advise dangerous operations, since it is very probable that if primarily successful the patient may yet not enjoy any long period of immunity. The freedom from gland disease which in many other forms of cancer justifies a hope that the disease is as yet confined to the primary growth counts for nothing in melanosis.

In Figure V is shown the appearance of a melanotic mole which had recently taken on growth. The patient was a young man, in whose lower eyelid two small brown moles had been present from very early life. Of these the outer one remained quiet and exemplifies the state in which both were originally, but the other had during the last year grown considerably and become blacker. I excised both freely and I believe he had no return.

The *diagnosis* of melanosis can seldom be very difficult if the surgeon be well experienced as to the features which it assumes and how slightly marked these features may sometimes be. It needs but a careful scrutiny of the part. If there is any doubt, radical measures should be adopted, for it is not a disease to temporise with. It is impossible to exaggerate the importance of early and adequate operations.

As regards *treatment* there is but one efficient measure, and that is free excision of the growth or amputation of the part involved. It is but seldom that amputation of any important part is required, since, as it usually begins in skin in the early stages, excision will suffice, and in the more advanced ones no operation will be of use. I have already alluded to the influence which knowledge of the fact that the internal viscera are early affected should have in dissuading us from any measure involving much risk to life.

The prognosis is, of course, always grave, but I have known several patients live for periods of three, four, or even six years after the removal of the eye for melanosis of the choroid. I do not know for certain the final result of any of the cases in which I have operated for melanosis of the skin excepting that in two, one of the finger and the other of the toe (the subject of Fig. VI), the patients died within the year with glandular and internal disease.

* After two free applications of the chloride of zinc paste, this patient got quite well. The wound, Dr. Butler informs me, healed perfectly.

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PLATE VII.

HYDROCELE OF THE NECK.

(Two Portraits from different subjects.)

A GREAT variety of tumours are met with in childhood which are more or less cystic, and at all periods of life the root of the neck is liable to be the seat of cystic tumours presenting more or less peculiarity.

The tumour which is illustrated by the two portraits in this plate is that to which the appropriate name of Hydrocele of the Neck has been given. It is, I believe, almost peculiar to this region and to infantile periods of life. It differs from the other forms of cystic tumours met with in infants in its proneness to attain a very large size, and in the fact that it is almost purely cystic and contains as a rule very little solid inter-cystic growth. These features of difference, although well marked, are only matters of degree; for in other regions we meet with tumours in which the cysts may be of considerable size, and in which very much the same tendencies as regards growth and possible spontaneous disappearance are observed. We also, in adult life, occasionally encounter cystic tumours which are believed not to have been present in infancy, and which in position closely resemble these now illustrated. At later periods of life, however, the cysts never attain anything like the size often met with in infancy. There can, I think, be little doubt that there is some anatomical structure deeply placed in the root of the neck which is the site of these peculiar tumours, and it is possible that some difference in its state at different periods of life may explain the differences which are observed in the tendencies to growth. I have thought it worth while to show two examples of the same malady in order to let it be seen how closely these cases resemble each other. In each, as is usual, the tumour springs from the root of the neck, behind the sterno-cleido-mastoid muscle. In each the

tumour consists, in main part, of a thin-walled single cyst, and has produced, by distension of the skin, a somewhat bluish tint. The subjects were both of them infants under a year old, and in both the tumour had been discovered some time after birth and had recently much increased.

It is a law which I think holds good concerning almost all congenital tumours, whether vascular, or cystic, or fibro-cystic, that they are prone, after a certain period of perhaps rather active growth, to undergo arrest and to shrivel. Sometimes an attack of inflammation with swelling precedes the shrivelling. These hydroceles of the neck frequently illustrate this law, and many thus entirely disappear without treatment. In one of the patients whose portrait is given this happened. The tumour inflamed, enlarged, and became extremely tense. It was painful, but the child was not very ill. The attack subsided and the tumour shrivelled away, and when I examined the child some months later nothing remained but loose folds of skin, beneath which was a contracted, knotted lump, quite destitute of cystic character. This child was under the care of my colleague Mr. Waren Tay. In the other case a cure resulted from tapping and injections with iodine.

I have only once witnessed an attempt at the excision of these cysts, and the result was not encouraging. The operator found that the cyst dipped deeply amongst the vessels and nerves, and passed down to the first rib and in close proximity with the pleura. Its deeper portion could not be dissected away with safety. The patient, a girl of six or eight, died afterwards of pyæmia. I have heard of similar difficulties in more than one other case in which an attempt was made to dissect out cystic tumours from the root of the neck in adults. In infants there is but little temptation to try such hazardous measures, for if the surgeon does not incline to leave the case to nature and trust to spontaneous shrivelling, he has a safe and usually an efficient alternative in the iodine injection. At one time I was in favour of letting these cysts alone, but from what I have seen of the result of iodine injection should now incline to use it at once and not allow the cyst to increase in size. Sometimes their increase is attended by inconvenience to the child and loss of health, and it always risks some deformity after cure from the redundant folds of skin. If an attack of inflammation occurs before the shrivelling it may cause much pain, and may even put the child's life in danger. These facts seem to point definitely to the propriety of early injection treatment.

I believe that in the hydrocele of the neck there is never much reason to suspect that the tumour has any association with nævus.

There is never any portion of nævus structure in the adjacent skin. In the much more common mixed cystic and solid tumours met with in other parts of the body, small portions of nævus are often present in the neighbouring skin and tend much to support the hypothesis which regards them as resulting from some intra-uterine changes in vascular tissue. This is not, however, the fact with hydrocele of the neck. When congenital tumours are met with under the lower jaw or on the cheek, although they may encroach upon the same parts as those occupied by the hydrocele, yet they never resemble it in the size of the cysts. In them the cysts are always small and multiple, and the solid structure in considerable abundance.

When cystic tumours in the root of the neck are met with in adults, I believe that they usually pass under the sterno-mastoid muscle, and present both behind and in front of it. They never, in my experience, attain the size of the infantile ones, and they not infrequently inflame and suppurate. They are exceedingly difficult of cure, and resist iodine injections most pertinaciously.

A very excellent paper on these tumours and their allies, from the pen of Mr. Thomas Smith, will be found in the 'St. Bartholomew's Hospital Reports.' The cases recorded by Mr. Cæsar Hawkins in the first volume of the 'Medico-Chirurgical Transactions' appear to have been examples rather of fibro-cystic growth than of the hydrocele, and, although near to this region, none of them grew from precisely the same position as those illustrated in the portrait. There can, I think, be little doubt that the part from which the cyst originates determines its character. I possess numerous portraits from cases of congenital fibro-cystic tumours in other regions. In some of these the tumour was of large size. In some the tumour hung down the neck from the cheek or side of the jaw, as in several of Mr. Hawkins's cases. In none of these, however, although intruding on the same locality, did the growth at all parallel the true hydrocele of the neck in its cystic development. In all, the cysts were small in comparison with the amount of solid matter.

Fig. I

Fig. II

E. Burgess del. et ch.-lith.

W. West & Co. imp.

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PLATE VIII.

The two figures in this plate belong to wholly different subjects. Both of them illustrate exceedingly rare conditions of disease, and for neither of them have I been able to find any appropriate name. Fig. 1 is, I believe, an example of a very peculiar form of erysipelatous inflammation of cellular tissue attended by enormous swelling and by a tendency to ecchymosis; and Fig. 2 illustrates a form of skin disease, possibly allied to papillary psoriasis, which occurred on the hands of a man who had suffered from gout. Both cases are, so far as my own experience goes, unique, but in the collection of drawings in the Museum of the University of Christiania I was shown one which had been presented by Professor Boeck representing a condition of things almost exactly like that in Fig. 2. The two drawings are, I must repeat, wholly unconnected, and must be described in detail separately.

Fig. 1. *General Erysipelatoid Swelling, with Ecchymosis.*

The following are the particulars respecting Fig. 1.

Case of Injury to the head followed by suppuration in one ear, and subsequently by inflammatory swelling of the extremities which travelled from one part to another and was attended by ecchymosis. The following is a diary of the case to which I shall append a narrative and comments.

Aug.	17	S.	A healthy lad, æt. 18, fell backwards and struck his occiput. Was giddy, sick, and faint after it.
	18	S.	
	19	M.	Went to his office and considered himself well.
	20	Tu.	Living as usual.
	21	W.	" "
	22	Th.	" "
	23	F.	" "
	24	S.	" "
	25	S.	" "
	26	M.	" "
	27	Tu.	" "
	28	W.	" "
	29	Th.	" "

Aug.	30	F.	Living as usual.
	31	S.	Slight headache on right side of head.
Sept.	1	☉.	Increasing headache.
	2	M.	
	3	Tu.	Violent headache and pain in right ear.
	4	W.	Free discharge from right ear.
	5	Th.	Headache and discharge from the right ear continues.
	6	F.	" " " "
	7	S.	" " " "
	8	☽.	" " " "
	9	M.	" " " "
	10	T.	Both lower extremities suddenly swelled.
	11	W.	Swelling of right arm to great size.
	12	Th.	Threatened gangrene of right arm from swelling.
	13	F.	Swelling of neck and shoulder.
	14	S.	Great swelling of neck and face. Threatened suffocation.
	15	☉.	Œdema diminishing. Swelling of left arm.
	16	M.	Improving.
	17	Tu.	Rapid improvement.

He subsequently made a perfect recovery with the exception of some permanent deafness.

Narrative.—The patient, a healthy lad of 18, fell backwards on some stairs on to a bucket, and struck the back of his head and left arm. He was giddy, sick and faint immediately after, but it was believed that no serious injury had been done. There was no bleeding from ears or nose. He was out of sorts for twenty-four hours, but two days afterwards (on Monday) he returned to work and remained at it till three weeks later. He had never before had discharge from the ear or been subject to headache. Towards the latter part of the time, he began to suffer from headache; and at the end of the three weeks (on September 3rd) the pain became violent, affecting the right side of the head and right ear, his appetite failed and he shivered. Next day he seemed rather better, but there was a discharge from the ear; Mr. Mundie (formerly of Dalston) was for the first time called in. For the next week there were no other symptoms than the headache and otorrhœa; he was kept indoors, but not in bed. On the 10th, however, Mr. Mundie was sent for in great haste, and found both legs greatly swollen, red and tense, and the arms also somewhat swollen. Next day the legs had very much diminished, but the right arm was enormously swollen and the entire forearm cold and almost devoid of sensation. In the evening of this day (12th) I saw him for the first time. His aspect was not that of a person very seriously ill; his memory was clear, and he was not suffering any material headache; he had, however, been slightly delirious the night before. Tongue white in centre, reddish and dry at sides and tip; pulse rapid and feeble; still a profuse discharge of pus from right ear, and this ear almost completely deaf. The right upper extremity was enormously swollen up to the place of insertion of the deltoid, above which it suddenly ceased, the general effect being as if a broad belt had been tied round the limb at that part. The hand and forearm were cold and the skin for the most part tallowy; a large patch on the back of the forearm, however, was bluish and looked as if about to become gangrenous, but there were no bullæ. From the elbow upwards, the temperature gradually increased until over the upper part of the swelling it was decidedly hotter than natural; here also the skin was somewhat reddened. The pulse could not be felt at the wrist on account of the swelling, but the pulsation

of the brachial was perceptible to about halfway down the arm, where it became lost in the swelling; there was no tenderness along the course of the vessels. He could feel even to the finger-tips, but not perfectly; the whole arm, he said, felt numb and stiff, but he could raise it from the bed and could even move the forefinger a little. The other arm was considerably swollen, though not nearly so much, and its temperature was not less than normal. There was some swelling of both legs, but this was much less, Mr. Mundie told me, than it had been the day before. Heart sounds muffled, but no murmur.

With regard to the headache from which he began to suffer a fortnight after the accident, he described it as having been very severe and limited to the right side of the head. I could not ascertain that there had been any symptoms of paralysis of any part. There was no strabismus, and he could see equally well with either eye. He had not had any very severe rigors, but had often complained of being chilly.

Next day (13th) the right forearm was rather less swollen, and the fear of gangrene was removed. The upper arm, however, swelled much more, and the shoulder and neck became involved. Three days later, it had spread to the face, which was so swollen that the features were concealed; the swelling here had the same characters as that of the arm, œdema with pallor of skin and ecchymoses, with the additional feature of bluish vesications. The tongue and pharynx were also affected to such a degree that breathing was interfered with and he could not speak intelligibly, and tracheotomy was contemplated. As the swelling left the neck, the left arm became more involved, but did not swell very much and quickly subsided.

The portrait was taken a week after my first visit. It does not represent the state of things at their worst, for the swelling so rapidly subsided that the artist could not keep pace with it, and it had not been thought safe to let him begin till a few days had elapsed and the patient's condition become less critical. In about a week from my visit, the disease was on the decline and convalescence fairly established. The treatment had consisted chiefly in the administration of turpentine in doses of fifteen minims every four hours, and wine and beef tea as freely as he could take them. In about a month, the lad was fairly well, and after that had no relapse, but it was many weeks before the right arm was quite restored, its fingers remaining stiff and swelled; one or two of the nails came off. Two years after the illness he called on me just before sailing for China; he had grown much and was in robust health; he still, however, remained somewhat deaf in his right ear, and was liable to occasional giddiness.

At the time that it occurred, I was inclined to think that there must have been in this extraordinary case some transitory plugging of veins, but on subsequent consideration that hypothesis seems perhaps less probable than that the disease was really a form of rapidly travelling cellulitis allied to erysipelas. The way in which it travelled from limb to limb, subsiding in one as it extended to another, is exceedingly like what we observe in erysipelas of the skin. It was clear, however, that the skin in this instance was only secondarily affected, and that the swelling began in the cellular tissue. The ecchymoses and ecchymotic bullæ were not improbably the result chiefly of the extreme tension of the swollen parts, and are to be compared with the like conditions when seen on limbs swollen after fractures. The portrait gives no idea of the immense swelling which was present at an earlier stage of the case. We considered

the lad too ill to allow of a portrait being taken until some days had passed and the worst was over. The disease subsided much as an erysipelatous inflammation often does, and it did not leave any enlarged superficial veins such as are usually seen after plugging and obliteration of the main trunks.

It must be admitted that the simultaneous swelling of the two lower extremities which the notes record is a fact more in favour of plugging of the vena cava, and that the circumstance that the swelling did not begin in the head or near to the suppurating ear, but in the lower extremities, is another which is somewhat opposed to the hypothesis of erysipelas. We know nothing, however, for certain of any condition of plugging of large veins which is only transitory, and which does not result in permanent occlusion and its consequences. I am obliged, therefore, to leave the diagnosis in great doubt, with the hope, however, that the publication of the portrait and narrative may be the means of bringing to light other facts which may elucidate the subject.

Fig. 2. Anomalous Disease of Skin of Fingers, &c. (Papillary psoriasis?).

Fig. 2 represents the hand of a man on which large, solid, livid patches of induration were present. These patches occurred, as is shown, on the middle finger, in the cleft between the middle and ring fingers and on the dorsum of the hand. They were abruptly margined, a good deal elevated and smooth. Their colour was almost purple. The artist has, I am sorry to say, not been very successful in representing the peculiarities described. There were patches of very similar character, but with less thickening, on the front of the left tibia. The patient was an elderly man, apparently in good health, but who had suffered much from gout. The patches had begun to appear two years before; they remained without alteration during the twelve months that he was under treatment, and I believe up to the time of his death, six years later. The following are the details.

John W—, æt. 58, was first under my care at the Hospital for Skin Diseases in January, 1869. He came on account of a number of peculiar patches of dark purplish colour on his extremities. The following description is taken from notes written at the time:—On the fronts of his legs, some of his fingers, and on one forearm, were a number of patches consisting in the first instance of distinct tubercles, which afterwards became confluent and then lost their tubercular character. The patches were peculiar chiefly on account of their dark purple colour; this tint seemed to depend partly upon venous congestion and partly upon deposit of colouring

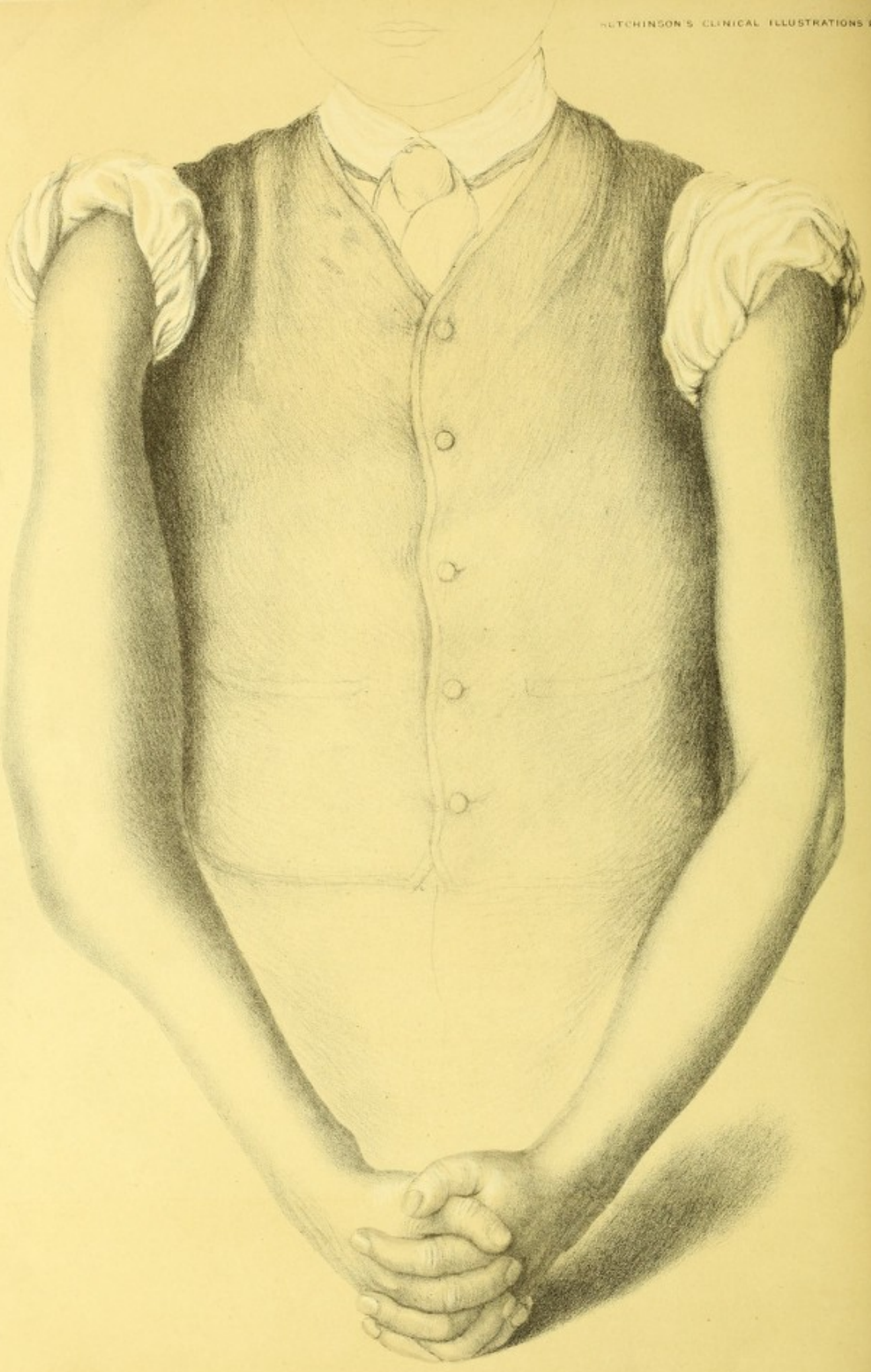
matter in the tissues, for although their margins could be made pale by pressure, no amount of squeezing altered the colour of the central parts. The patches were irregular in size and shape, distinctly raised above the general surface, their margins for the most part irregular and abruptly defined, and their surfaces smooth and almost glossy, or sometimes covered with thin dry epidermic scale. Their elevation above the surrounding skin was due in great part to œdema, for they could be made to pit by continued pressure, and in fact could be squeezed until almost all thickening disappeared. They were neither tender nor painful. The skin around them was slightly œdematous.

The patches were distributed on the whole symmetrically, but the symmetry was incomplete. There was a large patch on the front of each leg, that on the left being much the larger. Another large one was present on the back of each middle finger; on the right hand it involved nearly the whole finger, back and front, while in the left the patch occupied only the dorsum of the finger just above the knuckle. There were small separate tubercles of the same nature on the backs of the hands, but these were much more abundant on the right. On the left arm, there were two little patches, one above and the other below the elbow, whilst there were none at all on the right arm. Both hands were slightly swollen. The patient stated that the left leg was attacked first, and that the patch in that situation had been present for two years, while that on the right had existed only a couple of months. He was a stout florid man engaged at a coal-wharf and comfortably off. He was liable to attacks of gout, and considered that he had been subject to that disease for twenty-six years. From his account it seemed that he had had well-marked attacks, but that latterly they had been less severe. He was not aware that he inherited the gout. For years he had taken no beer at all, and only a little gin and water. In connection with the patches on the legs it should be stated that his veins were not markedly varicose.

He remained under care for very nearly twelve months,[1] and during that time the amount of swelling in connection with the patches diminished somewhat, but their colour remained the same. Some fresh patches appeared on the legs; a few of these were at the margins of the former ones, but others, separate ones, came at the backs of the calves, most of them being on the right, and only a single one on the left calf. He had an attack of gout in the metacarpo-phalangeal joint of his left forefinger while under treatment. No medicine had much effect on the eruption; he took at different times, colchicum and magnesia, arsenic, acid iron mixture, iodide of potassium, and simple alkaline mixture. No special local treatment was adopted, only an ointment of lead and mercury being ordered.

During a visit to Christiania in the summer of 1869, Dr. Bidenkap was kind enough to show me the collection of pathological drawings in the University Museum, and amongst these was one taken from a patient of Professor Boeck, showing a precisely similar condition of things to that delineated in my portrait. The only particulars that I could ascertain were that it was from the hand of a Swedish sailor, who appeared to be in good health, and who was not known to have suffered from gout. Professor Boeck told me that it was the only example of its kind that he had ever seen.

[1] I have learned whilst these pages have been passing through the press that this man has died within the last few weeks. From what his widow tells me, it is probable that the cause of death was bladder and kidney disease; I have not seen him for five years, and can therefore not add any further facts as to his skin malady. It is said to have persisted and to have extended. He had been under treatment for it at King's College Hospital, where his condition is said to have excited much interest.



H. Burgess del. et lith.

NODES FROM HEREDITARY SYPHILIS

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PLATE IX.

OSSEOUS NODES IN CONNECTION WITH INHERITED SYPHILIS.

The subject of this Plate has been selected in order to illustrate a common and important result of inherited syphilis, the formation of numerous osseous nodes on the long bones. In the boy whose arms are here delineated nodes were present on a majority of these bones. The portrait shows them affecting the right humerus, radius, and ulna, which are so thickened as to wholly conceal the contour of the elbow-joint. In the two lower bones the enlargement is confined to the elbow third, but in the humerus it extends over the lower two thirds, gradually tapering off above at about the insertion of the deltoid. The nodes were quite hard, and there was no tendency to suppuration. He had similar enlargements on both femurs, and on the tibia and fibula of each leg. Both arms are depicted in the portrait in order to show the natural contour of the left in contrast to the more diseased one, but on its bones also slight periosteal enlargements could be detected by the finger.

The history of the case as regards syphilis was unusually definite, for I had the boy's mother under care at the same time and long afterwards for tertiary syphilis. Her history was that she contracted syphilis during her first pregnancy. Her first child was born dead, and Charles P—, the subject of the present case, was the second. He did not present any severe symptoms in infancy, but in boyhood he was under my care at Moorfields for keratoiritis of both eyes. Subsequently, between the ages of eleven and twenty-one, we often had him as an in-patient at the London Hospital on account of disease of the liver, ascites, albuminuria, hæmaturia, and multiple nodes. A younger sister of his was also often in at the same time with nodes, one of which, on her left tibia, had ulcerated. At one time his liver was so much enlarged as to project quite visibly and to pass considerably below the level of the umbilicus. The ascites was never very considerable in amount. He was pale and very cachectic, and we repeatedly admitted him in the belief that he was about to die. After a few

weeks' rest in the hospital, however, and a course of iodide of potassium, he used to recruit and return to his work. When not in the hospital he was still usually taking the iodide. His home was a very poor one, and it is quite possible that the rest in bed and hospital food were the chief means in his restoration.

The sketch was taken when he was eleven years old. Long before his death, which took place at twenty-one, all trace of nodes had disappeared. His liver also had receded to its natural dimensions. He died with advanced disorganisation of the lungs and disease of the kidneys. He had had albuminuria, I believe, continuously for several years. During his last illness he suffered much from sickness and complained of pain and aching in his lower extremities. He had the aspect of a patient in fever. He passed very little urine: it had a specific gravity of 1010, and was so highly albuminous that nearly two thirds coagulated on boiling. At the post-mortem the liver was found in its greater part healthy, but its surface was fissured and puckered in several parts, and at the base of these fissures was a little fibroid contraction, but there were no masses of deposit nor any very definite scars. The kidneys were much atrophied, and weighed together only five and a half ounces; their surfaces were granular and mottled, and the cortical substance so thin that in some parts the tubes almost reached the capsule. There was nothing to indicate syphilitic changes, and the changes were precisely like what are seen in the granular contracted kidney.* The tibiæ were still somewhat thickened, and looked bowed forwards by deposit on their surfaces. The right elbow, although no remaining thickening of the bones could be detected, could not be extended much beyond a right angle. There was no disease of the brain or of the skull-bones.

I must not omit to mention an important fact in this case, that though the evidence of inherited syphilis was so strong and the history so clear, there was nothing in the lad's physiognomy to have suggested it, nor were his teeth in the least malformed. I used often to demonstrate these facts to my class in proof that the various peculiarities of teeth and physiognomy so common in inherited syphilis are not invariably associated with it. If a patient escapes secondary symptoms in infancy, he will probably escape the malformations which so often betray the disease in after-life. If stomatitis have been absent in infancy the teeth will not be malformed. A great many cases are seen like the present in which,

* For the record of the post-mortem I am indebted to Dr. Sutton, my colleague at the London Hospital, and Pathological Demonstrator.

although the patients suffer severely from inherited syphilis, the teeth are perfect in form.

It is interesting to note that his younger sister had typically malformed teeth. It may be of interest to append a few additional facts as to this patient's family as illustrating the laws of inherited syphilis. It will be seen that the inheritance was from both parents.

The husband gave his wife sores during her first pregnancy. She had no treatment, and about ten years later she was suffering from nodes on the shin, and it is noted that she had lost one eye from syphilitic inflammation of vitreous and secondary cataract.

The children were as follows:

1. (Male.) Born dead at full time.

2. (Male.) Charles P—, under care at various times between æt. 11 and 21; at first for large nodes on arms (sketched) and enlarged liver; subsequently for phthisis and albuminuria, of which he died at æt. 21. He had kerato-iritis of each eye in boyhood.

3. (Female.) Died at 8 months, much wasted, and with sores at anus.

4. A cross birth; died in delivery by instruments.

5. (Female.) Under care at æt. $4\frac{1}{2}$ years for large nodes on radius and tibia. About same time had severe double keratitis. Temporary incisors very bad; permanent upper centrals typical at æt. 7. Bridge of nose sunken.

6. (Male.) Reported healthy at æt. 3 years.

7. (Female.) At æt. 1 month "psoriasis" in spots all over skin and much hoarseness. Under care, and treated by mercury.

In reference to the subject of disease of the bones in syphilis I may remark that I believe it is far commoner than is generally supposed. In M. Diday's excellent work I find to my astonishment the statement that "affections of the bones are so rare in children with inherited syphilis that the annals of medicine scarcely offer five or six well-authenticated examples of caries or periostitis." So different has been my own experience from this, that I may say we are scarcely ever without a severe example of it in the wards of the London Hospital. The cases present some remarkable differences from the periostitis of acquired syphilis. The latter is rarely symmetrical, not often multiple, and attacks the skull, clavicle, and tibia by preference. The nodes of inherited syphilis, on the contrary, are very seldom met with on the skull or clavicle, and are almost as common on the bones of the upper as of the lower extremity. They are almost invariably multiple, and very often symmetrical. They are by no means attended by the severe nocturnal pains which are

common in those who acquire syphilis, nor are they, as a rule, very definitely influenced by the iodide of potassium.

A very remarkable feature, and one which is illustrated by the case just quoted, is, that after having lasted for a certain time they disappear spontaneously, and as they are sometimes of very large size this feature is very noticeable. When once absorption has begun it seems to progress steadily, quite irrespective of treatment, just in the same sort of way as the cornea clears after severe syphilitic keratitis. They are not unfrequently of such large size that they might easily be mistaken for malignant disease. I well recollect one as large as an adult fist on the femur of a child, which caused us great difficulty in reference to this diagnosis. Finally, after having persisted in spite of treatment for some months, it underwent spontaneous and almost complete absorption. A few months later another similar one formed on the opposite femur, and went through a similar course.

On the tibiæ it is not uncommon to find deposits of new bone covering almost the whole front surface, and causing an appearance of bowing forwards which is often mistaken for rickets. It is, I think, between the ages of eight and fourteen that the multiple nodes of inherited syphilis are most common. There is in the Musée Dupuytren, at Paris, a skeleton which shows the osseous framework of nodes on almost all the long bones. I have little doubt that it is from a patient who was the subject of inherited syphilis, and not the result of the acquired disease. In our own Museum there are several single bones which present similar conditions, and to which I should attach a like suspicion, for multiple nodes in association with the acquired disease are, I may repeat, by no means common. It is just possible, however, that the specific efficacy of iodide of potassium against all forms of tertiary syphilis from the acquired taint, and especially against periostitis, and its comparative uselessness in the similar diseases due to inherited taint may explain this difference. We know nothing of nodes from acquired disease as our forefathers knew them before the iodide came into use. But the nodes of inherited disease maintain their severity of type, for against them the iodide is comparatively inert.

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PLATE X.

CHEIRO-POMPHOLYX.

It is not my intention in the present work to undertake the illustration of skin diseases, but I shall nevertheless introduce a few portraits which display symptoms on the skin of an unusual character.

In the present instance our portrait shows a condition which has, I believe, never before been represented, and of which I am not sure that any correct clinical description has been given. It is an exaggerated example, being indeed one of the most severe and typical that I have ever seen, but as such it is the more instructive.

The patient, whose hands are here shown, is a lady of about fifty years of age, single, who has been subject, from the age of twenty onwards, to a great variety of ailments, which have chiefly had reference to her nervous system. It has often been suspected that part of her disorders were feigned, so strongly marked has been her craving for sympathy, and so wayward and peculiar her temperament. She has been at different times under the care of some of the most distinguished London physicians. One of these, whom she had consulted at my wish, wrote to me, after a careful examination, that he could discover no real malady, and that the case was, he considered, "a disease of the *ego*." At this time the lady was extremely thin, painfully restless, and complained of hyperæsthesia of the skin, which she said prevented her from either sitting or lying long in one position, and even from resting her arm on the table. She appeared extremely sensitive to the influence of climate, and was constantly wearying her friends with complaints as to the ill-effect of different places of residence. Her appetite was very small, and had indeed at one time been reduced so much that her relatives suspected her of obtaining food privately. Thus it will be seen that most of her symptoms were of the subjective class, and that they were of a character which might well suggest a fear that the case might end in insanity. A great variety of remedies were tried from time to time, but none produced any

material benefit. Miss G—, however, was always better during hot and dry weather; the hotter it was the better she liked it.

The chief amongst the symptoms which always made me think that Miss G—'s complaints, although undoubtedly nervous, were real and in nowise feigned, was a liability to attacks of eruption on the hands. At first these attacks would occur at intervals of a year or two, but subsequently they became more frequent. She did not live in London and I saw her but seldom, and it was not until twelve years after the first attack that I had an opportunity of seeing the hands myself. The attacks had for the most part been much of the same character, although varying in degree of severity, and they had been especially peculiar in this, that the eruption had always disappeared spontaneously. The bullæ, I was informed, however large, almost always dried up without bursting. Nothing had been observed in connection with the first attack which threw any light on the cause. Miss G— stated that she usually experienced, as premonitory symptoms, a general sense of increased discomfort, as burning of the hands and feet; next, with great burning and itching and sense of stiffness, a number of deeply placed little blebs would show themselves by the sides of the fingers; in a few days these would coalesce, and enormous bullæ, such as those shown in the portrait, would result. These looked much as if the fingers had been blistered with some vesicating fluid. Indeed, so great had been the similarity to ordinary blisters, that I was asked by the patient's friends whether I thought it possible that she produced the eruption intentionally. With the bulbous eruption on the hands there usually occurred a red lichenous rash over the whole body, which varied much in colour at different parts of the day, and which, although it never caused vesicles, was always followed by desquamation. The feet were always affected in some slight degree, and vesicles occasionally showed themselves on them.

I first saw the eruption in consultation with Dr. Ransom and Dr. Higginbottom, of Nottingham, where the lady was then staying. Dr. Ransom had seen several attacks, and was able to foretell their course and duration. As a suspicion had been raised as to the *bonâ fide* character of the eruption, I proposed, quite unexpectedly to the patient, that we should examine her feet, and on doing so we found between the toes a number of small vesicles, which were arranged with perfect symmetry. Thus, I think, we may consider it perfectly certain that the eruption was not an artificial product. The sketch was taken by Mr. Burgess on the following day, the eruption being then at its height, and having existed about a week. It soon afterwards disappeared, just as on former occasions, with

peeling of the skin, but without the slightest tendency to ulcerate, scab, or pass into an eczematous condition. Six years later I had another opportunity of watching the eruption through its whole course, but on this occasion it was not nearly so abundant. It should be added that the eruption is sometimes attended by follicular sores in the mouth. It is never at its height for more than a few days; and however severe it may have been, in the course of three weeks afterwards the hands are usually restored to their natural condition. The nails, as might be expected, usually show for some time afterwards deep transverse furrows.

In 1869 Miss G— had a fever and was very ill. After it, for six months, her health was unusually good. At Christmas, 1870, she had a somewhat severe attack of the eruption. It did not come out quite so freely as usual, and after it her health did not, as had usually been the case, show any marked improvement. She remained through the first two months of that year still feeling ill and uncomfortable; and in March, whilst staying in London, another attack of the eruption on the hands occurred. It lasted about ten days, and, as had been previously noticed, the thumb, index and middle fingers were much more severely affected than the two ulnar ones. The little finger was indeed almost exempt. During this attack Miss G— was seen by Dr. Tilbury Fox.

Miss G— has never had rheumatism, and it may be noted as an interesting point that she is not liable to catarrh, and to use her own expression, "does not know what a cold in the head is." She has recently passed through a severe and almost fatal attack of pleurisy with effusion.

Although I have thought it worth while to record in detail the particulars of the case from which the portrait was taken, I do not in the least believe that the case is unique or even very rare. It is rather a very severe example of what in minor degrees is tolerably common. Many, indeed, perhaps most of us, are liable at times in connection with slight derangements of health, or possibly with exposure to the sun, to the occurrence of a very irritable sago-grain eruption on the sides of the fingers. The so-called sago-grains are deeply placed effusions of serum, but in a large majority of cases they undergo spontaneous absorption after a few days, and not even peeling of the epidermis results. They never by any chance result in eczema. In those liable to it this slight affection is prone to occur repeatedly at intervals perhaps of a few years. More severe cases in which the vesicles coalesce and develop into bullæ are not very uncommon, their subjects being, so far as my experience has gone, almost invariably young women.

In several of the most severe cases which I have witnessed the eruption was attended by extreme depression of spirits, and in one this condition had been such as to lead the parents to fear insanity. Although the eruption always shows a tendency to spontaneous disappearance, yet its duration is by no means always so short as in the case just narrated, and in some instances it may last for a couple of months and require treatment. In the case of a married woman who was under my care in 1867, the liability to attacks had extended over thirty years, and no other parts than the hands had ever been affected. In her case the vesications always broke, and a state much resembling that known as psoriasis palmaris resulted in the palms, whilst on the sides of the fingers it looked more like eczema. She was the mother of a large family, and had not observed that her attacks were in any way connected either with lactation or pregnancy, but she complained that she was always low spirited before they appeared. This case is exceptional to the general rule, since most of my patients have been unmarried.

The eruption is, I believe, always symmetrical, and only in the more severe cases affects the feet, whilst in a few of the most severe of all it is attended by a general red lichen rash. I have seen it occur with the latter about a fortnight after childbirth in a lady who was in good health and who had no other ailment. The eruption on the hands never passed beyond the sago-grain stage, but was very copious. At the time that it appeared belladonna was being applied very liberally to the breasts, and the suspicion crossed my mind that it might possibly be in connection with this, but there were no other symptoms of belladonna poisoning.

There can, I think, be no doubt that this eruption is a neurosis, its tendency to spontaneous cure and its frequent coincidence with other nervous symptoms being of considerable weight in that direction. This suspicion, however, by no means excludes the possibility of the nerve disturbance being in its turn due to some drug or article of food inadvertently taken. The probability, however, seems rather in favour of its being a catarrhal affection. I have preferred to name it from its most prominent symptom, but without in the least intending to imply a relationship to true pemphigus.

Fig. I.

Fig. II.

Fig. III.

Fig. IV.

Fig. V.

Fig. VI.

E. Burgess, del. lith. et imp.

W.W. & C.

DEFECTIVE DEVELOPMENT OF TEETH (MERCURY?)

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PLATE XI.

MERCURIAL TEETH.

I PUBLISH this Plate and connect with it the above title because I wish to attract attention strongly to the frequency with which mercurial stomatitis in infancy produces malformations of the permanent teeth. It is by no means intended to imply that mercury is the only cause under the influence of which stomatitis may occur which will result in peculiarities in the teeth, though it is, I believe, by very far the most frequent and most important. The term *Stomatitis teeth* would in some ways be preferable as being more inclusive, but I doubt whether on the whole it would prove so convenient. The result of careful and long-continued inquiry on the subject has been to make me believe more and more strongly in mercury as the almost invariable cause of malformations of the kind I am about to describe whenever they are present in a well-marked and severe degree. The stomatitis of thrush may, perhaps, in some cases cause almost a similar state, but compared with mercury it is an insignificant influence. It seems better, then, at once to call them "Mercurial teeth," with the full admission that now and then other causes may compete with the chief one.

The belief that mercury may damage the teeth is, of course, one which is old and widely spread, but I believe I am correct in stating that it has never been reduced to any very definite shape. The question as to whether its results are to be expected in the first or second set has, I think, never been discussed, nor have the peculiarities of the malformations been described. At the present time, when teeth peculiarities are so constantly employed as means for the recognition of inherited syphilis, it is especially desirable to be precise as regards all other states which might be confounded with them. The duty of helping in this matter, if I can, devolves, perhaps, more particularly upon myself, since I am well aware that, in consequence of my having drawn attention to the value of the syphilitic teeth, many erroneous diagnoses have been made. It is of the utmost importance for all who value accuracy in this

matter to know the difference between syphilitic and mercurial malformations.

The defects produced by mercury concern chiefly the enamel, although they may, when severe, affect the dentine also. The enamel is usually deficient, and the surface of the tooth is in varying degrees rugged, pitted, and dirty. The incisors and canines are usually affected, and not unfrequently we see the enamel deficient on them all below a line which crosses them at the same level. The appearance produced is much as if a line had been stretched horizontally across these teeth at about their middle (see Fig. I). Sometimes only the incisors are involved and the canines escape. A very remarkable point to be observed in sets of mercurial teeth is that the præmolars escape all damage. Very rarely, indeed, is any defect of enamel to be observed in them. This fact is shown in Figs. III and IV of the Plate, but not so definitely as is often witnessed. Whilst thus the bicuspids escape, the first molar is almost invariably affected; I am speaking, of course, of the permanent set only. Whilst the middle upper incisors are the test teeth of syphilis, it is to the first molars of both upper and lower jaw that we must accord this rank in reference to mercury. Their peculiarities are well shown in Figs. III, IV, V, and VI of the Plate. On the surface of the crown of the tooth the enamel is deficient, and the dentine grows through, presenting a number of discoloured tubercles or spines. Sometimes the whole of the surface is thus involved (Fig. III), and sometimes only a central area, as in Figs. IV, V, and VI. It is to these teeth that attention should be especially directed when there is any question as to the recognition of former mercurial influence. The explanation as to why they suffer when the præmolars escape is probably to be found in the fact of their earlier development. It is probably due to this frequent deficiency of enamel that these teeth are, as is well known to dentists, the first in the mouth to suffer from caries. In addition to the deficiencies of enamel and dirty pitted exterior which have been described, we sometimes find in severe cases that the whole tooth is dwarfed (see Figs. III and VI). The characteristic notch in the upper central incisors, which constitutes the test as to inherited syphilis, is, I believe, never materially simulated by mercurial conditions. It is, as might be expected, very common to meet with the results of both syphilis and mercury in the same mouth, and hence much of the confusion which has occurred. In Figs. II and IV this complication is illustrated; in each the two upper central incisors are characteristically notched, but in addition to the notch their surfaces are pitted and discoloured. In each

case other teeth, and in Fig. IV the anterior molars especially, show the mercurial influence. It is not uncommon, however, to see syphilitic sets which are wholly exempt from the influence of mercury, and in these the enamel is sometimes almost perfect. Mercurial teeth are very apt to be coated with tartar, a condition probably depending in part upon their uneven surfaces and in part upon derangement of function of the salivary glands.

Fig. I shows the front teeth of Arthur B—, æt. 16. He has lamellar cataracts, and teeth which show in a very marked degree the defects which, I think, are due to the use of mercury in early life.

He was a small infant, and at a year old had cut no teeth, when he began to suffer very severely from fits. "The doctor said they were fits which nothing but calomel would cure, and that often it would not." He accordingly took many powders during the period of his liability to convulsions, which extended over the second year of life. When two years old he had cut several teeth, but they were broken and bad.

The present state of his permanent teeth is so characteristic as to deserve more detailed description. The change about to be mentioned affects all the incisors, canines, and first molars of both upper and lower jaws, the bicuspids being scarcely implicated at all; the second molars also are quite healthy. In the first molars the alteration consists of deficiency of enamel on the upper surface of the crown and the presence of spines of uncovered dentine. In the case of the incisors a considerable portion of the crown of each tooth is totally devoid of enamel, and its dentine is also deficient to some extent, so that the teeth are thin, sharp-edged, and of a dirty yellowish colour. The transition from the enamel-covered to the diseased part occurs suddenly in a horizontal line at some little distance from the crown of each tooth; the position of this line or step being in each tooth nearly at the same distance from the gum, the general effect when all the teeth are seen together is as if a string had been tied round them when soft and the distal part had withered. This effect is particularly noticeable in the lower incisors. The canines show a similarly constricted and denuded (apparently withered) point. All the incisors and canines are also stunted.

When the patient was six years old he fell from the top to the bottom of the stairs and had a severe illness for a month, followed a month or two later (?) by loss of sight, probably optic neuritis. His eyes oscillate, and his sight is extremely defective. The cataracts had not been found out until he came to me, and were then too

dense to allow of my seeing the optic discs. After operating on one eye (the right) I found that the disc was highly atrophied and the retinal vessels somewhat diminished. Vision was, of course, not much improved by the operation.

Fig. II. The front teeth of both jaws of a woman, æt. 28, Susan H—, showing both the deficiency of enamel, due in all probability to mercury given in infancy, and the malformation (notching of the central upper permanent incisors) caused by inherited syphilis.

It will be observed that the mercurial change is more extensive on the central upper incisors, the same teeth that are affected by syphilitic stomatitis.

Fig. III. The teeth of the lower jaw of Edith M—, æt. 9, showing a much diseased condition of the incisors, canines, and first molars; the bicuspids are perfectly healthy.

In the first molars the enamel is quite wanting from the upper surfaces and about the upper half of the sides of the tooth. The exposed dentine is discoloured and rough, and the cusps of the teeth unusually sharp and prominent. The lower part of the sides of the tooth (*i. e.* the part nearest the gum and the last to rise above it) is covered with healthy enamel, and the transition from the healthy to the diseased surface is abrupt. In the case of the incisors and canines the whole or almost the whole of the body of each tooth is almost devoid of enamel, and the dentine discoloured and pitted. In the upper jaw the same conditions were present, but the central incisors had suffered much more than the lateral ones.

The patient has lamellar cataracts. It is not known whether she took mercury in infancy, as the person who nursed her in infancy cannot be seen. She is rather stunted, and her thyroid gland is large, but she seems healthy. Her eldest sister has a large bronchocele.

Fig. V. Permanent teeth of the lower jaw of James A—, æt. 23 (F. 312). He was the subject of lamellar cataracts, which have been removed by operation. He had fits in early infancy, but there are no facts to be obtained as to whether he took mercury.

The chief peculiarity of the teeth is seen in his first molars, all three of which (one has been lost by caries) show precisely the same defect of development. On the upper surface of the tooth the enamel is deficient, and an area is abruptly mapped out on which the dentine is exposed. This area includes almost the entire surface, but it will be noticed that it is subdivided into smaller patches by lines of enamel, which run from the centre to the circumference of the

crown and occupy the grooves between the cusps ; the cusps themselves are the parts devoid of enamel. The sides of the tooth and the margins of its surface are covered with enamel and look quite healthy. The bicuspids and the second and third molars are natural. The canines and incisors, however, all show a surface which looks as if it had been somewhat worn, the dentine being more or less exposed and discoloured ; this is least marked on the lateral incisors (these minutiæ as regards the incisors and canines are not well brought out in the figure). The upper central incisors were also suspicious, though by no means characteristic of hereditary syphilis.

The patient is the second born and only survivor of three children ; the eldest was killed at æt. 2 years, and the third died in infancy. He is of short stature, has a long narrow face and nose, speaks thickly, and, although very musical, his intellect is somewhat defective. He regained enough sight after the operation to work at box-making, but the disc of one eye was found two years after the operation to be somewhat grey and waxy looking, and there was an opacity in the vitreous.

Figs. IV and VI represent the upper and lower teeth respectively of Edward G—, æt. 11, again illustrating the coincidence of the mercurial and syphilitic dental changes.

All the four first molars (the test teeth as regards the changes due to mercury) show a complete absence of enamel from their upper surfaces ; but the sides of the teeth are fully clothed with healthy enamel. The incisors, which are not all fully up, show in a rather slight degree the mercurial change, their surface being somewhat discoloured and pitted. The central upper incisors also exhibit the syphilitic deformity. A central notch (at present ill-marked) and screw-driver outline, both changes being accounted for by the defective development of the middle lobe of the tooth, which will presently, perhaps, break away and leave a deep, characteristic notch.

The canines are not yet up. The two carious milk molars on one side of the upper jaw are of no diagnostic value. It will be seen that the bicuspids on the other side of the same jaw are quite healthy.

Fig. I.

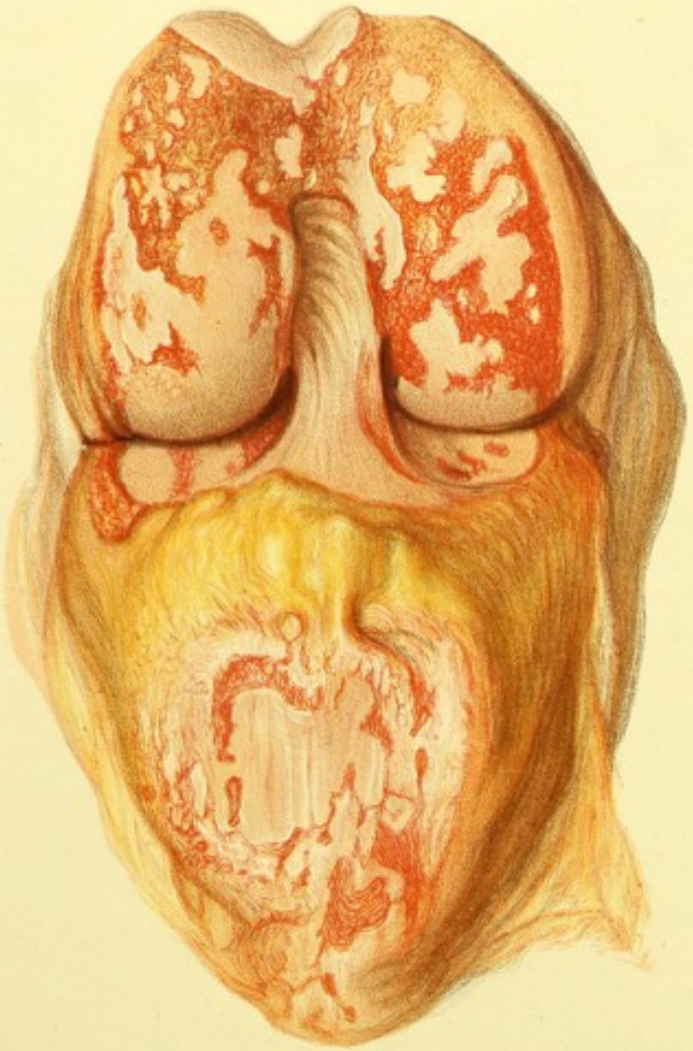
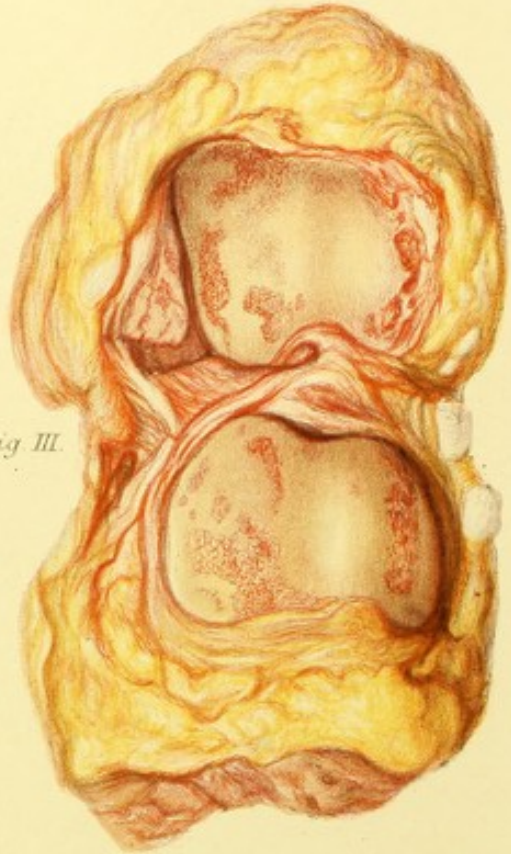


Fig. II.

Fig. III.



CHRONIC RHEUMATIC ARTHRITIS, WITH GENERAL ABSORPTION OF CARTILAGE.

Figs. II & III. (TREETON'S Case) Fig. I. (Dr. GOLDIE'S Patient)

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E. Burgess ch. Sth. Sd. eat.

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PLATE XII.

CHRONIC ULCERATIVE RHEUMATIC ARTHRITIS ("CRIPPLING RHEUMATISM").

The changes which are characteristic of what is known as *arthritis deformans*, or chronic rheumatism, have long been well recognised. Specimens illustrating the eburnation of the articular surfaces, the growth of lips from the margins of the bone, the production of fringed and pedunculated processes from the synovial membrane, and in severe cases the remarkable alterations in the contour of the bone itself, abound in all museums. It would appear to have been taken for granted until quite recently that such changes occur in greater or less degree in all cases of what is known as rheumatic gout. So far, however, I believe, is this from being the fact, that in the majority of the more severe forms of rheumatic gout they are wholly absent. I allude to a class of cases in which a large number of the joints are affected at the same time, and in which, more especially, the smaller joints of the hands and feet are prone to suffer. In these cases usually the disease is subacute, at its onset is attended with a good deal of swelling about the affected joints and persists for many years. Although the other has earned the epithet of "deformans," this is especially the crippling kind of rheumatism. The one produces remarkable deformity of single joints, but this stiffens them all. It is productive, as might be expected from its general character, of far more constitutional disturbance than its congener, and whilst the latter but seldom interferes much with the patient's health, this often kills. Whilst the true arthritis deformans shows a marked preference for the senile period, this may occur at any age, and its most severe examples are often met with before middle life. It is prone to attack women, and may occur in connection with disordered menstruation or at the climacteric period. It occurs often in the relatives of those who have suffered from gout, although it is by no means always that any history of a family tendency in that direction can be obtained.

It happens curiously that the form of rheumatic gout just

described has been scarcely distinguished by authors, and but little attention has been given to its pathological anatomy. Very often partial dislocations of the joints involved are produced, and the consequent deformity has been mistaken for alteration in form of the articular ends of the bones, and thus it has been assumed that the changes were similar in character to those met with in the other forms. We must remember, also, that it is not very often that the surgeon has the opportunity of opening the joints of the hands or feet. My own attention was first drawn to the peculiar conditions which occur in this form of rheumatism by the dissection of a limb which had been removed by amputation, and which furnishes the subject of some of the illustrations in the Plate. In this case all the joints without exception showed similar conditions, viz. local ulceration of cartilage producing deep abruptly margined pits without the slightest tendency to suppuration, and with but slight evidences of what might be called inflammatory action. In many of the joints there was a small quantity of thin synovial fluid, not unfrequently blood-stained; and the synovial membrane, although not materially thickened, showed many delicate bridles of false membrane. Nowhere was there any tendency to eburnation or to bony outgrowth. Soon after my examination of this specimen I had an opportunity, in a body which I had procured for the purpose of demonstrating operative surgery, of examining the same thing on a yet larger scale. In this instance we dissected all the joints in the body, and in nearly all were found similar conditions. A knee-joint from this patient is shown in fig. 1 of the Plate. The joints from both these patients were exhibited before the Pathological Society, and are described in detail in its 'Transactions.' Those of the second case were subsequently deposited in the Museum of the College of Surgeons. My own opinion is, as already expressed, that it is the common condition of a large majority of the cases of persistent general rheumatism.*

I will not here introduce any remarks as to the clinical history of these cases. The two described are the only ones in which I have been permitted to make post-mortem examinations; but, as already hinted I believe that they may be taken as fair specimens of what is probably common in this variety of rheumatic gout. The following account of the specimens is abridged from the 'Pathological Transactions:'

* Dr. Robert Adams, in his well-known work on 'Rheumatic Gout,' has described some cases which exemplify some of the features of this form. The case of John McGarry, at p. 25, of his 'Atlas,' presents some features of similarity; but in it it is especially stated that the ends of some of the bones were in a state of nodosity, whereas in my cases the absence of any alteration in the form of the bone was a chief feature.

Fig. 1 represents the right knee-joint, opened, from a case of chronic ulcerative arthritis, in which almost all the joints in the body were more or less affected. The most conspicuous changes consisted of fringed and velvety thickening and blood-staining of the synovial membrane; thinning and absorption of the cartilage, both in a slight degree over the whole surface, and in abruptly defined patches of deep erosion; condensation of the subjacent bone, but with only slight indications of eburnation, and sometimes patchy removal of the most superficial layer, little nodular islands of bone being left. The joints least affected were the left hip, right shoulder, the ankles, great toes, and some of the synovial joints of the spine. With the exception, however, of a few of the distal joints of the fingers and toes, not a single synovial articulation in the body was quite free from change. In some of the small joints of the tarsus and carpus, fibroid ankylosis had occurred in addition to ulceration of cartilage. The cartilage of one tarsal joint showed white patches like healed ulcers. The removal of the cartilage usually began at the margins of the joints.

The right knee, from which the figure was taken, illustrates very well the changes in the cartilage. A very large part of the cartilage has been removed from the femur, patella, and tibia. The patches of erosion have no constant shape, many have become confluent, leaving islands of cartilage, and the general result is a map-like arrangement. It will be seen that on the femur and tibia (as on many of the other bones) the removal of cartilage is most complete along the margin of the articular surface. In none of the joints was there any evidence of absorption from pressure, *i. e.* in the position of greatest friction, as in the ordinary form of chronic rheumatic arthritis.

The man in whom this remarkable form of disease occurred was a foreigner, who died at the age of sixty-one, having been for the previous eight years an inmate of a workhouse infirmary on account of the crippling due to his disease. He was believed to have been formerly very intemperate. He did not suffer any very severe pain, nor was he confined to bed until about four months before his death. He died from exhaustion. After death the feature which attracted attention was the characteristic deformity of the right hand, and this led to examination of the other joints, most of which showed externally no changes.

Figs. II and III show similar changes in various joints of the foot of another patient (Joseph T—, æt. 41), whose limb was amputated in the middle of the thigh for the same disease in the knee.

Fig. II shows the distal articular surfaces of the astragalus and cuboid (upper figure), and the distal ends of the four small metatarsal bones (lower figure). Fig. III represents the ankle-joint cut open.

In the ankle there are abruptly margined patches of deeply ulcerated cartilage, some of them with overhanging edges. They are chiefly near the margins of the joint. The joints shown in Fig. II are all affected in the same way to a greater or less degree, but the changes are less definitely confined to the edges of the articulating surfaces.

The knee of the same limb was in a more advanced stage of the same disease, and presented extensive ulceration of cartilage, exposing the bone, bands of adhesion between the opposite bones, and some with nodular growths of bone from the exposed spongy tissue on the ulcerated surfaces. The bone had not, as in the former case, undergone condensation, but was rough and spongy.

The patient, Joseph T—, æt. 41, was a very intelligent man, of dark complexion and nearly bald. His arthritis began at the age of thirty-seven, in the great toes. The attack never wholly passed off, and he was soon obliged to lie up. After this his knees, hands, and elbow all suffered, and he also became aware of grating in some of the joints of the neck, which I afterwards heard very distinctly with the stethoscope. At the time of the amputation he had been unable to work for two or

three years. He had had much relief while under treatment at the Bath Mineral Water Hospital.

He had had good health early in life, and lived very abstemiously in respect to alcohol. There was no evidence on his person of gout tophi; nor did his arthritis at its onset, although it began in his great toes, agree in symptoms or course with true gout.

His father had lived freely, and was a hale and hearty man when he died at the age of sixty after an accident; although his habits had been such as to produce gout, it is believed that he never had the slightest evidence of any joint-disease. Further family history was almost entirely wanting.

The patient was one of eight—four brothers and four sisters: six were living; two, a brother and sister, having died, but not of any arthritic maladies. Of the six living, the three brothers all suffer from "rheumatic gout," and the three sisters are all quite free. In one of the brothers, æt. 38, the attacks have been very like true gout. In each of the three the disease has begun between thirty-five and forty years of age, and, excepting a single attack of inflammation of the foot during childhood in one of them, they have not previously suffered from any joint symptoms. In all, the great toes were the first to be attacked. All three have been remarkably temperate in the use of beer. I cannot help suspecting that in this instance, seeing that three brothers were affected without any obvious exciting cause, there must have been some fact as regards hereditary history with which they were unacquainted.

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ILLUSTRATIONS OF INJURIES TO THE HEAD.

I COMMENCE with the present Fasciculus a series of illustrations of the results of Injuries to the Head which will extend through three numbers. The Plates will be taken chiefly from a large volume of original portraits which accompanied my essay on this subject which gained the Astley Cooper Prize in 1864. This essay and its illustrations are now the property of Guy's Hospital, and it is by the liberal permission of the Treasurer of that institution that I am allowed to publish them. The Plates selected for publication will be chosen chiefly as being explanatory of the more frequent causes of death, and they may be suitably introduced by a tabular list of the fatal cases which were narrated in my essay. This list includes all the cases which came under my observation during the time the essay was in preparation, for the most part comprising the years 1861, 1862, and 1863. I might have added to it very largely if I had included those which have been under my care since, but to have done so would have somewhat interfered with its value, as being to a certain extent a statistical document. As it stands now I believe it includes nearly all the cases which were under the care either of myself or of my colleagues during the period mentioned. It supplies, I believe, the means of forming a very fair estimate as to what are the real risks of this class of accidents as met with in the practice of a large London hospital. In this way it appears to possess some value, giving, as it does, greater precision to our knowledge as to how the assertion *nullum vulnus capitis contemnendum* comes true. By reference to it we shall see especially how important the secondary or inflammatory lesions are, and how amongst them osteitis and pyæmia stand conspicuous. My table also affords valuable information as to usual duration of life in connection with the several causes of a fatal result. It has been made as concise as possible, but most of the cases are recorded in great detail in my manuscript essay, to which references are given in the first column. Many of them have also been published in my lectures in the 'Medical Times and Gazette,' which I shall probably reprint. It is right that I should state that of the cases mentioned in the table a considerable number were not under my

own care. I had received from my hospital colleagues permission whilst I was engaged in preparing my Essay to observe their cases and to record them. Unfortunately the conditions of competition rendered it compulsory that all names should be omitted from my manuscript, and I could not now supply them with any degree of accuracy. It seems best, therefore, to leave them in their present state, and I must simply acknowledge in general terms my sense of obligation to Mr. John Adams, Mr. Curling, Mr. Maunder, and Mr. Couper, for the many facts which I collected in their wards. To Mr. Waren Tay I owe my warmest thanks for his unwearied assistance in bedside observation and in note-taking.

TABLE SHOWING THE CAUSE OF DEATH AND THE DURATION OF LIFE IN FATAL CASES OF INJURY TO THE HEAD.

Case.	Name.	Age.	Nature of accident.	Duration of life.	Cause of death.	Remarks.
No. Page.						
1, 167	A man (See Plate XV)	40	Fall from a horse	20 min.	Concussion and laceration of brain	Very imperfect reaction; fracture of base of skull.
2, 135	James Titjmans	25	Fall on the head (ten feet)	6 hours	Concussion and severe laceration of brain	There had been full reaction; fracture of base of skull.
3, 1	A man	40	A fall in the street; no external injury	8 hours	Compression of brain by large clot in arachnoid.	
4, 107	Catherine Fannin	23	Fall from a window	24 hours	Concussion and extensive contusion of brain	The skull was severely fractured; there had been full reaction.
5, 69	A man (See Plate XVI)	24	A violent blow on the head	28 hours	Concussion of brain (slight contusions at various parts)	Imperfect reaction.
6, 99	Thomas M.	30	Thrown from a gig on his head	40 hours	Concussion, with extensive lacerations of brain	There had been full reaction.
7, 305	A man	51	Compound fracture of right parietal bone	40 hours	Acute arachnitis	Trephining four hours before death.
8, 259	John O'D.	35	Compound fracture of right side of frontal bone, with depression	42 hours	Commencing arachnitis; violent convulsions	The dura mater was lacerated at the seat of fracture.
9, 469	Walter Chelton	16	Fall sixty feet; concussion	48 hours	Contusion of left middle lobe; effusion of blood into the arachnoid.	
10, 77	A girl	5	Knocked down in the street	3 days	Collapse from concussion, without lesions	No reaction.

Case. No.	Page.	Name.	Age.	Nature of accident.	Duration of life.	Cause of death.	Remarks.
11,	351	Joseph Inch	31	Fracture of the petrous bone on the right side	3 days	Acute arachnitis.	
12,	23	W. Chapman	53	A severe blow on the occiput; a mere bruise externally	4 days	Contusion of the right middle lobe; hæmorrhage into optic thalamus.	
13,	187	William Walsh	26	Fall twelve feet	4 days	Concussion and laceration of brain	The base of the skull was fractured; full reaction.
14,	235	Mary Fitzgerald	22	Compound and depressed fracture of right parietal bone from a fall	4 days	Concussion and severe contusions of brain.	
15,	323	Henry Brown	21	Operation for removal of exostosis; injury to dura mater	4 days	Acute unilateral arachnitis.	
16,	449	Solomon A.	9	Concussion; fracture of lower jaw and fracture of left temporal bone	4 days	Concussion; secondary collapse.	
17,	300	Charles Crews	4	Punctured fracture of the lesser wing of sphenoid from the orbit (foreign body)	5 days	Arachnitis and infiltration into subarachnoid spaces.	
18,	113	Mary Edwards	50	Knocked down in the street	5 days	Concussion and contusion of brain	Full reaction, but with rapid pulse; fracture of base of skull.
19,	267	Henry Jay	36	Compound fracture of right parietal bone	5 days	Arachnitis, contusion of surface of brain	Dura mater was lacerated.
20,	295	Geo. Parsons	21	Compound fracture of the frontal bone	5 days	Traumatic delirium, possibly in connection with other injuries	The man had fractures of both legs.
21,	195	Peter Garten	38	Blow on the head; compound fracture of frontal bone, with laceration of dura mater	6 days	Laceration and softening of the surface of the hemisphere beneath the injury.	
22,	275	Walter Chiswick	6	Compound fracture of left parietal bone, with depression	9 days	Arachnitis	Extensive laceration of dura mater at the seat of injury.
23,	335	W. Richardson (This case has been published by Mr. Couper) (See Plate XVII)	25	Punctured fracture of right temporal bone, and wound of middle lobe of brain	10 days	Acute arachnitis and encephalitis	The injury was very severe; the end of a palisade was impacted.

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Case. No.	Page.	Name.	Age.	Nature of accident.	Duration of life.	Cause of death.	Remarks.
24,	15	Mrs. Fenton	71	Knocked down in street	10 days	Red softening of brain after contusion, pneumonia	There was a fracture of the base.
25,	155	Martin Tiljin	43	A fall, feet foremost	11 days	Concussion, contusion, and inflammatory softening of left anterior lobe, pneumonia?	There was a fracture of the base of the skull.
26,	251	William Wilkie	25	Compound fracture of left parietal bone	11 days	Purulent arachnitis, pyæmia, osteitis	The depression was very great; there was no compression; the dura mater was lacerated.
27,	223	William Jarrold	10	Compound fracture of left parietal bone from a fall	12 days	Osteitis, arachnitis, pyæmia	There was no laceration of the dura mater.
28,	307	Joseph Mills	21	Fracture of left petrous bone from a fall	11 days	Effusion into subarachnoid space, pneumonia.	
29,	375	Edward Smith (See Plate XIX)	10	Contusion of skull and laceration of scalp	13 days	Osteitis, thrombosis, arachnitis, pyæmia.	
30,	413	A man	40	Contusion of skull and laceration of scalp	13 days	Osteitis, arachnitis.	
31,	285	William King	15	Compound depressed fracture of the right parietal bone	14 days	Arachnitis, osteitis? pyæmia?	
32,	359	A woman	45	Laceration of scalp; compound fissure fracture of right frontal eminence	15 days	Osteitis, thrombosis, arachnitis, pyæmia.	
33,	245	An Irish labourer	48	Compound fracture; slight depression from a blow	16 days	Osteitis and pyæmia	No autopsy.
34,	405	Daniel Stammers	26	Contusions of the frontal bone and orbital tissues; no laceration	17 days	Infiltration of subarachnoid space, osteitis, pyæmia, limited arachnitis	The contusions were believed to have been received in fighting.
35,	207	Phillip Klein	4	Depressed compound fracture of left parietal bone	18 days	Osteitis, arachnitis, and pyæmia.	
36,	331	A German sugar-baker	24	Compound fracture of the left parietal eminence from a blow	18 days	Arachnitis, pyæmia, osteitis?	Primary trephining was performed.
37,	199	Henry Jameson	13	Gunshot fracture of temporal bone	19 days	Osteitis and pyæmia.	
38,	391	Thomas Newton	28	Contusion of skull and laceration of scalp	20 days	Osteitis, pyæmia, and pleuro-pneumonia.	

Case. No.	Page.	Name.	Age.	Nature of accident.	Duration of life.	Cause of death.	Remarks.
39,	433	A man (See Plate XXI)	54	Laceration of scalp and scratch-fracture of the frontal bone	21 days	Osteitis, thrombosis, pyæmia, arachnitis.	
40,	395	Geo. Caseby	25	Contusion of bone; laceration of scalp	22 days	Osteitis, arachnitis, pyæmia.	
41,	417	John Welsh (See Plate XVIII)	10	Lacerated wound of scalp	23 days	Osteitis, thrombosis, pyæmia, pleuro-pneumonia.	
42,	425	John Toomey (See Plate XX)	30	Lacerations of scalp; contusions of skull	25 days	Osteitis, thrombosis, pyæmia, arachnitis, and small abscess in the brain.	
43,	473	James Gray	30	Laceration of scalp and contusion of bone	30 days	Osteitis, thrombosis, pyæmia.	
44,	211	Daniel Hill	21	Laceration of scalp from a blow on the head	30 days	Abscess in the brain, osteitis, suppuration between bone and dura mater.	
45,	383	Samuel Collins	6	Contusion of skull and laceration of scalp	31 days	Osteitis, thrombosis, pyæmia, pleuro-pneumonia.	
46,	281	Ashby Mowatt	2½	Punctured wound of the brain through the left parietal bone	4½ mos.	Abscess in the hemisphere	The child for some time had scarcely any cerebral symptoms.

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It will be seen that the cases in the above table have been placed according to the duration of life. Thus we have first cases of concussion, contusion, and compression, next the several forms of direct arachnitis and encephalitis, and lastly (beginning at Case 26), those in which inflammation of bone was the cause of the other changes which led to death. This last is a large and most important group, and counts no fewer than nineteen cases. I cannot help suspecting that this number is greatly in excess of what is usual, for during the last few years I have had but very few such. I must ask attention to the fact that there is not a single case in the list, of death from compression by depressed bone, nor have I ever witnessed a death from that cause. In the following table I have attempted to show the relative proportion of the different causes of death.

SUMMARY OF THE PRECEDING TABLE ARRANGED TO SHOW THE RELATIVE PROPORTION OF THE SEVERAL CAUSES OF DEATH AND THE AVERAGE DURATION OF LIFE IN CONNECTION WITH EACH.

	Total.	Average duration of life.
Simple concussion, Cases 10, 16	2	3½ days.
Concussion, with contusion and laceration of brain — Primary injury, Cases 1, 2, 4, 5, 6, 9, 12, 13, 14	9	2 days.
Concussion, with contusion and laceration of brain — Secondary changes, Cases 18, 21, 24, 25	4	8 days.
Compression by extravasated blood, Case 3 . . .	1	8 hours.
Compression by depressed bone	0	0
Arachnitis, direct traumatic } Cases 7, 8, 11, 15, 19, 22, 23 . .	7	5 days.
Arachnitis, secondary; thrombosis, and pyæmia } Cases 26, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 45 . . .	18	21 days.
Inflammation of pia mater and subarachnoid tissues, Cases 17, 27	2	8½ days.
Abscess in the brain substance, Cases 44, 46 . .	2	78 days.
Traumatic delirium, possibly not connected with injury to the head, Case 20	1	5 days.
Total	46	

TABLE SHOWING EXTREMES OF DURATION IN SOME OF THE ABOVE-MENTIONED CLASSES.

Cause of death.	Shortest duration.	Longest duration.
Simple concussion	3 days	4 days.
Concussion, with laceration and contusion of brain — Primary . . .	20 minutes	4 days.
Concussion, with laceration and contusion of brain — Secondary . . .	5 days	11 days.
Arachnitis, direct traumatic	40 hours	10 days.
Arachnitis, secondary, including Pyæmia . . .	11 days	31 days.
Inflammation of pia mater and subarachnoid tissues .	5 days	11 days.
Abscess in brain substance	30 days	4¼ months.

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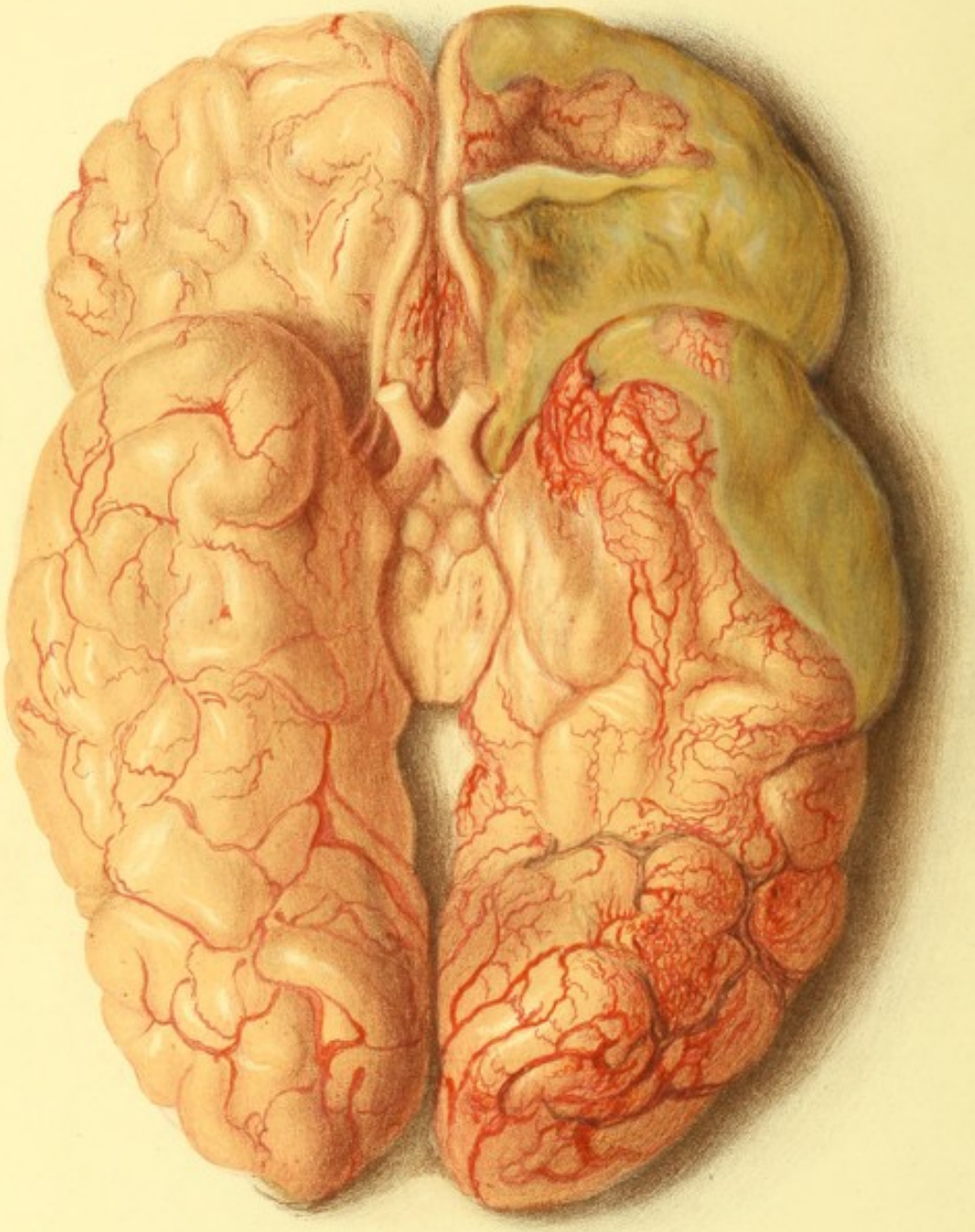

INFLAMMATION OF ARACHNOID
AFTER COMPOUND FRACTURE (JONES' CASE)

E. Burgess ch. lith. ad nat.

W. West & Co. imp.

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PLATE XIII.

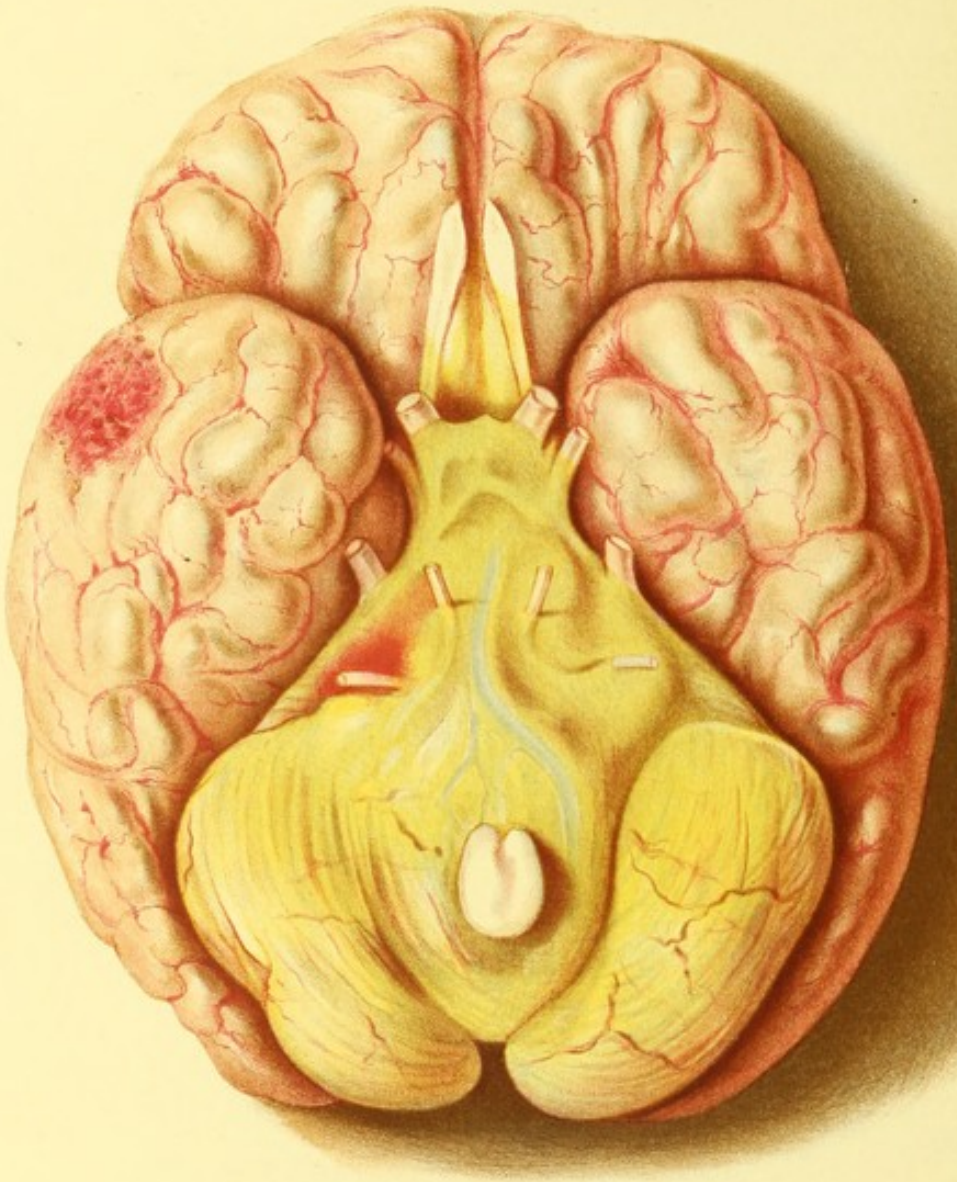
DIRECT TRAUMATIC ARACHNITIS.

This Plate is given to illustrate the formation of a coherent layer of puro-lymph in the arachnoid cavity, in contra-distinction to the cases in which the effusion takes place in the subarachnoid spaces or tissue of pia mater (see Portrait XIV).

The portrait represents the under surface of the brain, the left half of which has suffered from arachnitis. The anterior and middle lobes are covered by a layer of inflammatory secretion of tolerable thickness, which completely conceals both convolutions and sulci. At parts this layer has been peeled up with forceps to show its thickness and tenacity, and also to demonstrate the fact that the pia mater beneath is not infiltrated in the least. It will be observed that over the whole of the affected hemisphere the pia mater is congested. It will be seen also that the visceral layer of arachnoid, although concealed, is not at all altered as regards its transparency, and that when once the coating of new material has been peeled up the parts beneath are left clean, and, excepting as regards congestion, unaltered.

In this form of arachnitis both the parietal and visceral layers of the membrane are always affected together, and the layer of lymph which lines the one and covers the other is usually much the same as regards thickness and strength. Between the two layers there is often a little fluid pus. Sometimes a single patch more or less extensive is all that is found, but usually the inflammation travels over the greater part of the hemisphere. It almost always spreads from one point of commencement, and is scarcely ever seen in separate patches.

This is the condition so often met with after compound fractures of the skull with direct wound of the dura mater. It is also not uncommon in connection with inflammation of the bones of the skull consequent on contusion. In the one case we have direct or primary traumatic arachnitis, in the other secondary or osteitic arachnitis. The extension is usually much greater in the direct



INFLAMMATION OF PIA-MATER AT BASE OF BRAIN,
AFTER FISSURE-FRACTURE OF PETROUS BONE. (J. MILLS' CASE.)

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PLATE XIV.

INFLAMMATION OF SUBARACHNOID SPACES AT BASE OF BRAIN.

We have here a good illustration of the conditions met with at the base of the brain in cases of inflammation of the subarachnoid spaces. This form of disease is to be carefully distinguished from true arachnitis; the two may coexist, but this is often met with alone. When it occurs as the result of injury, it is generally consequent on fracture of the petrous bone, and of extension of inflammation along the sheath of the seventh pair of nerves. In this way access is obtained directly to the subarachnoid spaces. The effusion begins at the base of the brain, and may extend thence either upwards over the hemispheres or through the transverse fissure into the ventricles. Everywhere it is easily demonstrable that the effusion is under and not upon the visceral layer of arachnoid. A similar condition may be met with in cases of inflammation extending backwards from the orbits; and as an idiopathic malady it is familiar to physicians as cerebro-spinal meningitis. In removing the brain from the skull care must be taken or the arachnoid covering the base may easily be torn and a mistake as to the precise position of the effusion may be made. If due care be taken, however, it may be made perfectly clear that upon the arachnoid surface not a single flake of lymph is present. In traumatic cases, as well as others, the effusion may extend down the spinal cord for a considerable distance.

It will be seen in the Plate that all the structures at the base of the brain are concealed by a greenish opaque effusion, and that the trunks of all the nerves are matted together. I have appended the notes of the case which supplied the specimen in full detail, because it was one of great importance. I shall reserve to a subsequent occasion what I have to say as to the symptoms and general course of the malady, and may in the meantime refer the reader to my lecture in the 'Medical Times and Gazette' for May 29th, 1875.

Summary of Case.—*Fracture of the base of the skull, followed by discharge from the left ear and paralysis of left seventh nerve. Inflammation of subarachnoid tissues. Death. Autopsy.*

Nov.	2	W.	A man, æt. 21, fell whilst drunk. Bleeding from left ear.
	3	Th.	Much sickness and headache. Free serous discharge from ear; sleepless.
	4	F.	Discharge from the ear; sleepless.
	5	S.	Discharge continues. Sleepless; occasional delirium.
	6	☉.	Still sleepless. Able to walk about.
	7	M.	Admitted into hospital deaf in left ear; furred tongue; paralysis of seventh nerve.
	8	Tu.	Still sleepless. Peculiar manner, but rational. Pulse 100. Large pupils.
	9	W.	Sleepless.
	10	Th.	Sleepless, but takes food, and is rational. Dilated pupils.
	11	F.	Pneumonia; sleepless. Pulse 100. Herpes on lips.
	12	S.	Increased difficulty in breathing.
	13	☉.	Death at four in the morning. No convulsions.

Autopsy.—Effusion of puro-lymph into the tissues of the subarachnoid space at base of brain and at transverse fissure; starting of the left occipito-temporal suture and fracture of the petrous bone. Rupture of membrana tympani.

J. M—, æt. 21, admitted on Monday, November 7th, at 4 p.m. He walked into the ward; was quite conscious, and gave his own history. He stated that on Wednesday afternoon he was drunk and had a fall. He was carried home, and when he came to himself he had a bad headache, and vomited repeatedly. On Thursday he was "very bad" and was in bed all day. On Friday he was also sick. On Saturday he felt better, and had less pain in his head. This is his statement. On Saturday night his friends state that he was delirious. He states that his left ear bled freely at the time of the accident, and that when he commenced vomiting "water flowed from the ear." When "he retched, a great deal came," "made his pillow in a dreadful mess." Since then the discharge of fluid from the ear has continued. He believes that his nose did not bleed. He says he has not slept since the accident on account of severe pain in his head.

Present Condition.—He speaks in a thick, spluttering manner, as if he were half drunk. We observe that when speaking he uses only the right half of his mouth; the left half remains closed. His mouth is a little drawn to the right side. He can close both eyes, but he closes the left less perfectly than the right. He can also move his left cheek towards the ear, but he does it slowly and not nearly so well as on the right side. There is no squint. His pupils are rather small, but not particularly so; both act well. His face is flushed; lips rather dusky. Scalp rather hot; ears hot; tip of nose quite cold. He appears inclined to go to sleep; says he has not much pain in the head now. He can move all his limbs equally well. His hands are cool. Pulse soft, feeble, and occasionally intermittent. There is dried discharge in his left ear; he says there has been no escape of fluid since Saturday. Tongue thickly covered with white fur, large, flat, and flabby.

November 8.—He reports that he did not sleep in the night, and adds that he has "not slept since the accident." He is very thirsty; has not shivered. He says that he has very little pain in his head. He does not know what kept him awake, but "could not sleep," and was very restless. He is less flushed than yesterday; in fact, he is rather pale. Skin of forehead warm; nose warm. He appears to

be utterly deaf in the left ear. He took his soup for dinner, and appears to have enjoyed it. His tongue is covered with a creamy fur. There is now no discharge from his ear. Pulse 100, regular, soft. Pupils of equal size (natural), and active. His head is shaved, and he has ice applied. His bowels have acted twice in the night. He still speaks in a heavy, thick manner, as if half drunk; but his memory is good, and he is quite rational.

9th.—4.30 a.m.: He still asserts that he has never slept since the accident, and asks for opium.

11th.—5 p.m.: Still complaining bitterly of being unable to sleep. Skin hot, aspect flushed; pulse 100. Herpes on the lips noticed yesterday. Pupils dilated, and although they contract when he looks at a candle, they remain even then larger than natural. His water is not high coloured. His feet are cool, but not cold.

12th.—He is evidently much worse. His aspect is dusky; lips purple, and there is a circumscribed flush on each cheek. He breathes with difficulty. I examined his chest yesterday, as well as his restlessness would allow me, and did not detect any evidence of pneumonia. To-day his aspect is decidedly that of pulmonary congestion. His face is bedewed with perspiration; his pupils are very large in the shade, and when exposed to light, only contract to a slight extent. His right pupil is larger than the left. His tongue is, as it has been throughout, broad, flat, and covered with a thick white fur. I scarcely ever saw a tongue more loaded, yet he still takes his milk, bread, and beef tea, freely. His night was again quite restless, and he has repeatedly been decidedly delirious. His delirium is attended with hallucination, but it quickly passes off when he is roused by conversation.

At the time of my visit he was perfectly rational, and his memory seemed perfect. He reiterated his request for something to send him to sleep, a request which he has made every day with the utmost energy. The nurses confirm his statement that he has literally not slept since he came into the hospital. He does not complain of pain in his head, but of aching all over, and especially of pain in his back. The nurses state that when he gets out of bed he staggers, but he has no paralysis of any limb, and has great muscular power in both hands. His pulse to-day is more feeble, and 110. The left side of his face is still, as it was, almost paralysed.

On Saturday evening, after the above notes were written, he became noisy, and was on that account sent into a separate ward.

During the night he was delirious, and frequently shouting loudly. At four in the morning he died. From first to last he had never had any convulsion nor any twitching of muscles. He had never squinted, and with the exception of the partial paralysis of his left portio dura, which we believe to have been connected with the injury, he had never had any paralysis. On the Friday, thirty hours before he died, I made him grasp each of my hands with each of his, and he did so with such force that I was glad to ask him to desist. In the afternoon before he died (twelve hours before death), although, as described in the preceding note, he was suffering very much from dyspnœa, yet he was sitting up in bed at the time of my visit with a mug of tea in one hand and a piece of thick bread and butter in the other. He stated that he did not feel either hand weak, but fancied that his left was not so good as the other. He used his left hand, however, freely. As regards his mental faculties, notwithstanding his occasional delirium, they appeared to be perfect. The last time I saw him, in the evening before he died, he begged for a dose of opium, asking, "Are you the head-doctor? If not, I won't ask you, for I know you must go according to orders. But if you are, do let me have something to go to sleep." He had been rough and unmanageable all the time, persisting in throwing his clothes into disorder, in spitting about the ward, &c., in spite of the entreaties of the nurse. Thus, although not in a state of actual delirium, we might consider that he had been very excitable and restlessly impulsive the whole time. On several occasions he had begged the nurse to remove a "black man" whom he imagined was

near him. At the time of my visits, however, he was always quite rational, excepting that on one occasion, after a visit from one of my colleagues, he assured me that the Devil had been to see him and had been sitting on his bed.

He was an exceedingly muscular, powerful man, and had a very vigorous heart. There was a rumour that he had been an opium-eater, and this, if true, would explain to some extent his sleeplessness.

We examined the body at two in the afternoon. Both lungs were loaded with blood, and their posterior lobes were in a state of recent hepatisation. Large portions of them sank in water. The heart contained in both cavities large masses of very firm fibrinous coagulum. His bladder was distended with pale yellow urine. *Head:* the scalp was loaded with venous blood. No bruise was perceptible externally. A small bruise, implicating all the tissues of the scalp on the left side, about an inch and a half behind the ear, was disclosed on turning back the scalp. On removing the pericranium, a starting of the temporo-occipital suture in its whole length was found. There was a little extravasated blood, both in the suture and between the membrane and the bone. The separation permitted of some motion. There was no fracture of the vault. The calvaria and the brain were now cut through and the upper part removed, the line of section passing through the ventricles. The ventricles contained serum in moderate quantity. In the anterior cornu of the right lateral ventricle was a small quantity of purulent lymph. In the opposite one there was none, but in the posterior cornu of this there was lymph in the tissue of the pia mater. The lining membrane of the ventricles did not appear to be even congested. In the subarachnoid space of the transverse fissure was a considerable quantity of greenish-yellow puro-lymph which moulded itself to the parts. The lymph extended over the upper surface of the cerebellum in the tissue of the pia mater as a very thin layer of infiltration. At the base of the brain under the anterior lobes and about the optic nerves there was no effusion, but commencing at the optic commissure and passing backwards, the subarachnoid tissue was infiltrated with pus and lymph. This lymph was of a greenish-yellow colour, and matted all the nerves together. It evidently contained much fluid in its meshes, for when the medulla was cut and the parts removed, it gradually lost much of its apparent thickness. It extended laterally upon the lobes of the cerebellum and upwards over the crura cerebri to the transverse fissure. The arachnoid over this effused lymph was smooth and glistening, and nothing could be scraped from its surface. The parietal arachnoid in apposition with it was also quite smooth and free from inflammatory effusion. The velum interpositum was much congested, but did not show any evidence of inflammatory effusion. The choroid plexuses on each side were somewhat œdematous, but showed no lymph. The portion of the plexus which passed down into the posterior cornu of the left lateral ventricle was swollen and of a greenish-yellow colour from effusion into its tissue. The corresponding one on the opposite side was simply congested. There was no trace of inflammation in the third ventricle. Indeed, with the exception of the patch of lymph mentioned, as being present in the anterior cornu of the right ventricle, the lining membrane of the ventricles was everywhere perfectly free from inflammatory effusion. On the right side there was evidence of contusion in the hemisphere, especially of the sphenoidal lobe. There was no visible laceration of the arachnoid, but there were several large patches of extravasated blood between it and the convolutions; the largest patch was the size of a halfpenny, and was abruptly circumscribed. There was effusion of blood into the arachnoid sac on this side. A clot (consisting of a drachm or two) adhered to the under surface of the sphenoidal lobe, and a thin layer covered almost the entire hemisphere, adhering chiefly to the parietal membrane. There was no blood at the base of the brain proper, nor any on the left hemisphere at any part. The pia mater of both hemispheres was intensely congested, and its veins turgid with dark blood.

In reference to the symptoms present during life, we had throughout entertained a clear opinion that there could be no arachnitis over either hemisphere, because the

man had no paralysis. Until the last day or two it had been hoped that he would recover, and the absence of alarming symptoms was certainly remarkable. His pulse had remained quiet.

He had continued to take and enjoy his food, and had been for the most part free from actual delirium.

An exceedingly foul tongue, absolute sleeplessness, and great thirst had been his chief symptoms. Inasmuch as bleeding from one ear, followed by discharge of watery fluid, and attended by symptoms of partial paralysis of the portio dura, had occurred, I had expressed a confident opinion that the petrous part of his temporal bone must be fractured. In the post-mortem room, on stripping off the dura mater we could find only a starting of the temporo-occipital suture, and the most careful inspection of the petrous portion failed to discover any fissure in it.

We tried forcible movements of the skull, but could not discover any movement; with the ear speculum a recent laceration in the membrana tympani was found. It was triangular in form, having its apex at the middle of the membrane, and its base towards the Eustachian tube.

The lining membrane of the Eustachian tube and of the tympanic cavity was intensely congested.

We removed the temporal bone for subsequent examination. It was only after making several sections of it that I discovered that there was a line of fracture crossing horizontally through the canal for the carotid artery and in a direction to cross also that for the portio dura. The specimen is preserved.

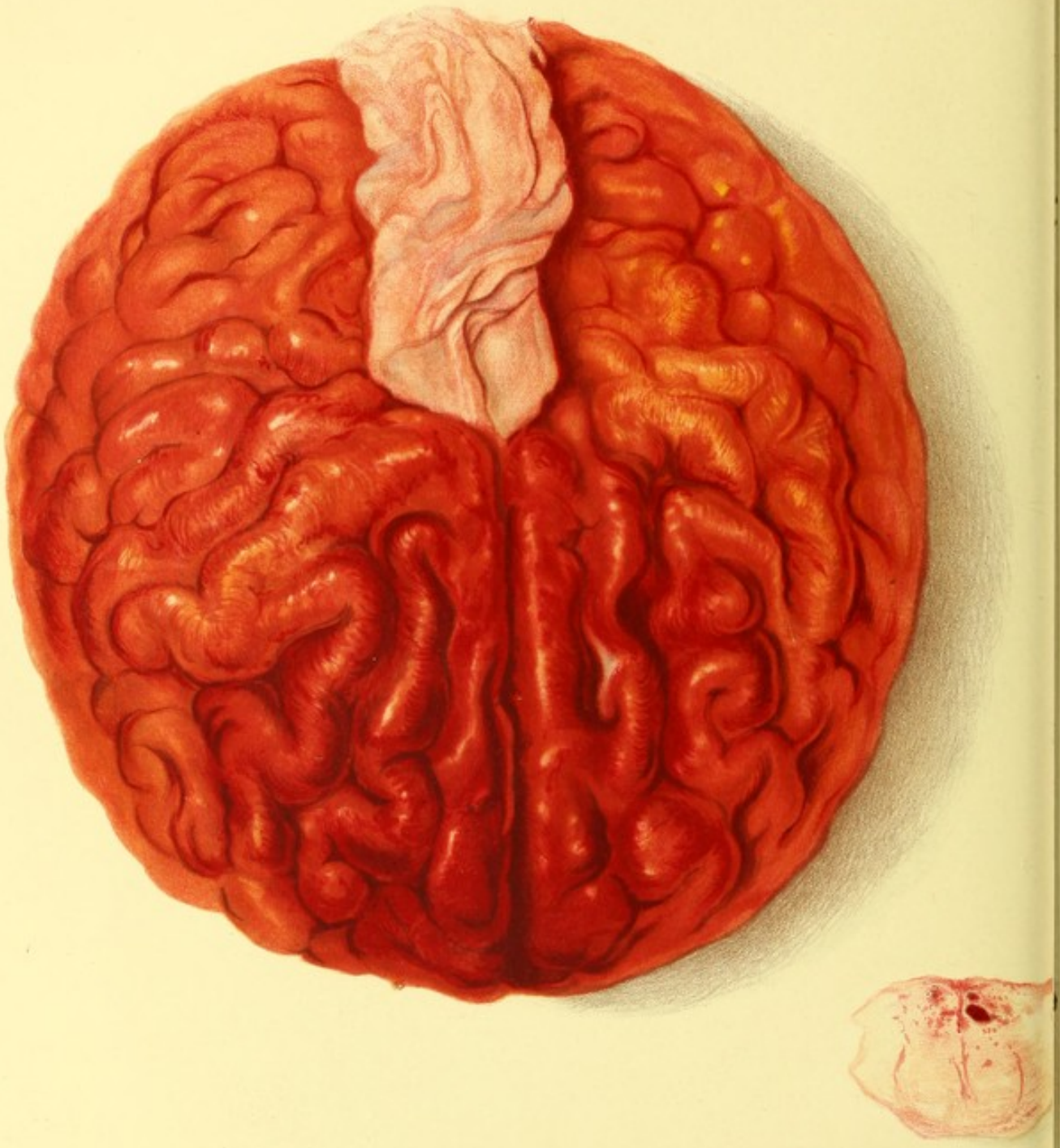
As regards the exact mode of death, my impression is that it was chiefly brought about by the very extensive pneumonic consolidation of both lungs. The occurrence of pneumonia is common to all severe injuries to the head. But, in this instance, we seem to have a special explanation of it in the manner in which the roots of the pneumogastric nerves were surrounded with inflammatory deposit. As regards the functional impairment of the other cranial nerves, whose trunks, equally with those of the pneumogastrics, were surrounded with inflammatory deposit, we may note that the man could see well and also hear well with the uninjured ear. Nothing more could be ascertained respecting the third nerves than that the pupils, at first active and of normal size, subsequently became less active and much dilated.

As to his fourth and sixth nerves, nothing could be ascertained. There was no squint, nor any degree of ptosis, but inasmuch as the disease involved the nerves of both sides, it is scarcely probable that unsymmetrical symptoms would be induced by it.

In reference to the fifth nerves, we have the fact of the thick fur on the tongue, and perhaps of some impairment of taste.

The portio dura and portio mollis on the left side were both probably damaged in the original injury; those on the other side retained their functions.

There was no reason to think that his lingual nerves were impaired, but the disturbed function of those included in his eighth pair, especially of the pneumogastrics, has already been alluded to. To this we must refer the sickness from which he first suffered, and the subsequent thirst, and perhaps the entire inability to sleep.



EXTREME CONGESTION WITH SLIGHT ECCHYMOSIS

OF PIA MATER

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PLATE XV.

PASSIVE CONGESTION AND DIFFUSE ECCHYMOSIS OF PIA MATER.

In this portrait we have an illustration of a most extreme condition of passive congestion (with some ecchymosis) of the pia mater consequent on concussion which ended fatally within twenty minutes. It will be seen by the notes which are appended that the base of the skull was fractured in various directions and that the crus cerebri was torn. The dura mater, however, was not torn, and there was no blood in the arachnoid cavity. It must be noted especially that the man died with a pale face, and that his optic discs, examined just before death, were white and mealy.* The latter fact is conclusive against the opinion that by the vascularity of the interior of the eye we may estimate that of the meninges of the brain. It must be admitted, however, that not the whole of the appearances presented in the portrait are due to capillary turgescence, for in various parts vessels had given way and diffuse ecchymosis had resulted. The blood was, however, entirely confined to the pia mater, and when this membrane was stripped off the convolutions were left clean. The substance of the brain on section was not unusually vascular, but it showed minute hæmorrhages in many places. The condition displayed is not a usual one, for in the majority of cases of death from concussion no remarkable congestion of the pia mater is present (see Portrait XVI, the subject of which died twenty-eight hours after the accident).

In the right-hand lower corner of the Plate is shown a section of the pons Varolii with hæmorrhages into its substance.

The following are the notes of the case:

Case.—*Fall from a horse, and death in twenty minutes. Failure of respiration before stoppage of pulse; pale face and white optic discs.*

Autopsy.—*Extreme passive congestion and ecchymosis of pia mater.*

In the following case we had an opportunity for noting the condition of the circulation during death from severe concussion with laceration of the brain.

* The expression "mealy" which I find in my notes of this and other cases means, I suppose, that the disc was white with a slight tinge of yellow and without any glistening appearance. A mealy disc is one wholly devoid of blood, but without any degree of atrophy. It is seldom seen excepting during fainting or just before death.

Whilst I was in the hospital near midnight on July 10th, a man was carried in who had just fallen head-foremost from his horse. He lived only about ten minutes after he was placed in bed. The accident had occurred within a few hundred yards of the hospital, and probably he did not live altogether more than twenty minutes after it. The statement we received was that he was sitting sideways on his horse when it shied and he fell backwards, pitching with great violence on his head. He was taken up quite insensible, and was immediately carried to the hospital. When put in bed his respiration was irregular and attended by a slight snort; his face was pale and deathlike; his pupils were moderately dilated and fixed; his surface was cool, but not cold; his pulse was steady, moderately full, and about 60. I at once remarked to those present on the great want of agreement which there was between his pulse and other symptoms. From his aspect and rapidly failing respiration (for his inspirations were becoming less and less frequent), he was evidently dying, yet his pulse was of good power. He had no bleeding from any part. I examined his left eye with the ophthalmoscope and found his optic disc white and mealy looking, its arteries being small and veins also diminished. As we stood by his bedside the breath movements became fewer and fewer, and in about five minutes ceased altogether. At the same time his pulse became slower and irregular; his pulse continued to be distinctly perceptible at the wrist for, at least, two minutes after his last inspiration.

At the *autopsy* little or no evidence of bruising was found externally. The pia mater over the whole surface of both hemispheres was intensely congested (see portrait). Not only were its capillaries, both venous and arterial, turgid with blood, but its tissue was ecchymosed in many parts. There was no blood free in the arachnoid cavity, nor when the pia mater was removed did any remain on the surface of the convolutions. The left crus cerebri was almost torn through, and its structure was much ecchymosed; but there was no large effusion of blood. The under surface of the brain, especially of the anterior parts of middle lobes, was much bruised and ecchymosed. There were several dots of extravasated blood in the substance of the pons Varolii, one as large as a pea (see portrait). The under surfaces of the lateral lobes of the cerebellum were bruised. In many parts of the brain small dots of ecchymosis were discovered. The dura mater was nowhere torn.

There was no fracture whatever of the vault. The base of the skull after the dura mater had been removed showed numerous lines of fissure fracture.

The occipital bone was broken in several directions, the lines of fracture running into the foramen magnum at two different places.

An uneven fissure (without any movement) crossed the base of the left petrous bone and ran thence obliquely forwards to the body of the sphenoid. A line of fracture not communicating with any other crossed the cribriform plate of the ethnoid and extended into the orbital plate of the frontal bone on each side, being most extensive on the left side.

DEATH FROM CONCUSSION WITHOUT STRUCTURAL LESION.—*A girl knocked down by a cart. Symptoms of profound concussion supervening some hours after the accident. Death sixty hours after the accident.*

AUTOPSY.—*General congestion of the brain, but no lesion of substance.*

A girl of about five was admitted on *Tuesday* evening, having been knocked down in the street and run over by a butcher's cart. I did not see her till *Wednesday* at about four, when I found her in the following condition:—She lay insensible, but occasionally moaning; face pale, lips bluish, pulse feeble, skin cool. On being moved she resisted, and moaned, but did not speak. She could move all her limbs, but was more readily induced to move her right limbs than her left ones. It required considerable irritation—pinching or tickling—to make her move either.

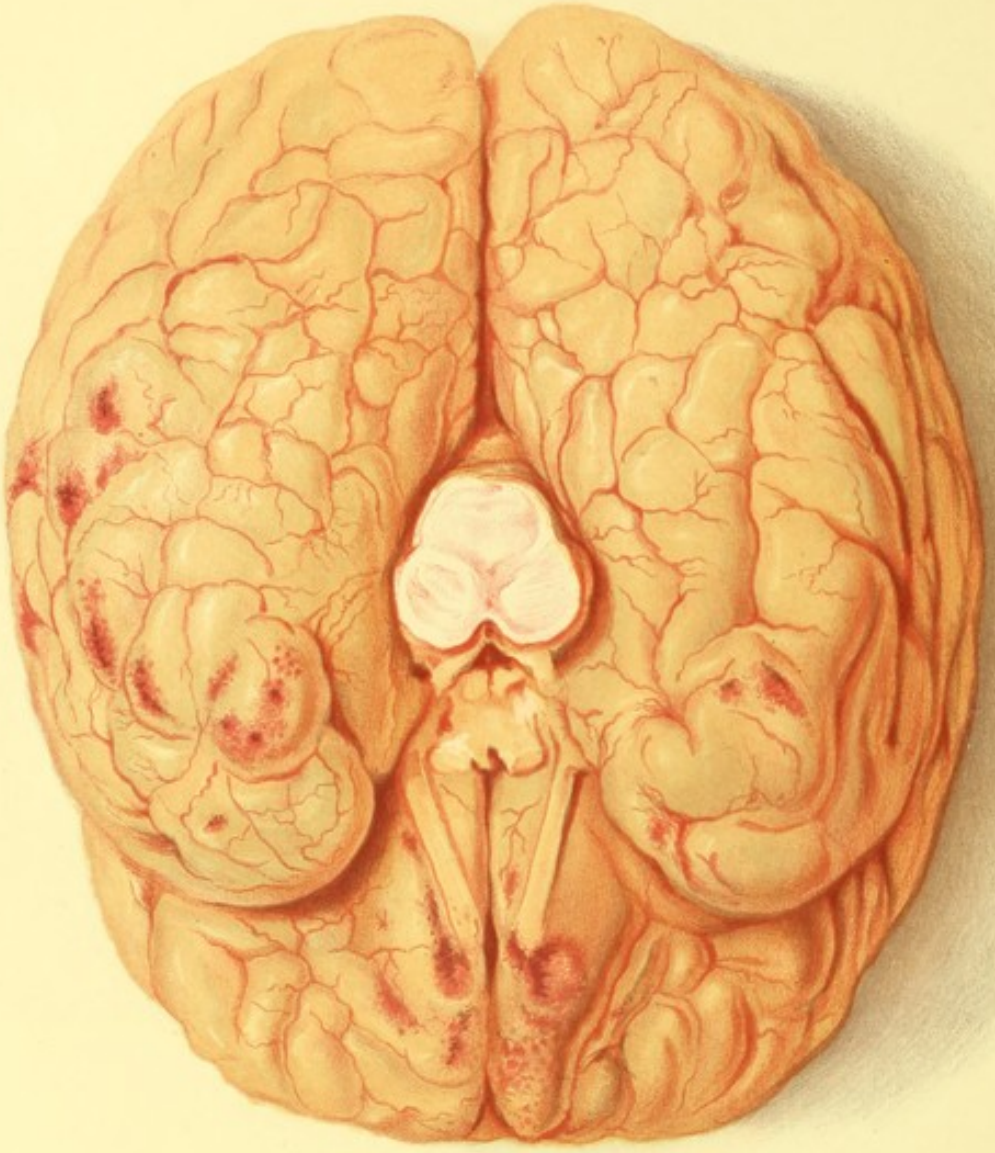
The history I obtained from her mother was that she was knocked down violently and run over, the wheel passing over her chest. She was taken up and carried first to one surgeon and then to a second, both of whom said that she was not hurt. She became, however, soon after so weak and ill that her mother brought her to the hospital. At the time of her admission she was fairly sensible, and she resisted strongly during the time she was put into a bath, using all her limbs. After having been got to bed she became collapsed and insensible. She was so pale and her pulse so weak that my house-surgeon Mr. Dyte ordered wine, by the aid of which she had, when I saw her, well rallied.

We carefully examined her body and head, but could not find anywhere any evidences of bruising. The wine was discontinued. The head was shaved.

Thursday.—Much the same. Quite insensible, but moaning and resisting when moved. Skin of trunk and limbs hot; head not so hot, but warmer than natural. Eyes closed; pupils of moderate size, as yesterday, and the right the larger. No strabismus. Lips more congested. Mucous râles in both lungs, which were free yesterday. Motions and urine have passed involuntarily. Has been freely purged by calomel. The conjunctiva was not at all congested, and as the heat of head was not great I decided not to deplete. Ordered the chest and head to be kept well elevated.

She remained much in the same state and died next morning, *Friday*, *i. e.* about sixty hours after the accident.

At the autopsy the brain and spinal cord were carefully examined, and, excepting general congestion, nothing was found. The lungs were very much congested, and the right cavities of the heart, as well as the cerebral sinuses, were distended with blood.



CONTUSION AND ECCHYMOSIS.

W. West & Co. ch. Lith.

LEEDS & WEST RIDING
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PLATE XVI.

CONTUSION OF SURFACE OF BRAIN.

In this Plate are delineated conditions of slight contusion of the surface, such as are often met with in cases in which the patient dies directly from the effects of concussion. It will be seen that certain prominent parts of the convolutions, more particularly of the anterior lobes close to the extremities of the olfactory bulbs and of the lowest parts of the middle lobes, show slight surface contusion. At most places a little ecchymosis into the pia mater is all that can be proved, but just in front of the ends of the olfactory bulbs there is more than this, and the tips of the bulbs themselves and the convolutions in front of them have evidently been somewhat broken by contusion. All that is here seen, however, must be taken rather as evidence of the violence of the shake which was the real cause of death than as having in any degree helped to that result. The patient, as will be seen from the notes, died within twenty-eight hours of his accident. He had been supposed to be dead when first taken up and he never thoroughly rallied. Although at the post-mortem lines of fracture in the base of the skull were found, and a thin clot of blood in the arachnoid cavity, yet neither these lesions nor any of those depicted in the sketch were in themselves sufficient to have caused death, nor even probably to produce alarming symptoms. A patient may have fracture of the petrous portion of the temporal bone with complete deafness and paralysis of the portio dura and yet seem to ail very little, and such cases often make rapid recoveries, and so also of each of the several proofs of injury which were found in this case. Taken collectively these fractures and contusions were proof that the head had been very violently concussed, and it was from the effect of such concussion upon the cerebral mass that the man died and not from any one of the lesions mentioned. This distinction is, I think, very important. It would be easy to put down such a case as death from fracture of the base of the skull or death from contusion of the brain, for both these conditions were undoubtedly present, but the symptoms are, I think, conclusive that they were merely the concomitants of the fatal injury. I cannot but believe that many cases of concussion which recover are attended by surface lesions at least as extensive as those seen in this sketch. There is nothing in them *per se* which would be in the least likely to cause death. In many other cases I have met with each individual lesion on the post-mortem table where the death had been from wholly different causes.

There is another way in which the same question often presents itself to the pathologist. We are asked, "Do you ever meet with death from concussion without lesions?" and it is assumed that to answer this question in the negative is equivalent to admitting that concussion alone cannot cause death. Yet so far from this being the truth my conviction is that a considerable number of the head cases, fatal within periods of a few hours or a day or two die from the general effects of the shake of the cerebral mass. Lesions are found, it is true, but they are to be regarded, I must repeat, as indications of the violence of the shake and not as causes of death, nor perhaps even as serious complications.

It is important to recognise this fact because it will help us in selecting measures of treatment in the early periods of head cases, and assist also very much in the prognosis.

Dr. Bright, in a Plate which has been often referred to, has figured spots of ecchymosis in the brain which are sometimes met with in cases of concussion (*see* Pl. XX in vol. ii). Extravasations in the deeper parts, whether punctate or of larger size, are, I feel convinced, of far less frequent occurrence than the surface bruising which I have delineated. They are, at the same time, far more likely to be attended by symptoms of local paralysis. In fig. 4 of the Plate alluded to Dr. Bright has given an excellent illustration of surface contusion from concussion.

It is of importance to note the parts of the brain most likely to be contused when the skull is violently shaken. They are, as might be expected, those which are nearest to prominent ridges of bone. Thus, the under surfaces of the anterior lobes rarely escape, and with them the olfactory bulbs are often damaged. A glance at the Plate will suffice to explain the loss of smell which those who recover from severe concussion not unfrequently complain of. The under surfaces of the middle lobes, dipping as they do into the middle fossa of the skull and surrounded by bony ridges, are also very apt to suffer. Not unfrequently very severe contusion is observed at these parts. The under surfaces of the posterior lobes resting on the tentorium are scarcely ever damaged, and their escape is well illustrated in the Plate. The following are the notes of the case to which the Plate belongs:

Abstract of Case.—*Death in twenty-eight hours from severe concussion with fracture of base of skull. Hæmorrhage from both nostrils, and slight ecchymosis of right conjunctiva; no bleeding from left ear. Paralysis of left portio dura (import of this latter symptom). Fracture of left temporal bone without rupture of membrana tympani. The fracture extending across body of sphenoid opening into both nostrils and crossing orbital plate of ethmoid.*

AUTOPSY.—*Spots of contusion and ecchymosis on under-surface of brain. Thin layer of blood between dura mater and bone in neighbourhood of fracture.*

A man, æt. 24, was struck on the back of the head by a beam of wood which fell from a scaffold. He was at first believed to be dead, and was carried in a state of entire unconsciousness to the hospital, and I saw him there a few hours afterwards. Soon after admission he regained enough consciousness to moan and to try to get out of bed. When I saw him he was pale, countenance bloated, extremities cool, respiration regular, quickened, and attended with gurgling, but no stertor; pulse 110, feeble, and with a slight jerk. When pricked he could move all his limbs, uttering at same time complaining moans; but cutaneous sensibility was much deadened, for after being pricked a few times no movements of limbs ensued. He could use his hands with very considerable power. The mouth deviated a very little to the right. The left eye was not perfectly closed, and according to the nurse's statement never had been so since admission. When the lids of this eye were held open the orbicularis did not resist in the slightest, while the same muscle on the right side sometimes resisted spasmodically. Once or twice when roused there was a certain amount of muscular expression in the entire right side of face, but never the slightest on left side. On touching his left cornea he raised his hand to resist, moaned and closed the opposite eye. Both nostrils full of dry blood and a patch of ecchymosis in right conjunctiva. There was also some blood in *right* ear, but it had probably run into the ear from the nose.

It was clear that his left facial nerve was paralysed, the fifth nerve on same side retaining its sensibility; and from this I guessed that probably the lesion of the facial was due to injury to the petrous bone, not to laceration or contusion of any part of the brain.

Three hours later I saw him again and confirmed the existence of paralysis of left facial, the fifth still being intact. He was in other respects much the same, but there was rather better reaction. Pupils equal, decidedly smaller than usual in the shade and not contracting on exposure to light, showing weakness of both third and sympathetic nerves. Sometimes he squinted strongly inwards. The nurse thought he could not swallow. All the limbs cool, almost cold, and no differences of temperature between them.

No alteration in symptoms occurred, but he made no further attempts to get up. Passed neither urine nor fæces. Died rather suddenly twenty-eight hours after accident.

The *post-mortem* confirmed the diagnosis. Separation of the bones at parieto-occipital suture. Fracture extended forwards across left temporal bone opening tympanum just behind membrana tympani, the latter being *in sitû* and uninjured. Fracture extended across body of sphenoid and into orbital plate of ethmoid opening into both nostrils and into right orbit. Left facial nerve completely torn across in its canal. Eustachian tube lacerated. The cerebral lesions were not great, consisting of ecchymosed, softened spots of contusion of the surface of the brain, not extending deeply at any part and without laceration of brain-substance. They occurred at the base of the brain, the two most conspicuous being symmetrically placed on the under-surface of the anterior lobes by the side of the olfactory lobes; they overlay prominences of bone projecting inwards, against which the brain had struck. Those occurring on other parts of the base also seemed to correspond to internal prominences of the bone; they were nearly symmetrical, but larger on the left side. One or two small clots were seen on the optic commissure and just behind it.

In left occipital region was a considerable diffused layer of blood between dura mater and bone, and some small clots on temporal bone; none of these were large enough to cause compression.

TABULAR STATEMENT OF CONCUSSION SYMPTOMS.

Having given in this fasciculus several cases which illustrate the subject of Concussion of the Brain, and having discussed the question as to its relation to certain minor lesions often met with at post-mortems, the present seems a suitable place to introduce the following detailed statement of symptoms. It has been carefully compiled from the observation and collation of many cases, and gives, I believe, a more accurate statement of the various stages than has been previously made. It will be seen from it that I by no means recognise the condition of intense congestion and ecchymosis shown in Plate XV as being an illustration of what is common in concussion; rather it seems probable, though by no means certain, that the more usual condition in the first stage is one of pallor. I wish especially to direct attention to the extreme tendency to sleep as the prominent feature of the reaction stage.

TABULAR STATEMENT OF THE STAGES OF CONCUSSION, THE SYMPTOMS PRESENT IN EACH, AND THEIR PHYSIOLOGICAL EXPLANATION.

DEFINITION.—*Shake of the cranial contents without any structural lesions of importance.*

Stages.	Duration.	Phenomena and their physiological explanation.		Remarks.
			Physiological explanation.	
1st stage. COLLAPSE (chief feature paresis (cerebral) of the heart).	A few minutes, an hour or two, or even one or two days. In the majority not more than an hour. May end in death.	Insensibility. Reflex irritability suspended. Pallor. Cold surface. Pupils neither dilated nor contracted. Feeble pulse. Feeble respiration.	Nervous centres not supplied with blood, and suffering directly from "shock." Cutaneous capillaries empty. *a.* No blood in the skin. *b.* Nervous supply suspended. Temporary shock paresis of 3rd, and vaso-motor nerves. *a.* Temporary cerebral paresis of the heart. *b.* Spasm of arteries (?). Medulla oblongata and spinal cord anæmic and suffering from "shock."	This stage always begins from the moment of the fall. If there has been a period of consciousness first then hæmorrhage is to be suspected.
2nd stage. RALLYING; (*vomiting stage*). Recovery of the heart from its temporary paresis, with partial relaxation of arterial walls.	A few minutes or a few hours, rarely longer than twelve hours.	Partial sensibility. Reflex irritability partially restored. Return of warmth and colour. Vomiting. Better pulse and respiration.	More blood supplied to brain. More blood to brain, medulla, and spinal cord. Cutaneous capillaries better filled. *a.* Previous arrest of digestion. *b.* Recovery of pneumogastric nerves from paresis. Recovery of heart from temporary paresis.	Vomiting is very often the symptom which ushers in this stage.

Stages.	Duration.	Phenomena and their physiological explanation.		Remarks.
			Physiological explanation.	
2nd stage (*continued*).		Mental distress and uneasiness.	Irregular and, as yet, insufficient supply of blood to different parts of the brain.	
		Subjective cold, with shuddering.	*a*. Supply of blood still imperfect. *b*. Still persistent spasm of arteries (?).	
3rd stage. REACTION; "sleepy stage" (full recovery of the heart's power; paresis of the arteries).	Three to ten days.	Reflex irritability tolerably good.	Nervous centres now well supplied with blood and not themselves structurally damaged.	Should any indications of local paralysis be present they are to be referred to local lesions, and not to the concussion proper.
	There is no risk of death in this stage unless, in addition to the general concussion, local contusions have been received, about which softening may occur.	Great sleepiness, but may be aroused.	Doubtful.	
		Consciousness when awake.	Brain not structurally damaged.	
		Occasional restlessness.	Certain parts of the brain irregularly supplied with blood (possibly contused).	
		Large, slow, full pulse.	Paralysis of arteries.	
		Intermittent pulse.	Rhythm of heart disturbed by shake of the medulla.	
		Surface hot and flushed.	Full supply of blood to skin on account of paralysed arteries.	
		Surface dry.	Activity of sudoriparous and sebaceous glands in abeyance.	
		Tongue dry or dryish.	*a*. Patient sleeps with mouth wide open. *b*. Activity of buccal and salivary glands in abeyance.	
		Bowels constipated.	*a*. Paresis of intestinal walls. *b*. Non-secretion by intestinal glands.	
		Bladder tolerant of distension.	*a*. Paresis of its muscular walls. *b*. Diminished sensibility of nervous centres.	
		Pupils contracted when asleep and normal at other times.	Recovered function of vasomotor and 3rd nerves.	
		Mental faculties confused.	Passive congestion of brain.	
		Irritability.	Irregular circulation of blood in brain.	
4th stage. GRADUAL CONVALESCENCE.	Indefinite.	Gradual return of memory and other mental faculties. Irritability of temper and tendency to outbreaks of passion. Susceptibility to the influence of alcoholic stimulants. Headaches.	Imperfect recovery of the vasomotor system and easy production of local turgescence of vessels	Some of the symptoms mentioned in this stage often remain for years as the sequelæ of severe concussions.

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INFLAMMATION OF PIA-MATER &c AFTER WOUND OF BRAIN (W RICHARDSON'S CASE)

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PLATE XVII.

SUB-ARACHNOID MENINGITIS ON SURFACE OF HEMISPHERE.

In Plate XIV I have given an illustration of the appearances produced, when the products of inflammation are collected in the large subarachnoid spaces at the base of the brain. Our present portrait may be suitably compared with it, since it shows the results of effusion in the same anatomical position, but on the surface of the hemisphere. On carefully looking at the Plate it will be observed that, although the parts are very much concealed by an envelope of greyish-yellow effusion, yet the convexities of the convolutions may be detected almost everywhere, and that in many places where the sulci are occupied by effusion they stand up bare and clean. This feature is characteristic of inflammation *under* the visceral arachnoid in contra-distinction with arachnitis. The latter condition is present when the inflammation-product lines the arachnoid itself, and when this is the case all parts are equally concealed. As an example of the latter the reader may consult Plate XIII. It is a most undoubted pathological fact that the delicate arachnoid membrane is, in many instances, quite sufficient to limit the effusion, and good examples of the two forms not unfrequently present themselves. In some the two conditions occur together; but, curiously enough, this is rather exceptional. When there is a layer of puro-lymph lining the arachnoid there is but seldom any in the subarachnoid spaces, and when the latter are occupied the arachnoid in its upper surface is usually free. Care must be taken in performing the autopsy that the visceral arachnoid be not cut through, otherwise effusions, which were in reality bound down beneath it, may easily be made to escape into its cavity. If this have happened, however, it will usually be easy to recognise the fact, since there will be no coherent lymph-layer, and the effusion, which will be perfectly fluid, will be found only near to the site of post-mortem injury and will be easily sponged off. In the present instance the notes state that there was fluid pus in the arachnoid. This fact does not, however, in any degree detract from

the value of the Portrait as illustrating the conditions peculiar to inflammation *under* the visceral serous membrane, for all effusion external to it had been carefully washed off before the artist began his task. The manner in which the pus follows the sulci is well seen in all parts, and it is very considerable in quantity. At those parts where islands of prominent convolutions are seen, it is to be observed that the arachnoid is quite transparent and allows the congested pia mater to be easily seen through it.

The pia mater on parts near to those occupied by effusion is much congested. Some of the large veins leading from the effusion are plugged with blood-clot. A large laceration is seen in the posterior part of the middle lobe, which was the cause of the inflammatory changes. The brain-substance immediately adjacent to it was softened and discoloured.

Although I have used the term *inflammation of pia mater* in connection with this Plate, I am in some doubt as to whether it would not be more correct to speak of it as inflammation of the posterior surface of the arachnoid. The inflammatory products accumulate in the spaces but avoid the tissue of the pia mater itself, and certainly do not usually pass with its vessels deep into the sulci or into the brain-substance. Witness the clean appearance of the convexities of the convolutions, which certainly show neither opacity of arachnoid nor thickening of pia mater. More precise examination of the structures concerned is, however, desirable before a definite opinion can be given on this point.

As regards the causes of this form of meningitis we may state now that it may occur whenever the visceral arachnoid is wounded, or whenever a nerve-trunk passing to the subarachnoid spaces is involved in a compound fracture. If an inflammation be set up by contusion of bone and preceded by osteitis then it will probably be arachnitis proper; and if in a compound fracture of the skull the arachnoid sac be opened, whilst the brain escapes laceration, then also, probably, the effusion will occur upon the arachnoid and not under it. It follows from the fact that laceration of the visceral layer of arachnoid must precede this form of inflammation that it will be often complicated with encephalitis, since the brain-substance will be, almost always, injured at the same time.

The fact last mentioned will explain why it is difficult to assign special the symptoms of this state of things without much risk of error. Since there is almost invariably a risk of encephalitis as well, we might be attributing to the surface effusion, symptoms really due to inflammation of the brain mass. Thus, in the present case the

hemiplegia of the opposite side, which was present from within a few days of the accident, may have been due to the inflammatory softening of the middle lobe around the wound, or to spreading of the inflammatory changes to the whole hemisphere. This encephalitis which to greater or less extent was undoubtedly present may quite as easily have caused the symptom as the surface effusion. We have seen that effusion at the base of the skull into the sub-arachnoid spaces rarely produces paralysis, but whenever the surface of a hemisphere is extensively involved (as in this Plate) it is in a high degree probable that hemiplegia of the opposite side would result. I do not, however, possess any uncomplicated cases which I could cite in proof.

The following are the particulars of the case. The patient was under the care of my colleague, Mr. Couper, by whom it has already been published in vol. ii of the 'London Hospital Reports.'

Abstract.—*Large punctured and compound fracture of the petrous bone on the right side, with wound of middle lobe of brain. Death from meningitis on the tenth day; Autopsy.*

June	7	Tu.	A house painter fell from his ladder and impaled the base of his skull on the spike of a palisade, sustaining a very severe punctured fracture into the right middle fossa. Partial insensibility; great difficulty in extracting the fragment; bleeding from right meatus, and deafness in this ear.
	8	W.	Pulse 120. Quite conscious; restless; some sickness.
	9	Th.	Pulse 102. Restless; discharge of bloody serum from right ear; face drawn to left (injury to facial trunk); no paralysis of any limb; skin very hot.
	10	F.	Less restless. Pulse 96. Wound suppurating.
	11	S.	Restless. Pulse 98. Delirious at times.
	12	S.	Delirious and restless. Stimulants given.
	13	M.	Restless, but better in some respects. Pulse 88. Fretful, but rational; left arm weak.
	14	Tu.	Left arm and leg paralysed; three convulsive attacks, affecting the right limbs and half of face.
	15	W.	Left limbs quite paralysed.
	16	Th.	Death at 8 a.m., after a convulsion.

Autopsy.—*Fluid purulent effusion in the arachnoid sac, and also in the sub-arachnoid spaces.*

W. R—, a painter, æt. 25, fell to the ground, twelve feet, from a ladder, and impaled the right side of the base of his skull on the spike of an iron palisade. He immediately rose to his feet, exclaiming "oh, my head!" then staggered, again fell and became insensible. He was at once carried to the hospital and recovered enough to answer questions between one and two hours after accident. There was a clean cut

wound three quarters of an inch long immediately under the right ear, partly overlapped by its lobule. An eye-witness of the accident told us that he thought the wound had been made by the tip of one of the iron palisades of the house where the accident happened, and he believed that a piece of metal was still in the patient's head; for the spike was seen to be freshly broken and the missing bit of iron could not be found. On examination of the wound the end of a large rough piece of metal corresponding to the description was felt.

When Mr. Couper saw the man, about five hours after the accident, he was quite conscious, could speak, but was drowsy; face flushed, radial pulse bounding. The iron was very close to the ramus of jaw, but did not impede its movement at all; right ear quite deaf, left hearing well. There were no signs of paresis or paralysis of any muscle supplied by right facial nerve, though it seemed likely from direction taken by piece of iron that this nerve had been injured. There was bleeding from the right ear, but no signs of injury to the orbit or to any orbital or ocular nerves. There were no one-sided symptoms indicative of implication of brain or its membranes. (Limbs, skin, vision, ocular muscles and pupils carefully tested.) The edges of the outer (broken) surface of the piece of iron could be easily felt, and its direction in the skull could be inferred from the position of its visible portions to be upwards, inwards, and a little forwards from the outer wound, which was situated half an inch under the external meatus between mastoid process and ramus of jaw.

The house-surgeon had enlarged the skin wound and spent an hour in trying to extract the iron without success before Mr. Couper saw the man; it was so firmly fixed that he had broken a pair of forceps in the attempt. Having placed the patient under chloroform, Mr. Couper succeeded after much forcible wrenching in extracting it, the head being as far as possible steadied by three students and by the operator's hand. During these efforts blood oozed from the wound to the extent of three or four ounces, and about the same quantity had previously been lost during the house-surgeon's effort. After the iron was out the bleeding ceased almost immediately, but a small quantity of semi-fluid brain substance flowed out (about as much as could be piled on a shilling). The brain matter was verified microscopically. The accident and operation were on June 7th. After the extraction the head was shaved and ice bags applied.

8th.—Conscious and can speak, but soon becomes torpid and appears to sleep much. Pulse 120, soft. Thirsty. Restless when approached.

9th.—Quiet last night. Pulse much smaller, 102. Is more collected and less drowsy; some of his acts are childish. Soft parts in track of wound inflamed. Much pain in examining the wounded part, and he will not allow a thorough examination. Decided evidence of paresis of right facial nerve, but no other one-sided symptoms. When asked as to numbness, &c., says that he had pins and needles in *right* leg, which, however, soon went off. Left side of scalp freely blistered; wound poulticed; ice bag to right side of scalp. Bloody serum continually runs from right ear.

10th.—Blister has not risen. Bowels freely opened (after purgatives yesterday). More composed, less tossing of limbs; he lies a long time quiet in the night and thinks he slept. Wound suppurates freely. No vomiting. Less childish and emotional; more spontaneous intelligence. Evidence of facial paralysis much less marked. Pain and difficulty in opening jaw owing to swelling of wound, &c. No signs of any other paralysis than the facial. Skin cooler. Pulse 90—96, better volume.

11th, *noon.*—More fever. Pulse 98. Wandering in night. Restless. Left scalp again blistered.

Afternoon and Evening.—Pulse 110. Alternately sleepy and in wakeful delirium, but sensible when spoken to loudly. Scalp not blistered; large fly-blister put on.

12th.—More delirium. Blister has partly risen. Pulse softer. Brandy begun.

13th.—Pulse much better volume and slower. Restless and childish. Wound suppurating freely. Less serous oozing from ear. Extremities become white and cold if uncovered, while trunk is hot and burning.

2 p.m.—No paralysis of limb, nor anæsthesia.

5 p.m.—Movements of *left* arm weak and sluggish.

14th.—Three fits of convulsion, each of a few minutes' duration, and affecting *right side* of body and face only, in the morning.

Afternoon.—More delirium and restlessness, with lucid intervals. Both sensation and motion much impaired in left half of body, more in arm than leg. Skin of *right face* hyperæsthetic, though not now involved in inflammation from contiguity to the wound.

15th.—Pulse 120—130. Left hemiplegia more complete. Barely conscious in the morning, and since then quite comatose, breathing heavily with eyes closed. No movement of any facial muscles excepting those of the nostrils. Occasional twitching of right forearm. Power of swallowing liquids partly retained, but some goes into larynx and excites cough. Still rouses himself occasionally and utters inarticulate sounds, apparently in the effort to speak.

16th.—Died at 8 a.m.—A few hours before, he had a convulsion described as like the former but less severe.

Post-mortem.—No pus between dura mater and bone; dura mater healthy except unusual congestion. On opening dura mater the surface of the right hemisphere was seen to be coated with thick creamy pus coming up to longitudinal fissure, but none within the fissure. Under the arachnoid were the conditions displayed in the portrait. No sign of arachnitis of left hemisphere except slight recent purulent exudation at front part of Sylvian fissure. The larger veins in the sulci on right side generally full of blood.

The posterior part of the right middle cerebral lobe had been deeply wounded by the iron spike, and the brain substance there was softened, of dirty grey colour and streaked with pus. The cerebrum and cerebellum were carefully examined by slicing in all parts, and the whole brain substance, excepting the softened and discoloured parts in immediate neighbourhood of the wound and of the island of Reil, was to all appearance sound; neither engorgement, nor ecchymosis, nor softening, nor discolouration anywhere.

The spike had entered just under apex of mastoid process, traversed the internal ear, and driven several irregular masses of anterior surface of petrous bone (where it forms the roof of the semicircular canals) through the dura mater. A few streaks of blood lay on inner surface of dura mater within the middle fossa of base of skull just in front of the track of wound. The fragments of bone in the wound were discoloured by pus and blood.

INFLAMMATION OF DURA MATER (ALMOST GANGRENOUS) WITH PLUGGING OF VEINS AND COMMENCING THROMBI IN THE LONGITUDINAL SINUS (WELCH'S CASE)

W. West & Co. chromo. lith.

LEEDS & WEST RIDING
MEDICO-CHIRURGICAL SOCIETY

PLATE XVIII.

THROMBOSIS OF LONGITUDINAL SINUS (WITH PYÆMIA) AFTER OSTEITIS.

We have hitherto illustrated cases in which death was caused directly by inflammation either of the brain substance itself or of its membranes. In the next four Plates we have to deal with certain cases in which the local lesion does not kill by itself but by the production of secondary blood changes, which, as a next stage, cause visceral disease. I do not, indeed, know of any class of cases by which we may more conveniently illustrate the chain of phenomena which make up what is known as "pyæmia" than those which we have now to consider. In the instance of the head we can very easily inspect the inflamed bone, the membranes containing the veins which pass from it, and the large sinus into which they open. I cannot conceive that any one familiar with the pathological facts respecting these cases can doubt that pyæmia proper is due to inflammation of veins. I am not without a hope that the publication of these four plates may have some effect in bringing back professional opinion to the old and more correct belief as to the chain of processes which make up this disease. We have to witness in these cases over and over again inflammation of the bone, first, as shown in Plate XX; next, extension to the dura mater, as seen in Plates XVIII, XIX, and XXI; and lastly, the formation of a thrombus in the longitudinal sinus. In every case in which pyæmia follows an injury to the skull these conditions are found, and they are not found in any other cases. We never in other cases find a thrombus in the sinus in the least similar to those which I have now to describe, and that it is the result of direct extension from the veins of the part no one can doubt. If it were as easy to inspect the veins of the uterus after deaths from pyæmia after parturition, or of the limbs after the like event after operations or compound fractures, in all probability evidence of a character just as definite would be forthcoming. In these instances it is, however, easy to miss the vein implicated unless a very detailed dissection be made.

Hence, I repeat, the special value of the lessons which we learn in connection with these injuries to the skull where the venous system is so easily inspected.

In Plate XVIII we have the dura mater exposed by removal of the calvaria, and the superior longitudinal sinus laid open through its whole length. The surface of the dura mater on the right side shows several patches of inflammation where the membrane is either covered by a layer of lymph or is in an ashy grey condition, as of impending gangrene. In the sinus on the side next to the inflamed tracts and adjacent to them are seen bulging yellow masses, which are parts of a thrombus which was more or less continuous. This thrombus is in part concealed by red blood-clot which loosely adheres to it. I wish especially to draw attention to the fact that the thrombus is connected with the mouths of veins opening into the sinus, and that it has no attachment to the veins from the right side, which is free from inflammation.

The drawing in this instance was not done by Burgess, and does not attain the standard of excellence which some of the others show. It is, however, faithful to nature, and as it shows better than any other that I possess the connection of the thrombus with the several patches of inflamed dura mater, I have thought it well worthy of reproduction. The precise characters of the thrombus will be better described in connection with Plate XX. The following are the details of the case :

Abstract of Case.—*Lacerated wound of the scalp by a dog-bite. Exposure of bare bone. Excellent progress for a fortnight. Severe rigor on the fourteenth day. Recurrent rigors. Double pneumonia. Death. Autopsy.*

Oct.	15	S.	John Welch, a healthy boy, æt. 10, had his scalp severely torn by a dog.
	16	☉.	No head symptoms.
	17	M.	Doing well.
	18	Tu.	
	19	W.	Is doing very well; wounds healthy.
	20	Th.	
	21	F.	
	22	S.	He is up and about the ward.
	23	☉.	
	24	M.	Wounds fast closing; one is quite healed.
	25	Tu.	
	26	W.	
	27	Th.	For the last ten days he has been up constantly, and seems quite well.
	28	F.	Felt poorly, and could not eat so well as usual.
	29	S.	The first rigor—a very severe one. There is still bare bone.

Oct.	30	S.	Repeated rigors; frontal headache.
	31	M.	Rigors; pneumonia discovered on right side.
Nov.	1	Tu.	Repeated rigors; not very severe ones; dyspnœa.
	2	W.	
	3	Th.	Rigors still recur; rapid pulse, and no appetite.
	4	F.	Rigors; no paralysis; no cerebral symptoms.
	5	S.	Increasing dyspnœa and debility.
	6	S.	Much the same; no cerebral symptoms; quite rational.
	7	M.	Died. Œdema of scrotum and left lower extremity.

Autopsy.—*Death of a large portion of parietal bone. Pus between dura mater and bone. Puriform thrombus in longitudinal sinus; left iliac vein occluded. Deposits in lung, liver, and spleen.*

John Welch, a healthy boy, æt. 10, was attacked by a large dog, knocked down, and his scalp extensively torn. This was on October 15th. He was admitted into the hospital directly after receiving the injury. He had a triangular flap of skin including all the tissues of scalp, torn up from the left parietal bone. The pericranium was laid bare, but not torn up, excepting perhaps, at a few points. It bled rather freely. It did not appear that the lad had received any blow in his fall; the injury was a *laceration*, not a contusion.

The flap of skin was adjusted in its place, and for some time all went on perfectly well. The boy had no cerebral symptoms whatever, and in the course of a week the wound was looking as if it would soon be healed. It was granulating freely. The boy was now allowed to be up and about the ward, indeed, he had only kept his bed for a day or two after the injury.

On October 28th he did not eat his dinner quite as well as usual, but nothing particular was noticed; the wound was looking a little pale.

On Saturday, 29th, whilst up and at dinner, the nurse noticed that he was crying, and on asking the matter found he was cold and shivery. He was at once got to bed, and the house-surgeon was sent for. A very severe rigor followed, and lasted for nearly twenty minutes, being succeeded by a very hot skin, and profuse sweating. During the rigor, for a time the pulse at the wrist could not be felt. The pupils were widely dilated. At four in the afternoon, about four hours after the rigor, I saw the boy; he was in bed and looked flushed and feverish. Skin hot and moist; pulse 120, sharp and irritable; tongue a very little furred; pupils rather small, of equal size, and quite active. The right hand and arm were decidedly hotter than the left.

The boy at first said he had no headache, but afterwards, on being asked where he had pain, put his hand to his left forehead, and said that he had had pain there. It was impossible to ascertain whether he had had headache for some days or not. Indeed, the misleading character of juvenile testimony was most forcibly shown in this case, for he denied that he had ever shivered or felt cold at all, although I put the question in all forms I could think of, to make him understand it. He had eaten no dinner to-day. His wound now was a granulating surface, about two inches long at the anterior angle of which a surface of dry bare bone, the size of a threepenny-piece, was exposed. The granulations were pale and glassy.

30th.—Another rigor; he complains much of frontal headache.

31st.—The right pupil is the larger; the left, probably, contracted. Yesterday he had three severe rigors, followed by sweating. He has complained much of pain in his head. At present he looks quite comfortable; his face is not flushed; his conjunctivæ are pale, and eyes clear and brilliant, and, excepting that he is a little

pale, no one, to look at him, would suppose that he ailed anything whatever. His tongue is a little furred, but only very little; he is said to have had a restless night; he does not eat, but he has had no vomiting.

November 1st.—He has now very decidedly the aspect of pneumonia. He is lying with his shoulders elevated; his breathing is short and quick, and his aspect flushed and dusky. There is comparative dulness over the base of right lung, and small crepitation is heard at the end of the inspiratory murmur. Respiration on the other side is quite clear; he is flushed; his lips are blue, mottled, and dry; respiration rapid and short. His mother, who is staying with him, states that he has had several attacks of what she calls "inward convulsions" during the morning, which appear to have been a minor form of rigor. Her description is that "his nose and ears get quite cold, and he looks very pale, but with spots of red here and there; he looks very bad, grins and shudders a little, does not shiver; as these pass off he gets very hot. His pupils to-day are almost equal in size; the right a little larger than the left; both of them contract well on exposure; but, when fully contracted, the right is still a little the larger. He has a short troublesome cough; skin very hot and, at present, dry; pulse 140, large, sharp, compressible; he is perfectly conscious; he has no degree of paralysis, and can move both arms; he does not complain of pain.

He is reported to vary much at different times in the day. He takes only his milk and beef-tea.

The discovery of the local signs of pneumonia, to-day, is strongly confirmatory of the opinion that rigors denote the occurrence of suppuration in secondary deposits. It is only three days since he first shivered. Had we examined the lungs earlier, perhaps we should have discovered the pneumonia even at an earlier date.

2nd (Wednesday).—He seems better than yesterday. Respiration more easy. He still has a short hacking cough, and expectorates a little mucus—very little, and never blood-stained. No further rigors (arterial spasm) have occurred. Pupils of equal size. It would now appear, judging from their present size, that on Monday the right pupil was dilated; the difference on that day was very marked. He lifts both arms easily. There is not the slightest sign of paralytic weakness. The right lung seems to me to be less dull than yesterday, but small crepitation is still very clearly heard. The left lung is clear (at the base at least). He passed a fairly comfortable night. Doubts have been expressed as to whether this boy is or is not the subject of pyæmia. His tongue is very slightly furred. He looks comfortable, excepting the blueness of lips, which is less than yesterday. That he is suffering from pneumonia all must admit, and that the pneumonia does not produce the usual train of symptoms (no rust-coloured sputum; no great dyspnœa; tongue almost clean, &c.). He has had a series of rigors of the most marked character. If there had been but a single rigor, it is very possible that it might have been indicative only of pneumonia; but their occurrence seems to me to denote pyæmia. This diagnosis is also favoured by the fact of his apparent improvement at times and great variations in condition.

We must note, as to the condition of his wound, that it is secreting a very fair quantity of healthy cream-like pus. Its granulations are much better than they were, and fairly florid.

During the last three days of this week, he continued much in the same condition; his thoracic symptoms being on the increase. He had pleuritic friction-sound on the right side. He emaciated rapidly. There was a circumscribed patch of redness on each cheek. His consciousness was perfect up to the last, and he had neither paralysis nor convulsions. The edges of the wound shrivelled, and all trace of granulations disappeared. Rigors occurred several times each day, but were not of great severity.

He died on November 7th, and the post mortem took place on the following day. There were soft, recent pleuritic adhesions on both sides. Both lungs con-

tained very numerous pyæmic deposits in all stages of progress, some of them containing from half a drachm to a drachm of purulent fluid. The liver also contained many abscesses; and there were patches of pyæmic thrombosis, not yet softened, in the spleen. The kidneys were healthy. Beneath the wound of the scalp was a portion of bone the size of a crown-piece, which was quite bare and of a greenish colour.

The edges of the wound were thin and quite loose. On removing the scalp the pericranium was found to be loose over a surface as large as the palm of the hand, and comprising, in fact, almost the whole of the parietal bone. The bone thus exposed was white, tinted with green, and here and there mottled with red. There was a recent cicatrix in the scalp, crossing the vertex transversely just above the parieto-occipital suture.

When the scalp was taken up at this part, the pericranium, which was thickened and inflamed, came with it, and a little pus exuded from some torn vessels entering the sagittal suture. The bone on both sides the sagittal suture at this part was green and discoloured. On subsequently applying the trephine at this spot, dirty green pus was made to exude on the inner surface of the bone. This pus had a fœtid odour. It must be observed that this portion of inflamed bone extended on each side the sagittal suture, and that it was under, not an open wound, but a soundly healed one. Between the dura mater and the bone, at the parts where the latter was inflamed, patches of pus were found, but there was no large accumulation, merely a thin layer. From these patches, veins, distended with a puriform fluid, might be traced to the superior longitudinal sinus. The sinus itself contained in part a recent black blood-clot, and in part a dirty puriform thrombus.

The thrombus tailed off and ended at the torcular Herophili. It was very much increased in size at the positions where the distended veins entered the sinus. There was no thrombus at the anterior third of the sinus, that is, in front of the inflamed tracts of bone; nor was there any in the right half of the sinus until we passed back to the part where the inflammation of the bone extended on each side of the sagittal suture.

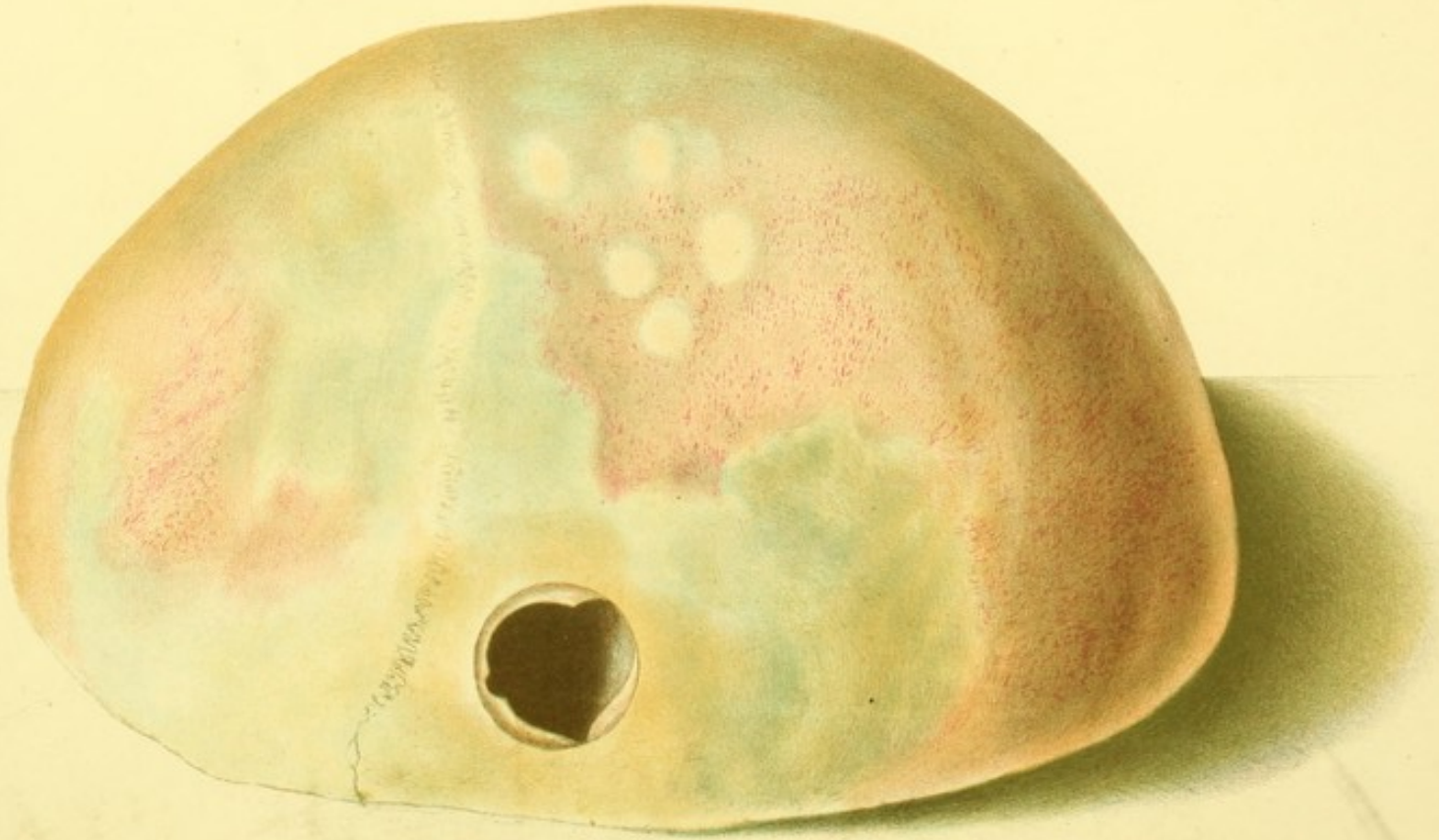
The parietal arachnoid presented, immediately beneath the inflamed portions of dura mater, some very slight evidences of inflammation. There was no lymph whatever on the visceral arachnoid, nor any discoloration of the cortical substance of the hemispheres.

The ventricles of the brain contained a little serum. The lateral sinuses and the cavernous sinuses contained only recent dark blood-clot. The middle of the bone at the inflamed part was green and contained no blood. It had been noticed that the boy's scrotum and left thigh and leg had become œdematous on the day before his death. In the left common iliac vein we found a blood-clot which completely plugged it. The greater part of the clot was evidently recent, but embedded in its inner side was a long piece of pale fibrine, much like the fragment of a tapeworm, which was very easily separated from the rest. In the blood of this clot the microscope showed numerous cells which exactly resembled those of pus. The blood of the superior longitudinal sinus showed similar cells, but in smaller numbers. The thrombus in the longitudinal sinus contained no red blood-cells, but was made up of molecular matter, *debris*, and cells like those of pus.

The specimens showed clearly in this instance that the process going on had been inflammation of bone, and not merely death of an exposed part. The area involved was very large. The effusion of fluid pus into the bone-structure was most free at the sutures; thus, the line of the left half of the coronal suture was marked out on the surface of the dura mater by the yellow purulent effusion. The inflammation, however, did not limit itself by the sutures, for in two or three places it had passed a little beyond both the coronal and the posterior part of the sagittal sutures.

The fact that inflammation of bone had taken place beneath the healed scar, as

well as at the open wound, was very interesting. The parts were, however, near together, and it is possible that the process was lighted up, in the first instance, at the open wound. There was, however, no spot more acutely inflamed than that beneath the scar.



OSTEITIS OF THE SKULL AFTER LACERATION OF SCALP AND SEVERE CONTUSION OF BONE. SECONDARY TREPHINING (SMITH'S CASE.)

W. West & Co. Lith.

LEEDS & WEST RIDING
MEDICO-CHIRURGICAL SOCIETY

PLATE XIX.

GANGRENOUS INFLAMMATION OF THE SKULL BONES AFTER CONTUSION.

THIS portrait, although taken from another case, might well represent the state of the skull in that just described. It illustrates the discoloration which occurs as a consequence of the osteitis, which is the first stage of the pyæmia process when it follows contusion of the skull. A large irregular area of bone, abruptly margined as if part of a map, is seen to be discoloured and of a greenish-yellow tint. The parts adjacent are pink with congestion,* but the discoloured area has lost its vessels. It is obvious from the shape and size of the patch that the inflammatory process which has produced it must have been spreading gradually at its edge. It probably commenced near the middle about where the trephine opening is seen. It will be observed that the coronal suture has not limited it. Where the bone is discoloured section showed its substance infiltrated with a dirty greenish pus and quite destitute of blood. The under surface of the diseased patch was lined with a sticky puro-lymph.

The following are the details of the case from which the specimen was obtained :

ABSTRACT AND DIARY OF CASE.—*Severely lacerated and contused skull; inflammation of bone and acute arachnitis.*

July	21	Tu.	Edward Smith, a boy, æt. 10, had his scalp on left side extensively torn up by a cart wheel.
	22	F.	No head symptons. During three days he took food well and seemed doing well, excepting that he was irritable in manner.
	23	S.	
	24	☉.	
	25	M.	
	26	Tu.	A severe rigor. Skin hot and dry. Tongue furred. Pulse 104.

* In reference to the deep pink tint of the congested parts, it is necessary to remember that the skull is that of a child in whom the osseous consolidation was as yet incomplete.

July	27	W.	Still fretful. Hands cold and damp at times, and others very hot. Left pupil rather the larger.
	28	Th.	A little sickness.
	29	F.	Increased febrile symptoms. Uses his right limbs less freely than the left.
	30	S.	Pulse 102.
	31	☉.	Very restless and hot. Partially conscious. Will not speak. Pupils small. Hemiplegia of right side.
Aug.	1	M.	Worse. Almost unconscious and exceedingly restless. Trephined, and dura mater opened.
	2	Tu.	Discharge of thin pus from arachnoid cavity. Right limbs paralysed.
	3	W.	Death.

Autopsy.—*Osteitis and arachnitis on the left side. Thrombus in the longitudinal sinus. No deposits in lungs or liver.*

Edward Smith, æt. 10, admitted July 21st.—A wheel had passed over his head (?). There was a very extensive laceration of the scalp on the left side, laying bare the parietal bone. He had no special head symptoms when he came in, beyond being slightly stunned. During the first few days he took his food, was perfectly conscious, and seemed to be doing well. No paralysis was noticed; he was irritable at all times, but was believed to sleep well.

My first visit, July 26th, 2·30.—There is a large portion of bone exposed above the left ear, white and dry, as large as a crown-piece. His tongue is dry and red in the centre and covered with thin white fur at the sides. The laceration extends downwards in the cheek in front of the ear and may possibly involve branches of the facial, but his cheek is too much swollen for us to ascertain this fact. Pulse 104 and feeble. Skin rather hot. There does not appear to be any paralysis. He takes his milk and beef-tea pretty well, but is fretful and irritable. The legs decidedly hotter than natural, and dry. Skin everywhere dry.

27th.—Was asleep, but woke up with a start when I touched his skin. Hands and arms cold and damp. Tongue more furred. Still fretful and peevish. Can use both hands much alike, but is rather weaker on the right side. His peevish condition makes it difficult to arrive at a satisfactory conclusion on this point. Pupils active. Left pupil perhaps rather larger than the right.

28th, Thursday.—Says he feels better. Has tried to vomit, but only brought up water.

29th.—We learn to-day that on Tuesday evening, the 26th, he had a strong rigor which lasted twenty minutes. The nurse called the house-surgeon who gave him brandy. To-day he is more feverish. His tongue is drier. Skin pungently hot and dry.

30th, 3 o'clock. Is fretful, very thirsty and always complaining. Pulse 112. Wound without granulations, looking glazed.

31st, 12 o'clock.—Nurse reports that he is very restless, trying to get out of bed, but cannot stand. Hands cold. Surface of trunk very hot and dry. Pupils small. The left is the smaller of the two. Both pupils act somewhat, little or no congestion of the conjunctiva is present. He passes his urine involuntarily, and he cannot be got to speak. Pulse very feeble and quick. He uses all his limbs at times, but those of the right side more feebly than those of the left. Legs hot and dry. Feet cool. We cannot make out that he has paralysis of either side of the face. His aspect is dusky. He lies on his right side, doubled up, with his mouth

open. Lips and teeth covered with sordes, tongue dry and brown. He kicks at the bed clothes. He evidently has considerable power in both arms, but he uses the left limbs much better than the right. Symptoms much as yesterday, excepting that the paralysis of the right arm and leg, though still incomplete, is more than it was.

August 1st.—The skull was trephined by my colleague, Mr. Little, in the middle of the exposed part of bone; that is two inches directly above the left ear. The dura mater when exposed was seen to be covered with yellow lymph. No fluid escaped. The dura mater pulsated pretty freely. It was cut through, and about a drachm of thin purulent fluid escaped at once in a jet. The opening was enlarged, but no more fluid escaped. The visceral arachnoid exposed by the incision in the dura mater was seen to be covered with lymph. 5 o'clock.—The edges of the wound in the dura mater are glued together with blood. On reopening them again at least a drachm of thin fluid ran out.

2nd, 10 o'clock a.m.—He still uses his left arm. The brain substance, covered by pia mater, bulges into the wound. It pulsates. The gap in the dura mater is wide open. When the brain is pressed back with the finger thin pus runs out from the arachnoid cavity in considerable quantity. The right pupil is slightly larger than the left. The conjunctiva is suffused. He lies with his mouth wide open and with his eyes only partially closed. The left eyelids especially are widely apart. His cheeks are dusky and rather yellow. His teeth and tongue are covered with black sordes. His aspect is like that of a patient in the last stage of fever. His face and hands are very hot, and his pulse feeble and very rapid. *He never uses his right hand.* His respiration is very rapid and he moans occasionally. He resists when he is irritated, but he allows the cornea of either eye to be touched. During the operation it was distinctly noticed that he moved the right side of his face without moving the left, which latter appeared to be almost, if not completely, paralysed. It must be remembered that the original wound comes down in front of his left ear, and may have damaged some of the branches of the portio dura in the cheek itself. The swelling of the cheek may, very possibly, have prevented our appreciation of the paralysis in this side earlier. Death took place early on the morning of August 3rd.*

Post-mortem, August 3rd, 1864.—Beneath the trephine aperture there was now a considerable hollow, the brain having sunk back. The bone around was green, dry, and discolored. No fissure could be found in it. The calvaria with the hemispheres *in sitû* was removed. On taking out the hemispheres, the left was found covered all over with a layer of thick creamy pus. This pus was partly fluid in parts, and little or no fluid had escaped during the removal of the skull cap. The other hemisphere was not inflamed, and the contrast between the two was most remarkable. The dura mater had been left *in sitû* in the calvaria, and showed this limitation of the inflammation to one side only in a most striking manner; everywhere in the left cavity the parietal arachnoid was concealed by a thick deposit of puro-lymph, whilst everywhere on the right side the membranes were perfectly free from inflammatory deposit, and were polished and glistening. On the left side of the falx the inflammatory deposit extended as far as its free edge, but did not pass under this edge, and the right side of the falx was perfectly smooth and clean. The veins entering the superior longitudinal sinus were, on the left side, distended with soft coagulated blood. The anterior part of the sinus itself was almost empty, and its lining membrane smooth, but in the middle two thirds it contained, in its centre, a yellow

* In this case it is certain that, at the time of the operation, the right portio dura was not completely paralysed. On the contrary, the right side of the face was once contorted a little, whilst the left remained smooth, quite contrary to the usual rule. It is possible that the apparent paralysis of the left side was due to injury to the cheek, for the wound in the latter extended downwards in front of the ear. Still, this difference in the action of the two sides of the face had never been noticed before, and we had several times made the note that there did not appear to be any facial paralysis in the early part of the case.

thrombus, which did not adhere to its sides. Its sides were here coated with deposit, which in places presented all the characters of fluid pus—a puriform fluid could be pressed out of the orifices of some of the veins communicating with the sinus. The lymph which covered the lining membrane of the sinus adhered pretty firmly. The posterior fourth of the sinus contained a thick clot of blood and fibrine, which did not adhere to the lining membrane, and the latter here was perfectly smooth. The lateral sinuses contained soft jelly-like coagulum and fluid blood. At the base of the brain the inflammation had extended under the anterior part of the middle lobe where there was a certain quantity of lymph. There was no lymph whatever on the under surface of the anterior lobe, and scarcely any on the surface of the tentorium. There was no sign of inflammation about the roots of the cerebral nerves, nor any on the opposite side. It will be seen therefore that the inflammation, although so acute and so extensive, was remarkably limited, involving only the whole upper and lateral aspects of the left hemisphere, and the under surface of its middle lobe. On section of the brain-substance, the grey matter of the inflamed hemisphere presented a greenish tint. The discoloration was remarkably perceptible in the under surface of the anterior part of the middle lobe, where it involved the entire thickness of its cortical structure, which instead of pink presented a dirty greenish-grey hue. This part contrasted strongly with the adjacent anterior lobe, which not being inflamed was of a healthy pink tint. From the parietal arachnoid in the middle fossa of the skull a layer of gelatinous yellow lymph might be peeled, which was very different from the opaque purulent lymph which covered other parts. The anterior part of the middle lobe on the right side was contused and softened, but without any positive ecchymosis. In the right crus cerebri near to its anterior and inner surface were two or three small but very distinct clots of blood. The largest of them did not exceed the size of two pins' heads, and the others which were near to it were mere points. The pons, medulla, and cerebellum were very carefully sliced, but no other evidence either of contusion or ecchymosis was discovered. The softening of the right middle lobe was very positive, the brain-substance being quite pulpy; but there was little or no evidence of extravasation of blood into it. From the close proximity of this part to the crus cerebri in which the ecchymosis existed, I have no doubt that it had been severely contused. The dura mater was stripped off (for examination) from the base of the skull, but no fracture could be detected. There was no fracture of the vault. The skull at the seat of injury was discolored over an extent almost as large as the palm of the hand (see Portrait). The margins of the discolored patch were very distinct, and adjacent to it were other patches which were quite isolated. On holding the calvaria up to the light, these patches contrasted strongly with the adjacent bone. The patches were of a greenish-yellow, opaque, and non-vascular; the bone immediately adjacent to them was of a deep purple, from congestion, and at a little further distance of a normal pink. The skull cap being very thin, these contrasts were easily seen. The heart was contracted, and excepting a little fibrinous clot was almost empty. The lungs were congested, but there were no purulent depcsits, neither any evidence of actual inflammation.

The abdominal organs were examined, but nothing special was found.

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PLATE XX.

INFLAMMATION OF DURA MATER AND THROMBUS IN SINUS.

This Plate may be profitably compared with Plates XVIII and XXI. Like them it represents the surface of the dura mater, as exposed by removal of the skull-cap, with the superior longitudinal sinus slit open through its whole length. In Plate XXI we have the walls of the sinus itself involved in inflammation and purulent products occupying its cavity, but in Plate XVIII and the present one we see a thrombus which adheres only at places, and which is not attended by any inflammatory thickening of the walls within which it rests. Our present Plate gives, indeed, a beautiful example of a long unbroken thrombus, the best that I have ever seen. In many cases such a formation as this is broken or pricked during the opening of the sinus, and then its fluid contents escape, and its form and size are not so easily appreciated. It will be seen that at two or three places in the right side branches from the main mass pass into large veins in the dura mater, and that a portion of the dura mater to the right in the front part is much swollen. At one spot this swollen part is laid open in order to show the continuity of the branch of the thrombus which passes into it. As stated in the notes of the case to be appended, a fluid which could not be distinguished from pus was contained in the chambers which occupied the layers of the dura mater at this part. There seemed no doubt that the swelling was produced in part at least by the distention of inflamed and occluded veins. The thrombus has no connection whatever on the right side of the sinus. The artist has not succeeded well in depicting the rounded and unattached end of the wormlike thrombus. It has the appearance of passing into a vein, which was not the case ; it was quite loose, and could be lifted from the blood clot on which it rested.

It is to be observed that the thrombus did not occlude the sinus, and the blood still flowed by its side. As regards its mode of production the conjecture seems probable that it was caused by fibrine from the blood coating over inflammation-products pro-

ceeding from the dura-mater veins on the right side. It consisted of a hollow tube, and its contents could not be distinguished with the microscope from pus with large admixture of granular and fatty matter. The greater size of its lower end is to be explained by the supposition that it was still undergoing distension by fluid forced into it from above. Its investing membrane was thin, and when pricked its contents gradually flowed out.

It is to the breaking up of such productions as those illustrated in these plates that the phenomena of visceral pyæmia are probably due. In the present case the man died of pyæmia on the twenty-sixth day, having had his first rigor on the twelfth day. Although the thrombus did not appear to have given way it is very possible that it really had done so repeatedly, or it might easily have happened that pus-masses had found their way into the blood-current through other channels.

Summary of Case.—*Lacerations of the scalp, laying bare the bone. Favorable progress. Rigor on the twelfth day. Repeated rigors on subsequent days. Death on the twenty-sixth day. Autopsy.*

1864			
Oct.	28	F.	J. Toomey, a healthy labourer, æt. 30, received severe contusions and lacerations of his scalp, laying bare the bone in several places.
	29	S.	Doing well.
	30	☽.	
	31	M.	
Nov.	1	Tu.	Suppuration of scalp wounds, and some tendency to burrowing of matter.
	2	W.	
	3	Th.	Doing well in all respects.
	4	F.	He is well as regards his head, and would be up were it not for a fracture of his fibula.
	5	S.	
	6	☽.	All the wounds are healed but one, and that is covered with florid granulations.
	7	M.	Felt rather ill, and in the afternoon was sick.
	8	Tu.	A severe rigor (the first); sickness continuing.
	9	W.	Another rigor. Sickness and abdominal pain. Pulse 120. Tongue quite clean and moist.
	10	Th.	A better day.
	11	F.	A third severe rigor, and a fourth in the afternoon.
	12	S.	A better day, but some tenderness about left shoulder.
	13	☽.	A rigor yesterday evening. Left sterno-clavicular joint tender.
	14	M.	
	15	Tu.	Repeated rigors.
	16	W.	Abscess in left sterno-clavicular joint.
	17	Th.	Abscess opened. Recurrent rigors. Rapid pulse.

Nov.	18	F.	Quite rational. No delirium; but he is very forgetful.
	19	S.	Worse; more feeble; still takes fluid food and stimulants.
	20	S.	Gradually failing. Rigors recur. Abscess in left ankle and at seat of fracture of fibula.
	21	M.	Much the same.
	22	Tu.	Death at 8.30 a.m.

Autopsy.—*Limited osteitis with inflammation of the membranes beneath the dying bone. Thrombus in the longitudinal sinus. Small abscess in brain. Deposits in lungs and liver.*

J. T—, æt. 30, was admitted on October 28th. His accident had consisted in a fall, feet downwards, consequent on the breaking of a chain. The chain followed and struck him violently on the head. He was said to have fallen forty feet. He had a Pott's fracture at his left ankle. He was in good health at the time. He was kept to his bed through the whole treatment on account of the fractured fibula; otherwise there was nothing apparently serious in his injuries. When on the twelfth day his first rigor occurred, all the scalp-wounds but one were quite healed, and that one was suppurating freely, and appeared quite healthy.

November 9th (twelfth day, Wednesday).—Up to Monday he had been doing quite well. On Monday he says that he felt a "little feverish, and had pain in his bones." On Tuesday, in the morning, just after he had been out to have his bed made, he had a severe rigor till his teeth chattered. Wednesday (this morning) he had a second rigor. Both on Monday afternoon and the whole of Tuesday he was sick repeatedly. He complains to day (Wednesday) of pain in his abdomen, but not in his chest. He looks pale; his skin is relaxed and moist; pulse 120. There is nothing about his tongue to attract attention; it is almost clean, and is moist and not too red. One of the wounds to the right of the middle line is not yet healed, but the bone is covered by a mass of florid healthy granulations. With the probe bare bone may be felt.

11th.—He had another shivering fit this afternoon. It was a very severe one. He had also had one in the morning. During the rigor his lips became blue, and his teeth chattered. His pupils were of moderate size, and absolutely fixed.

12th.—Feels rather better, but his pulse is very quick, and his tongue is beginning to be a little dry in the centre. He complains of pain in his left shoulder, but there is no swelling evident. He has not had any rigor to-day.

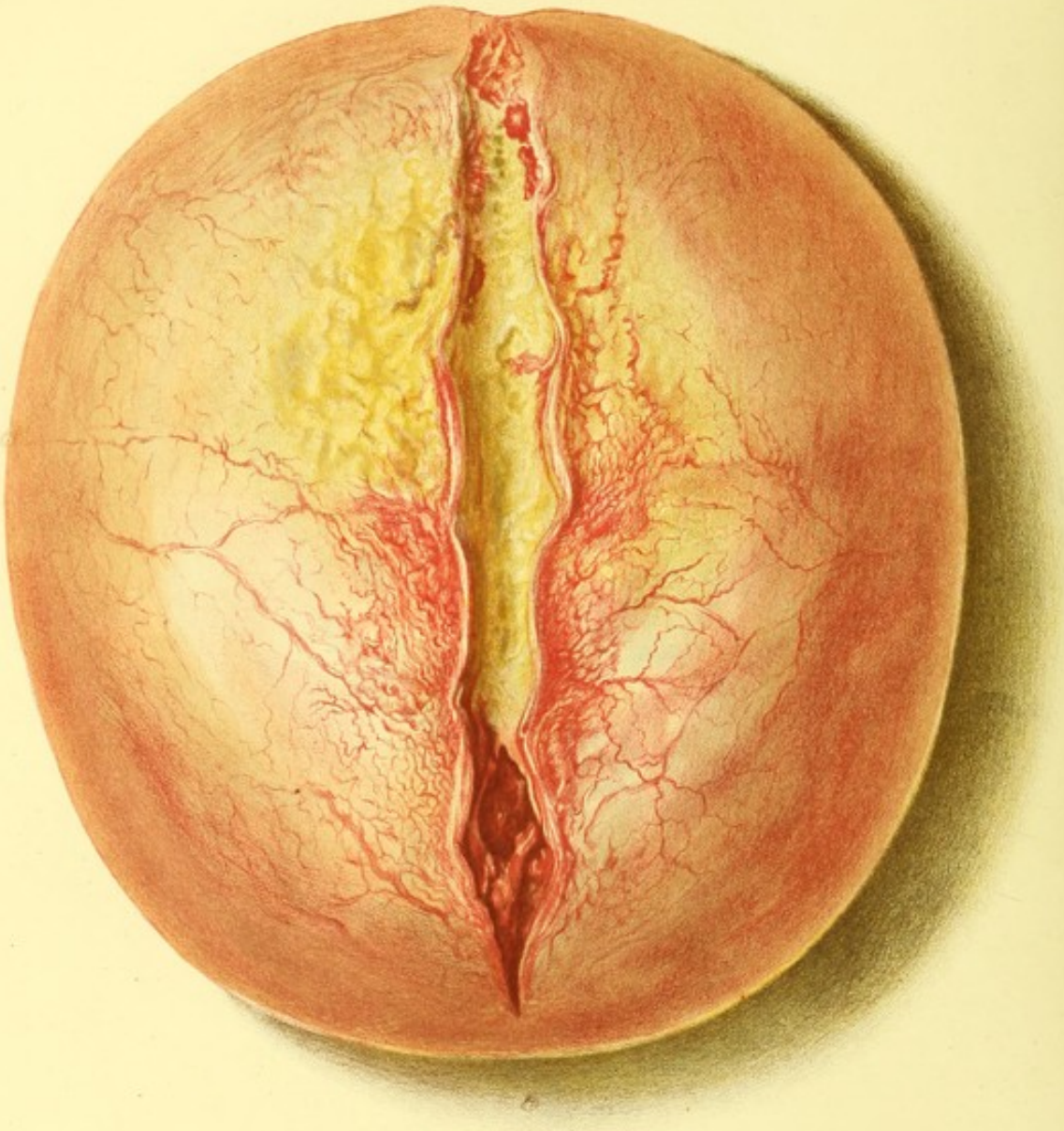
14th.—He says he feels a little better to-day. He had a rigor yesterday, but not to-day. There is decided swelling about the left sterno-clavicular joint, and great tenderness. His tongue is rather dry in the centre.

16th.—There is suppuration in the sterno-clavicular joint. Rigors continue to recur, and his appetite gets worse and worse.

From this date until the time of his death rigors continued to recur almost daily. He had usually a pungent, hot skin, and his tongue was dry in the centre, and his pulse from 110 to 120. He had little or no sickness. The abscess communicating with his sterno-clavicular joint was opened, and discharged freely. An abscess also formed on the outer side of his left ankle, communicating with the fracture. He became emaciated and very pale, but was not jaundiced. Owing to the abscess in his left sterno-clavicular joint, and the abscess on his left foot, it was not easy to estimate any slight degree of paralysis which might be present. He used to wander a little during the last day or two, and his memory became very defective, but he had no active delirium. No convulsions were ever noticed.

He died on the morning of the 22nd at half-past eight. He died quite quietly, but rather suddenly, having drank some brandy just before.

Autopsy.—All the wounds on his scalp excepting one were soundly healed. The unhealed sore was on the right, very near the middle line. The portion of bone which was bare was but little larger than a shilling; it was green and discoloured, and around its margin was an irregular narrow furrow, marking the place where separation was about to ensue. The pericranium adhered well up to the edge of this furrow, and was vascular and thickened close to it. On removing the pericranium no other part of the scalp was found to be diseased. On looking at the bone from within, the diseased part was easily distinguished by its yellow-white appearance; but it was not so abruptly defined as it was externally. Between the dura mater and the bone at this part a layer of thick pus was seen. It covered a somewhat irregular surface, not larger than a penny-piece, and did not in all amount to more than half a drachm. The dura mater at all other parts adhered firmly to the bone. On washing the pus from the outer surface of the dura mater, this membrane was seen to be ashy and discoloured beneath. The parts affected were a little to the right of the superior longitudinal sinus, and immediately beneath the coronal suture. The dura mater here presented several elevations, on cutting into which a grumous fluid resembling pus escaped. Whether these were originally enlarged veins or not it was difficult to say, as the walls of the veins had certainly been broken down. At several points in the surface of these elevations the outer layer of the dura mater had given way, and pus was escaping. The laceration had, no doubt, been caused by tearing off the calvaria. Whether the lacerations marked the points where veins passed from the bone or not it was impossible to say. The lateral sinus being laid open, it was found to contain in its anterior part only a slender coloured clot, but on reaching the part adjacent to the dead bone and inflamed membranes, it contained a continuous thrombus. This thrombus was red on the surface from a thin layer of red blood coagulated on it. This layer might be easily peeled off, and left the thrombus as a distinct pale yellow cord of the thickness of a common full-sized earthworm, and looking much like one except in colour. This cord ended by a rounded extremity a little above the torcular. The lateral sinuses contained only fluid blood or recent blood-clot (soft). The thrombus was perfectly smooth on its exterior; but its investing membrane was evidently exceedingly delicate, for the slightest touch sufficed to lacerate it. When it was torn, a fluid of homogeneous character and resembling pus, only less green, escaped. This fluid, when placed under the microscope, showed cells in countless numbers, which exactly resembled those of pus. It consisted almost wholly of these cells, with oil-globules and serum. At its anterior part the thrombus had branches into the dura-matral veins, chiefly on the right side. On the left side the openings of the veins were marked by red clots, very thin, and on the right by much larger and paler ones. At some parts anteriorly the thrombus adhered to the walls of the vessel, but posteriorly it was quite isolated, and lay like a worm in the sinus. The circulation of the blood past it had evidently gone on freely to the last; it had been bathed in blood. The surface of the dura-mater beneath the inflamed parts (parietal arachnoid) showed a layer of thick pus adhering to it. On the surface of the hemisphere below there was also a thick layer of puro-lymph. Close to the longitudinal fissure this lymph was stained with blood. The large veins passing from the pia mater into the sinus had their trunks completely concealed by a coating of lymph. This lymph was only over that part of the hemisphere adjacent to the inflamed dura mater; it did not extend over the side of the hemisphere, nor on either the anterior or posterior lobes. It dipped into the fissure towards the free margin of the falx. The large veins of the pia mater passing up through this lymph were plugged by coagula, and several showed yellow plugs through their transparent coats at considerable distances from the sinus. There were numerous secondary abscesses in both lungs and liver.



SUPPURATIVE INFLAMMATION OF DURA MATER AND SUPERIOR LONGITUDINAL SINUS, AFTER SEVERE CONTUSION OF THE SKULL. (CASE OF JOHN WELCH)

E. Burgess del. ad nat.

W. West & Co. chrom. lith.

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PLATE XXI.

INFLAMMATION OF DURA MATER AND LONGITUDINAL SINUS.

In this case we have features which in some important aspects differ from those which have been just described, as the superior longitudinal sinus was itself involved in inflammation, and instead of containing a worm-like thrombus which adhered only where its branches passed into the mouths of veins, it was lined by closely adherent material. This condition was explained by the fact that the portion of bone inflamed and dying was exactly over the sinus. Hence the implication of its walls by direct extension. It will be seen in the portrait that the surface of the dura mater on each side of the sinus and over a considerable extent is congested and coated with discoloured puro-lymph. The notes state that it was here separated from the dying bone by a layer of pus.

The features of the case, so far as the pyæmia was concerned, were closely similar to those in the preceding cases. The first rigor occurred on the fourteenth day and death on the twenty-first. In the preceding case the first rigor was on the twelfth and death on the twenty-sixth. In both, deposits were found in the viscera.

It is not without its interest to note that in this case the wound retained a healthy granulating surface throughout. I have witnessed this repeatedly in well-marked pyæmia. The shrivelling of granulations and glassy condition, although frequent, are by no means constant conditions.

Lacerated scalp near middle line, and chipped fracture of outer table. Favorable progress for a fortnight. Rigor on fourteenth day, and each day afterwards till death on twenty-first day. Inflammation of bone and purulent inflammation of superior longitudinal sinus.

March	15	Tu.	A man, æt. 54, fell, head foremost, into ship's hold; was stunned, and received a lacerated wound of scalp, with indentation or chipping of the outer table of skull at two points; no evidence of fracture through the tables. The wound was rather to right of middle line and parallel with it.

March	16	W.	In bed with water-dressing, and, latterly, poultices. Wound suppurated and granulated well. For first few days had much pain in shoulder and neck.
	17	Th.	
	18	F.	
	19	S.	
	20	☉.	
	21	M.	
	22	Tu.	
	23	W.	
	24	Th.	
	25	F.	
	26	S.	Began to have headache, but made no complaint.
	27	☉.	Began to feel ill, and lost appetite towards evening.
	28	M.	In the afternoon severe rigor followed by warm sweating. Wound quite healthy.
	29	Tu.	Another severe rigor followed by warm sweat. Appetite failing. Much headache.
	30	W.	Another rigor. Tongue drying. Pulse quick and sharp. Eyes yellowish; pupils small. Quite rational and no paralysis. Countenance anxious and pinched.
	31	Th.	Rigor.
April	1	F.	Rigor.
	2	S.	Died. Remained conscious till within a few hours of death. No delirium. Wound remained tolerably healthy looking.

Autopsy.—*Inflammation of small area of bone on outer surface and of a much larger portion on inner surface of skull, corresponding to the chipped fracture. Purulent inflammation of superior longitudinal sinus.*

A man, æt. 54, fell head foremost into a ship's hold upon some iron. He was stunned, and knew nothing until after he had been carried out. He was chilly and collapsed at first, but when, shortly afterwards, he reached the hospital he presented no head symptoms. It was then found that he had a scalp wound crossing the vertex to the right of and parallel with the median line, and that the bone was laid bare to a slight extent, and showed two linear indentations as if it had been chipped by a sharp instrument. The pericranium was exposed rather more widely than the bone. I thought that the bone was probably not fractured through its tables. The man was put to bed and water-dressing applied.

During the first few days he complained much of pain in the shoulder and neck, for which I could find no cause. He still had no head symptoms whatever, and no headache. Took food well and slept well. Was kept in bed and latterly had a poultice applied. The wound looked perfectly healthy, and was granulating and suppurating freely, when on the *fourteenth day after the accident* (*March* 28*th*) he had, in the afternoon, a severe well-marked rigor, followed by profuse warm sweating. When I saw him on this day he was still in the sweat, and his aspect was a little anxious. He now said that he had had headache for several days (subsequently he said it began on 26*th*), and that the night before (27*th*) he had begun to feel ill and had lost his appetite. The wound was still suppurating freely and looked perfectly healthy. Ordered ℥xv of turpentine and a blister to the nape.

29*th*.—Another sharp rigor in the afternoon, followed by a profuse warm sweat. Appetite not so good, and he complains much of headache; but tongue clean and moist. Faculties perfect; no wandering.

30*th*.—Has had another rigor; looks pinched and ill; tongue drier; pulse quick and sharp; eyes dusky and rather yellow; pupils small. Is perfectly rational and without paralysis. Says he has had much pain in his head the last few days. Wound discharges less, but still freely; the pus is of excellent quality, and the granulations florid. The bone is covered with granulations. I chipped off with my finger-nail the loose edge of bone where it had been indented; it was very thin, and was in healthy process of exfoliation; it was quite concealed in a bed of granulations.

On *Saturday*, *April* 2*nd*, just one week from the beginning of bad symptoms (counting the headache on *Saturday*, *March* 26*th*, as the first) he died. I had throughout, from the day of his first rigor, expressed a confident opinion that he was suffering from phlebitis of the superior longitudinal sinus. We carefully watched his symptoms, the chief ones being a daily rigor, rapid emaciation, pain in the head, an anxious expression of countenance, a quickened pulse, and loss of appetite. It was remarkable that the wound did not lose its granulations during the first few days, and, indeed, remained of fairly healthy aspect up to the day that he died. The bone was quite concealed amongst granulations. He had no delirium, and appeared to be quite conscious until within a few hours of his death.

At the *post-mortem* we found that the portion of bone bare was very limited, comprising only a margin of about an eighth of an inch on each side the line of the cut in its surface. At the margins of the bared part the pericranium adhered well, and there appeared to be some indications of the commencing formation of a groove for the exfoliation of the dead portion. On removing the calvaria lymph was found on each side the sinus between the dura mater and bone, and the under surface of the bone was white and discoloured over a considerable area. Thus the surface which appeared to be in process of death was much greater in the under than in the outer table. The calvaria illustrated well the condition of a "chipped fracture," and wishing to show this I did not saw it across, and consequently did not examine the diploë. The inner table was not fractured.

The *superior longitudinal sinus* was filled with greenish lymph, which adhered to its walls, and with a fluid exactly like pus, by which its cavity was much distended. In its anterior part was some coloured blood clot, and again, posteriorly, about two inches above the torcular, the clot became that of recent blood.

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VACCINATION-SYPHILIS.

The present Fasciculus, with the exception of two portraits in the last plate, consists wholly of illustrations of syphilis as conveyed in the practice of vaccination. In most the condition displayed is that of the vaccination-chancre, but in two the character of the rash is also exhibited. I have especially desired to afford the opportunity of becoming familiar with the appearances of chancres occurring under these circumstances, and also to demonstrate that considerable variations in aspect must be allowed for. Thus, in Fig. 2 of Plate XXIV we have three small buttons of induration without inflammation, and in one instance almost without redness. In Fig. 1 of the same plate the sores (again three in number and at exactly the same date) are much larger and much more inflamed, but still quite separate from each other and with but little involvement of the surrounding skin. In Fig. 2 of Plate XXII we have porrigo-scabs resulting from the inflammation of the skin around the vaccination-sores and quite concealing the special features of the latter. There is nothing in these sores which to the eye would suggest the existence of induration. In Fig. 2 of Plate XXV we have indurated and somewhat elevated sores surmounted by a papery scale and pus-crust, and surrounded by a definite area of dusky discoloration. Lastly, in Plate XXIII, we have a very unusual condition of things, a sore as large as a shilling, with hard edges, occupied in its centre by a florid mass of smooth granulations. The fact is that vaccination-chancres may vary as much in their features as do chancres from other sources, and we have all degrees, from the quiet uninflamed disc of induration to inflammation of the phagedænic type. More detailed descriptions, together with the particulars of the cases, will be found in connection with each plate.

It may, perhaps, be well to draw attention to a fact which ought to be universally known, that the conveyance of syphilis by vaccination is never effected without the intervention of the vaccination-chancre. It is, of course, not possible, as is popularly supposed, for the specific taint to creep into the system, whilst all the time the vaccination-sore appears to go through only its proper stages

and heals finally at the proper time. If syphilis is to follow, the sore must relapse and remain unhealed for months. Should a patient who entertains suspicion give a history of his sore having healed for good within the month, such fact is conclusive. Syphilis cannot be transmitted, excepting through a sore which follows the usual well-known laws as to periods of incubation, &c. In almost all cases the vaccination-vesicle, if it have developed, passes through its usual stages, dries up and heals, and it is not until after this that anything suspicious occurs. Then, at about a month after the vaccination, the scar becomes red and irritable, and a small button forms, which in the course of a few weeks becomes larger, and may ultimately exhibit any of the conditions shown in these plates. Most of the illustrations show the state of things present at from the ninth to the thirteenth week. It is not always that the vaccination-sore heals before the chancre begins to develop; for sometimes undue inflammation is present almost from the first, and the sore is covered with a scab which persists and conceals the first evidences of specific induration. But in these cases, as in the others, the induration is never present until the four or five weeks of incubation are passed.

I shall append to the plates a narration of the facts of six separate occurrences of the transmission of syphilis by vaccination which have all come under my own observation. In three of these only one person suffered, but in the three others there were several. The narratives of four of these series have been already published in the 'Transactions of the Royal Medical and Chirurgical Society,' from which, with a few alterations, they are extracted.

I scarcely know whether it is desirable that I should add a few words in justification of the publication of these portraits. I am well aware that my former reports were made much use of by the opponents of compulsory vaccination, and that they were, with a want of fairness, I fear, almost characteristic, so quoted as to make it appear that I was myself opposed to the law. In some instances quotations were given, as if from my pen, with which I had had nothing to do, and which expressed opinions very different from mine. In this way much injury and injustice were done me, and I not unfrequently received from medical men in different parts of the country, who knew me only by name, letters of remonstrance and complaint. It is surely needless that I should here say that I am a firm advocate of compulsory vaccination, and that I sympathise thoroughly with those who, in fighting its battles, have had to encounter missiles of the kind referred to. I could not, however, do anything by force to prevent the base use of my facts, and what

could be done in the way of remonstrance I did. The misguided zealots who have undertaken the anti-vaccination movement are, however, I fear, deaf to all appeals, and but scant fairness and courtesy are to be expected at their hands.

In spite of the very serious nature of what I have referred to, I have never been able to regret for one moment that I had made the facts public. Concealment in such a matter appears to me the very worst policy. Let it never be possible for our opponents to say that the medical profession does not dare to look the facts in the face, and to make them public in the freest manner. It is only after having done so that we can meet them fairly and uphold our view of the case. We cannot ask that vaccination be made compulsory unless we can honestly say that we have done everything in our power to make it safe. There can be no doubt that the danger of transmitting syphilis is a real and very important one. It can be guarded against only by giving the fullest information respecting it to all members of the profession, and by attracting their attention to it in the most forcible manner. I should deem myself culpable in a high degree if I failed in my duty in this respect.

The present plates are, so far as I know, the first delineations of vaccination-chancres that have ever been published. My hope is that they will serve a double purpose; first, that of increasing in those who see them the vividness of conviction as to the reality and importance of the subject, and, secondly, of affording the means of avoiding errors in diagnosis.

First Series of Cases.

Synopsis.—*Twelve persons, mostly young adults, vaccinated from a healthy looking child.—Satisfactory progress of the vaccination in all.—Indurated chancres on the arms of ten of the vaccinated in the eighth week.—Treatment by mercury in all.—Rapid disappearance of the primary sores.—Constitutional symptoms in four of the patients five months after the vaccination.—The vaccinifer showing condylomata at the age of six months.*

These patients came under my observation in the seventh week after vaccination. The suspicions of the vaccinator had been excited about a fortnight earlier, and he had applied to the Medical Officers of the Privy Council on the subject. It was on the advice of Dr. Seaton that I was requested to see the patients and investigate the matter. It was with the permission, and indeed at the suggestion, of the surgeon in whose practice it occurred (the father of the vaccinator) that the facts were made known to the profession, and I cannot help expressing here my admiration of the moral courage with which this gentleman met a calamity which caused him the keenest distress, and of the anxiety which he displayed that the fullest use should be made of it for the public good.

On February 7th, 1871, a young surgeon in the neighbourhood of London applied at a public vaccine station for a supply of lymph. He was offered a healthy looking infant of four months old, then on the eighth day, and with five good vesicles. As he wished to vaccinate a considerable number of persons in the same house, he preferred to borrow the child rather than, as first proposed, to charge points, and an arrangement having been made with the mother, the child was at once taken to a private house where eleven young adults (shopmen and servants) were vaccinated from its arm. Four only of the five vesicles were used, and the testimony, both of the operator and of the child's mother, is that more than one, and possibly all of them, bled somewhat. Finally, a tube was charged, and with the lymph thus obtained, which is reported to have looked quite clear, two persons, a father and son, residing in another house, were immediately afterwards vaccinated. Thus we have a total of thirteen persons vaccinated. In all excepting one doubtful case the vaccination was second to successful performance of the same in childhood. In the doubtful case both arms were done, in all the others only one arm. In all excepting one the vaccination took, and the vesicles are believed to have gone through their usual stages. The patients were not under any close medical inspection afterwards, as none of them needed it, but it seems certain from their testimony that at the end of three weeks in all cases the scabs had fallen and small round cicatrices alone remained. At the end of a month, or from a month to five weeks, several of them applied for advice because the scars were again becoming sore, and at the expiration of two months it was quite certain that ten out of the twelve had indurated chancres on their arms. Many of them had more than one chancre; and about half had enlarged axillary glands, whilst two or three suffered from febrile disturbance with roseolous rash. I will append to this paper some brief notes of each of the cases, but it will be convenient for the present to restrict our attention to the general facts as to the group, and to turn next to the vaccinifer.

Facts as to the Vaccinifer.

The infant had been seen by the public vaccinator, whose patient she was, and by the surgeon who borrowed her, and to them, to her own mother, and to those who were vaccinated arm to arm from her, she bore the aspect of excellent health. She was remarkably well grown, not in the least fretful, and had gone through the stages of her own vaccination perfectly well.

On April 5th, two months after the vaccination, she was brought to my house for examination. Her mother ridiculed the idea that she ailed anything. My attention was, however, at once attracted to a slight peculiarity in the tint of her skin and to the look of her face; and although it was strongly denied that she had ever "snuffled," yet when she was made to cry I noticed a nasal twang which was very suspicious. On having her stripped not a single spot of rash could be seen on the skin, but on inspecting the buttocks five small circular condylomata were discovered close to the anus, about which there could not be the slightest doubt. Her mother now admitted that she had been aware for a week of the existence of these sores, and had consulted a chemist about them, who had attributed them to teething. She said they had not been present more than a week, and repeated her assurance that the infant had not seemed in the least ill. I could not find in the mother herself any indications of syphilitic taint, nor obtain any history of suspicious symptoms. She looked pale and cachectic, as if underfed. She had been married about eighteen months, and this was her first-born child. Her husband was a Frenchman and one of the Paris National Guard. I prescribed for the child some mercurial ointment, and was very desirous to keep it regularly under observation, but the mother would not bring it.

A fortnight later (on April 19th) I sought it out at home. The child then looked more ill than when I first saw it; the condylomata were in the same condition. It had no rash. Its head was enlarging, and its mother complained that it was wasting away. She had not used the ointment, alleging that its father would not allow her to do so. I was never able to see the father of the child, although I used every endeavour; he was evidently unwilling to be seen, and his wife positively refused to give me his address.

About the existence of constitutional syphilis in the infant at the date of my examinations (two months after the vaccination) there could not be any doubt, and scarcely any as to the taint having been an inherited one. The vaccination spots presented perfectly healthy scars, and there was not the slightest reason for thinking that the disease was introduced into the child's system at the time of its vaccination. Had such been the case it is almost certain that it would have presented symptoms similar to those in the patients vaccinated from it, *i. e.* primary sores on the arm. There could be only a week's difference in the stage of the disease in itself and in those vaccinated from it. Instead of this we find the child presenting the ordinary symptoms of hereditary syphilis—condylomata, commencing marasmus, and hydrocephalus. That a syphilitic infant should appear to be in perfect health as far as external appearances are concerned is by no means unusual. "It is a mistake to suppose that syphilitic infants always present a withered 'old-man-like' aspect; in many instances, although manifesting specific local symptoms, they may grow well and remain plump and fat."* This occurs, I believe, with especial frequency when the child does not suffer from a skin eruption, and under such circumstances condylomata are not unfrequently the only symptom by which the existence of the taint is proved.

There can, I think, be little doubt that in this instance it was the blood, and not the vaccine lymph, which was the source of contamination.

Two of those vaccinated wholly escaped, and as they were two of the youngest on the list, and mere boys, it is very probable that their immunity was consequent on their having had syphilis before. In those in whom chancres occurred, nearly half of the vaccination punctures escaped. Now, I can see no other explanation of this immunity of some persons whilst others suffered, and immunity of some vaccination punctures in the same person in whom others were infected, than by supposing that the vaccine virus and the syphilitic virus were present in different fluids, and that it was possible to convey the one in all its vigour without necessarily conveying the other. It is important in reference to this point to note that the two individuals who have escaped were the two who were first vaccinated, since it is not improbable that the lymph which first flowed was unmixed with blood. I may add also that the third person vaccinated was the only one in whom both arms were done, and that one of his arms escaped whilst the second suffered. The conjecture may be permitted that it was when obtaining lymph for this patient's second arm that the operator first drew blood.

The success or non-success of the vaccination, as vaccination, seems to have had nothing to do with the induration of the scars. Some scars in which the vaccination vesicle had not "taken" became indurated, whilst many punctures which did "take" escaped. Owing to the patients not having been constantly under observation after the vaccination, there is a little uncertainty as to which vesicles were well-developed and which failed, since we are obliged to rely to a considerable extent on the statements of the patients themselves. There seems reason to believe that the vaccination failed in all the spots in only one individual, and he subsequently had several indurated chancres at the sites of puncture.

The period of incubation seems to have been very nearly the same in all the cases. Two of the patients, a father and son, noticed that their scars were becoming irritable on the same day, the 18th of March, a little more than five weeks after the vaccina-

* 'Aphorisms, &c., on Syphilis.' By the Author. 1862.

tion, and between two and three weeks from the cicatrization of the vaccine vesicles. In all the patients, the spots were characteristically indurated when I saw them on April 4th, exactly two months from the date of the vaccination. It would have been of great interest to science to have allowed half of this group of patients to abstain from any specific treatment, but, on the other hand, it appeared a paramount duty to adopt at once the very best means for their recovery. On the 4th of April they all commenced, with one exception, the use of mercury in small doses and the application of black-wash. In all, the effect of the remedy upon the local sore was most definite. Many of them, at the date of my first paper, had become (after eleven days' treatment) quite soft; in the course of a week none of them displayed a degree of induration which would have been considered characteristic, and several which had been ulcerated were healed.

One important feature in this group of cases is the remarkably close similarity which they bear to each other. In no single instance was there any unusual degree of inflammation of the vaccine vesicle. In all, as far as the patient's impressions go, the vesicles went through a usual course, and, in all, a period intervened, before the development of induration, during which the cicatrix was quite healthy. As the patients were not at the time under medical inspection it is impossible to be accurate as to the precise day on which induration of the cicatrices began, but so far as can be ascertained there is reason to believe that nine out of the eleven began to complain of inflammation of the scar towards the end of the sixth week. At the end of the eighth week these nine patients had all reached the same stage. In the other two cases the progress was about a fortnight behindhand.

The characters assumed by the sores were, with some minor differences as to size, &c., remarkably similar. Ulceration occurred in all excepting two patients, and in one of these two, out of three chancres, one did for a day or two ulcerate slightly. In one patient, a healthy, florid girl of 17, three glossy buttons of induration formed, but never passed into the ulcerative stage. It is not improbable, however, that they were arrested by the influence of mercury. Of those which ulcerated all took the circular form, and in all, in the first instance, the discharge was stated to have been "glutinous." They had all been dressed with water dressing for several days before I saw them, and had much improved in appearance; some were then secreting healthy pus, but most of them still showed deficiency of secretion. None of the patients were out of health at the time of the occurrence, but they varied a good deal as to temperament and degree of vigour. There is no reason to think that any one of them had suffered from syphilis before. About half of them complained that they had headache and felt more or less unwell during the time that the sores were indurating. One young man was confined to his bed with severe aching in the back, vomiting, and general febrile disturbance, all of which passed off in a few days. Most of them had more or less enlargement of the glands in the axilla, but in none did it occasion any material pain or inconvenience. In all but one, mercurial treatment was commenced on the 4th of April, two months after the vaccination, and about a fortnight after the scars had begun to indurate, and the uniformity with which all the sores altered in character under its exhibition was most remarkable. In the two cases in which ulceration had not occurred, the sores never passed beyond the stage of induration. The sores which were ulcerated when mercury was begun, in the course of about a week after its commencement began to discharge healthy pus and to show florid granulations. Most of them, as already stated, were healed within a fortnight, and after three weeks the majority were quite sound and in all almost free from induration. In all the cases the mercurial treatment consisted in two grains of grey powder given night and morning, with the application of black-wash under gutta-percha tissue. About half of the patients showed slightly the influence of mercury on the mouth, but none were particularly inconvenienced. In one case the patient did not come under treatment till ten days after the others, having, indeed, in the first instance

consulted a homœopath. In him the chancre attained a size twice that of the largest of the others.

The following paragraphs are extracted without modification from my first report (April 25th), as I have special reasons for wishing to preserve their original form.

"As already stated, none of the patients have as yet displayed any of the persistent forms of skin rash, nor have any shown positive ulceration of the tonsils. Several of them have had transitory but definite eruptions of roseola, and in several the skin of the abdomen and chest is slightly mottled. Three of them to-day display about the neck, face, and shoulders a few lichenoid spots of doubtful character.

"It is to be feared that before long we shall have yet more definite evidences of constitutional contamination in some of these patients; but in the present stage I think we are quite justified in deducing the following conclusions from them:

"1st. That the blood of a child suffering from inherited syphilis can, if inoculated, transmit the disease with great certainty.

"2nd. That the result of such inoculation of blood will be an indurated chancre.

"3rd. That if multiple inoculations be practised, multiple chancres may be produced.

"4th. That a period of incubation between the inoculation and the first occurrence of induration about the prick will occur, during which the part may appear perfectly healthy.

"5th. That the period of incubation prior to the first specific induration will usually be about five weeks.

"6th. That it is quite possible for vaccine lymph and blood to be transferred at the same time, and for each to produce its specific results, the effects of the syphilitic inoculation occurring subsequently to those of vaccination.

"7th. That it is quite possible to vaccinate successfully from a syphilitic infant in the stage of utmost potency as regards its blood, without communicating syphilis."

The following are some further particulars respecting all the persons vaccinated in this series. The cases are arranged according to the order in which vaccination was performed.

No. 1. Master W—, a youth of 14. He was vaccinated in three places, all of which took and went through their usual course. No ill consequences followed. On April 8th I examined his scars and found them pale and quite normal.

No. 2. W. N—, æt. 16. Only one of three spots took. No ill consequences followed. On the 8th of April I found the scar of the vesicle which succeeded, pale and healthy.

No. 3. Mr. T. B—, æt. 20, a young man of fair complexion and somewhat delicate appearance. As he had no scars of a former vaccination, it was thought best to vaccinate him on both arms. This was accordingly done in three places on each; in two or three on each arm the vaccination took and scabs resulted. He left the establishment shortly afterwards, and at the time of my first visit I did not see him. Having obtained his address, he was subsequently induced to come to my house. This was at the end of two months after vaccination. He had then one large ulceration with indurated edges and prominent granulations in the middle (see sketch). This chancre, which was as large as a florin, had resulted from the confluence of two vaccination sores. He stated, as regards the vaccination, that the scabs fell within three weeks, and that the sores then seemed quite well. During the sixth week two of the spots on his left arm inflamed and became hard, and during the following week he had a good deal of febrile disturbance. He had an enlarged but softish gland in the left axilla. Mercurial treatment* was commenced in the end of the ninth week, and continued for two months. The chancre was quite healed in

* By "mercurial treatment" throughout this paper may be understood the careful use of black-wash applied to the sore three times daily and protected with oil-silk, and the administration internally of two grains of grey powder twice or three times a day according to circumstances.

about a month, but the scar remained hard and dusky. He had a few suspicious lichen spots in the thirteenth week, but nothing characteristic. He never had any sore throat, and his general health remained throughout good.

No. 4. See Plate XXIV.

No. 5. Caroline R—, æt. 24, stout and florid, was vaccinated in three spots, two of which took slightly and one well. After they had been for some time soundly healed they relapsed about the 20th of March and became red and irritable. She had at this time backache and flying pains. There was no swelling in the axilla. Mercurial treatment was commenced at the end of the eighth week, and was pushed to decided salivation at the end of ten days, after which she took only one pill daily. At the end of a month the sores were all healed and the scars soft. She had on several occasions shown a few suspicious spots about the neck, but nothing characteristic, and she had had no sore throat. Throughout she had complained a good deal of rheumatoid pains, &c., but she kept at her work. In the middle of July, at the same time as in the preceding case, a characteristic rash, attended with ulcers in the tonsils, showed itself. Mercury, which had been suspended for two months, was resumed, and the rash soon disappeared. On the 1st of August she was quite well, with the exception of two or three spots which persisted on her neck. In the beginning of September, however, she had a relapse of ulceration in one tonsil, but it was very slight. Her general health at this time was good.

No. 6. See Plate XXIV.

No. 7. Lucy L—, æt. 20. All the four vaccination-punctures took well, and healed in due course. Nothing followed until the last days of March (beginning of eighth week), when the two inner spots became red, hard, and irritable. On April 4th the two outer scars still showed no sign of irritation, but the two inner ones were of a dusky red, somewhat raised, hard, and covered with thin epidermic scale. She complained that they felt sore. She had no other symptoms. No axillary bubo. In this case the chancres never ulcerated. Under the influence of mercury the induration disappeared. For a short time in the tenth week her tonsils were suspiciously inflamed, but she had never any rash. Cod-liver oil was given most of the time, as she was in delicate health, and had a cough.

No. 8. Mr. T—, æt. 20. Three vaccination-places took, and the fourth did not. These scars remained quite sound until April 1st (eighth week). I saw him on April 8th, and found one of the scars inflamed, slightly hard at the base, and covered with a scab. The other three were quite quiet. He said that he felt well. There were some hard glands in the axilla. Mercury was at once commenced, and the sore, which had ulcerated, soon healed. The mercury never produced any ptyalism, and, excepting a little headache, he felt quite well throughout. On the 5th May the scar was sound, but still hard, and the glands in the axilla could still be felt. My notes mention "some small spots on neck and shoulders, fairly characteristic." The spots alluded to had disappeared at my next visit. He subsequently remained quite well until the middle of July, when he had a general roseolous eruption, which, however, disappeared in a week when mercury was resumed.

No. 9. Mr. H—, æt. 22, of fair complexion, and delicate. Lymph was inserted at three places, and good vesicles developed at two. They all healed well, but about March 20th the inner one began to inflame. On April 4th, when I saw him, he complained of having felt dull and heavy during the last week. The spot which had inflamed was raised and hard. On each tonsil there was a slightly marked patch of suspicious appearance, but not actually ulcerated. Mercury was commenced at this date. The chancre soon healed. The throat was slightly sore for about a week, and after this, excepting some complaint of frontal headache, he had no symptoms. On May 5th the chancre, which had been healed for more than a week, scarcely showed any induration. He felt quite well, and had no rash. Mercury was continued once a day for a month longer, and then disused.

No. 10. Mr. W—, æt. 18, a rather delicate young man of dark complexion. He was vaccinated in three places, but none of them took. The inner one inflamed a little, but soon healed. On the 22nd of March the inner one had again inflamed, and was becoming hard. On April 1st he felt ill, had backache, thirst, and headache; and on the 2nd a succession of slight rigors with frequent sickness came on. When I saw him on April 4th he was in bed on account of his backache and feverishness. There was an enlarged gland in his axilla, and the skin of his abdomen was a little mottled. Only one of the vaccination spots was affected, and it was exactly like those in the other cases—raised, hard, and inflamed. Nothing could be seen on his tonsils. On April 8th he was much better, having lost his backache. He stated that on the 7th his body and face were covered with a blotchy rash, but, with the exception of a very slight mottling of the abdomen, this had disappeared on the 8th. On the 5th of May he had congestion of the right eye and circumorbital pain, but no positive iritis resulted. At the same time he had a lichenoid eruption on shoulders, arms, and face, but as it was mixed with acne, to which he had been previously liable, it was not easy to be confident as to its character. On account of diarrhœa the mercury had been omitted.

No. 11. Mr. W—, æt. 45, a married gentleman, the father of a healthy family, who had never, at any time, suffered from syphilis. He was vaccinated in three places, two of which took, went through their stages, and cicatrized. The middle one of the three did not take. On or about March 18th all three inflamed, and when I saw them on April 4th they were all indurated and ulcerated. He had no enlarged glands, nor any other symptom. On April 8th his condition was much the same; he was taking mercury twice a day; the thermometer had been used regularly and had not shown any elevation of temperature. On the 11th the mercurial was omitted, as he was decidedly salivated. On the 14th two of the sores were quite healed and the other showed healthy granulations. After this he continued the liberal use of black-wash, but took no more mercury internally. From the 10th to the 24th his mouth was slightly sore, and the mercurial odour was perceptible in his breath. Subsequently he remained quite well as regards syphilitic symptoms until the latter end of June. We had sent him to the sea-side, as he had not regained quite his ordinary strength. Whilst there he rapidly improved, but a copious eruption came out on his scrotum, thighs, and scalp. He thought it had been excited by bathing. He returned to town three weeks later, and I saw him in the middle of July. His scrotum, penis, and the inner sides of his thighs were covered with flat-topped papules and patches of psoriasis of the most characteristic kind. He had no rash worth mention on other parts of the body, but his scalp, which was bald, was covered with small patches of porrigo. Under the use of a mercurial ointment and small doses of mercury internally both the scrotum and scalp rapidly healed.

No. 12. Mr. W—, junr., æt. 18, son of the subject of Case 11. He was of brown complexion and in tolerable health, but had been for years the subject of enlarged tonsils. Three out of four of his vaccination spots took, went through their usual stages, and healed. On the 18th of March two of the three spots which had taken had become a little inflamed and irritable, and during the next week they gradually indurated. He consulted his surgeon about them on the 24th, and on April 4th I saw him. The outermost of the three spots then showed a healthy cicatrix, but the inner and middle ones were inflamed, slightly raised, superficially ulcerated, and decidedly indurated at the base. Their condition is shown in a sketch taken at this date. He had no other symptoms. No definite glandular swelling. Mercury was prescribed, and under its influence the sores softened and healed. He was never positively salivated, but the occurrence of slight diarrhœa several times interrupted the mercurial course. Up to the present date he has not had any secondary symptoms, with the exception of a doubtful roscolous rash in the beginning of May. He took mercury in all for about a month.

LEEDS & WEST RIDING MEDICO-CHIRURGICAL SOCIETY

Second Series of Cases.

Synopsis.—*Unquestionable symptoms of constitutional syphilis in nine children who had been vaccinated from the same patient.—Suspicious symptoms in six others, and entire escape of a certain number.—Vaccinifer a fine healthy looking child, but with slight local symptoms indicative of inherited syphilis.*

On May 5th, 1871, two children were brought under the care of my friend and colleague, Mr. Waren Tay, on account of syphilitic eruptions. They were a brother and sister, aged respectively 4 years and 16 months, and in both the syphilitic rash was very definite. In searching for its cause Mr. Tay found that about seven weeks previously they had been vaccinated, and that the vaccination spots were at the present time unhealed, and with very decided induration at their bases. Mr. Tay now brought the cases to me, and I am indebted to his courtesy for permission to investigate the facts respecting them, and also for much help in doing so. We obtained from the mother of the children the name of the vaccinator, and on application to him were at once supplied with his vaccination register, and allowed to copy out the names and addresses of twenty-four other patients who had been vaccinated at the same time from the same vaccinifer. Nothing had occurred to excite the vaccinator's suspicions, not a single one of this series having been taken back to him on account of the unhealthy condition of the arm. On making inquiries at the houses of the patients, however, we found that no fewer than nine had chancres on their arms, and that six were suffering from well-marked and copious syphilitic rashes. Two of them had been under other medical care for these symptoms, but in not a single case had the real nature of the disease been suspected. I will state *seriatim* the chief facts respecting the cases in this series, but it will be convenient first to mention those which concern the vaccinifer.

History of the Vaccinifer.

I visited the child at its home, the parents having no knowledge of the object of my visit. I found it a stout, well-grown male infant, of seven months old. Thus, he would be four months old at the date of vaccination. His mother stated that he was selected as a vaccinifer from amongst several others, as being the most healthy present, and that his vaccination spots were very good ones. They healed afterwards quite well, and the scars remained sound. He still looked healthy, and was well grown and cheerful. Excepting a little transitory "tooth-rash," probably lichen, on the face, he had had no eruption. His head was decidedly large, and the fontanelles widely open. This had, his mother said, only been noticed for a few weeks. Latterly several neighbours had told her that he had "water on the brain." I inquired as to snuffles, and she replied at once and emphatically, "Yes, he has snuffled a great deal." There was no trace of rash in the child's skin at the time of my visit, but at the anus was a single small condylomatous patch just healing. This had never attracted his mother's attention. He was said to have had thrush. His mother was a young and healthy-looking woman, who had been married two years. I did not, of course, ask her any direct questions.

Immediately afterwards I called on the father of the child, and in answer to a direct question he denied very positively having ever been the subject of venereal disease. On a subsequent occasion he submitted to a personal examination at my house, and we failed to detect anything of a nature to cast suspicion on his denial. I saw the infant two or three times during the next six weeks, but no symptoms of a

more definite character showed themselves. The condyloma soon healed, and, with the exception of a slight tendency to hydrocephalus, the infant at the time I last saw it might have been regarded as a specimen of excellent health. As regards its condition at the date of the vaccination I may state that the parents of several of those vaccinated from it, subsequently mentioned to me its very healthy appearance.

No trustworthy evidence could be obtained as to whether blood was or was not transferred in the act of vaccination. The vaccinator, who is a very able and careful surgeon, assured me that it was his custom to avoid blood-stained lymph, and several of the women who witnessed the proceedings told me that they did not observe any bleeding. In addition to the number of children vaccinated directly from its arm some tubes were also charged with its lymph. These tubes, having been mixed with others, could not be traced.

The following are the particulars of all the patients vaccinated from this vaccinifer :

No. 1. Arthur Edward T—, æt. 16 months, one of those first seen by Mr. Tay. He had been vaccinated for the first time on February 13th, and five of the punctures were successful. The spots healed, but subsequently became hard. When he applied to Mr. Tay in May the scars were decidedly indurated, but not ulcerated; there were enlarged glands in the axilla; he had symmetrical ulcers on the tonsils, and a moderately copious rash of mixed roseola and psoriasis on the trunk and limbs. He was treated by mercury, and his symptoms slowly disappeared.

No. 2. See Plate XXII.

No. 3. William C—, æt. 10 years. His was a second vaccination, but three of the punctures were followed by good vesicles. The vaccination spots were healed. He became the subject of general rheumatoid pains, and had a copious rash over the whole body. When seen by me at the end of the thirteenth week he had already been for several weeks under medical treatment. The vaccination-chancres were just healed, but were still inflamed, indurated, of a dusky red colour, and covered with a dry papery scab. There was a gland as large as a walnut in the axilla. Each tonsil showed a well-marked grey-based ulceration. The rash, although evidently fading, was still abundant. It occurred symmetrically on the neck, arms, trunk, and thighs. It was copious both on the backs and fronts of the arms, and especially so on the outsides of the thighs. A sketch of his arm was kept.

No. 4. Eliza T—, æt. 14, a revaccination; four or five of the punctures took; the crusts fell in about a fortnight, and the scars remained sound for three weeks afterwards. Five weeks after vaccination they inflamed and became hard, and "a white skin came over them," but they never re-ulcerated. She had a painful lump in the armpit during the first week after vaccination, but it subsequently disappeared. During the twelfth week she first noticed an eruption on the chest, and at this time she had some cough and felt ill, as if she had taken cold. She was now placed under the care of a surgeon. I first saw her on May 17th, the first day of the fourteenth week. At that date her vaccination spots were soundly healed, but the scars were dusky and covered with a papery scale; none of them were indurated. There was a slightly enlarged moveable gland in the armpit. She had symmetrical ulcers in the tonsils, with white borders. There was a sparing eruption of dusky lichen spots on her chest, chiefly below the nipples. There were a very few spots also on the chest and upper part of the neck, but none on the arms. Up to this date the patient had taken no mercury.

No. 5. Maria H—, æt. 3; a first vaccination; four punctures took. When visited in the fourteenth week she was found to have symmetrical ulcers in the tonsils, a slightly enlarged gland in the axilla, and an eruption of dusky psoriasis on the back and outer sides of the thighs. One of the vaccination-scars was slightly indurated and dusky, with a thin papery scale; the others were sound. The rash had only been noticed for a few days. The child had been for some time under the care of a surgeon for "inflammation of the lungs." Up to this date the child had taken no

mercury, and the treatment afterwards was conducted with extreme irregularity. On September 6th, after an interval of two months, during which the child was lost sight of, it again came under care on account of condylomata at the anus.

No. 6. Eliza M—, æt. 15; revaccination; four places took. On May 16th, end of the thirteenth week, the sores had only just healed, and their scars were slightly indurated, dusky, and covered with a dry scale. There was a slightly enlarged gland in the axilla, and she had a few scaly papules of dusky-red colour on the upper parts of the legs, but none elsewhere. She was florid and in good health.

No. 7. This patient, Hannah S—, was not found.

No. 8. Elias W—, æt. 1 year; a first vaccination; four punctures took. At the end of the twelfth week the sores were not healed, but were covered with porrigo scab. There was, however, no evidence of syphilis, and the child had been the subject of porrigo before vaccination.

No. 9. Mary Anne O—, æt. 11; a revaccination; five places took. The sores healed very slowly, and had only just closed at the end of the thirteenth week. Their scars were then dusky and red, with a thin dry scale and slight induration. There were a few dusky papules on the back of her neck, and one in front of the right elbow. The patches were either smooth and glossy or covered with a thin scale. There was a large indolent swelling in the axilla. The child had not been out of health, and no treatment had been adopted.

No. 10. Amelia O—, æt. 5 years; first vaccination; five places took. The sores healed in about five weeks, and the scars, when examined at the end of the thirteenth week, were scaly and somewhat congested, but not indurated. The axillary glands were slightly enlarged. She had no eruption excepting some patches of dry eczema on the face. It is probable that she was not syphilitic.

No. 11. Frances C—, æt. 4 years. I do not know more respecting this child than that the vaccination sores healed slowly, and that during the eighth week she had a rash of red pimples. She was not seen.

No. 12. Alice C—, æt. 5½ years, sister of the above. Facts as to the vaccination very similar.

No. 13. Henry C—, æt. 8 years, brother of the above. On May 8th, end of twelfth week, two or three of his vaccination spots were still unhealed and covered with porrigo scab. He was reported to have had a rash like his sisters, but neither in him nor them was there anything positively syphilitic.

No. 14. Emily Julia J—, æt. 6; first vaccination, five places took. The places healed up at the end of the third week, but subsequently inflamed and reopened. On May 17th, fourteenth week, the four lower spots were healed, but hard, glossy and dusky. The upper one was covered with a dry pus-scab and its base, as large as a shilling, considerably indurated. She had an enlarged gland on the border of the axilla. The lower part of the chest, the whole of the abdomen, and the back were covered with a lichenoid rash, and there were a few spots on the front of the elbows and on the thighs. The rash had probably been out about a fortnight. There were symmetrical ulcers in the tonsils, and she had been low-spirited and ailing. Mercurial treatment, one grain of grey powder twice a day, was commenced on the 17th. On the 30th all traces of the rash and of the ulcers in the throat had disappeared, and she was in good health. The vaccination scars were still dusky and somewhat indurated.

No. 15. Alfred J—, æt. 9, and brother of the above. A first vaccination; five places took, and all healed during the third week. They afterwards inflamed and reopened. In the beginning of the fourteenth week the scars were dusky, and there was an enlarged gland in the axilla. He had no rash of a positive character, but a suspicious mottling of the skin of the abdomen.

No. 16. Annie J—, æt. 3 years, sister of the above. All the four vaccination punctures healed well in the usual time, but subsequently reopened. An abscess

formed in the armpit and broke. It was said that she had scarlet fever soon after the vaccination. At the beginning of the fourteenth week all the sores were well healed, but the scars were slightly dusky. She had no rash.

A young woman who was vaccinated from this child suffered no ill consequences.

No. 17. Herbert D—, æt. 5 years. In this case nothing unusual occurred.

No. 18. Alfred George H—, æt. 1 year. In this, as in the preceding, the vaccination was successful and without any untoward result. Both of them were first vaccinations, and in each some places took.

No. 19. Eliza C—, æt. 16 months. In this instance the vaccination, first, was not successful, but nothing followed it.

No. 20. Rose Jane B—, æt. 3 months. I did not succeed in obtaining any information about this child, and the same remark applies to the three following cases.

No. 21. Rosina T—.

No. 22. Daniel C—.

No. 23. John C—.

No. 24. See Plate XXIII.

No. 25. Harriet W—, æt. 15 years; revaccination; successful; no ill consequences.

No. 26. John R—, æt. 8 years. A successful first vaccination. No ill consequences.

Third Series (one case).

The following case came under my care at Moorfields, where its subject applied on account of acute iritis, of the cause of which he had no suspicion.

The patient was a tobacconist, æt. 46, a married and respectable man. The iritis for which he applied at Moorfields was double. On investigation it was found that his body and limbs were covered with a papular and scaly rash of a very definitely syphilitic nature; he had also symmetrical sores in the tonsils. The examination further revealed the fact that he had large unhealed sores on his arm which had resulted from vaccination. He told us that he had been vaccinated three months before, being at the time in perfect health. Several of his children (young adults) were vaccinated at the same time and from the same child.

His account was that the vaccination places took and went on favorably, but that just as they were about healed, during the fourth week, they again inflamed, became ulcerated, and gave him much trouble. He attributed this relapse of inflammation to the irritation of tobacco dust, in which he worked. It was not until more than six weeks after the vaccination that the eruption showed itself, and not till the end of another month that the iritis occurred. He had not as yet had any specific treatment, since the nature of his disease had not been recognised. On being questioned as to the possibility of his having contracted syphilis he firmly denied it. He readily submitted to an examination of his genitals, and we could not find the slightest trace of sore on them. His vaccination sores, at the time he came under my notice, were open ulcers as large as shillings, covered with scab and with dusky indurated borders. There was an indolent swelling in his armpit.

This man remained under my treatment at Moorfields for two or three months, and was seen repeatedly by many members of the profession who were attending my clinique. There could not be the slightest doubt that he was suffering from secondary syphilis, and that too in a very severe form. We treated him with mercury, and both his iritis and rash disappeared.

Everything in the man's history that we could ascertain seemed to point to vaccination as the source of contamination. His vaccination spots were the seat of chancrous induration after having in the first instance healed. The date of their

induration and the date of appearance of the rash fitted exactly with the hypothesis that he had in some way acquired syphilis about the date of his vaccination.

Having obtained from him the name of his vaccinator I called on that gentleman, and from him obtained information which strongly confirmed the man's statements. He said he had never in his life seen such vaccination sores as this man's arm displayed. "He had been quite frightened at them," and had thought their condition so near phagedæna that on two occasions he had applied a strong solution of nitric acid. He had never, however, suspected the real nature of the disease.

About a dozen other persons had, I was informed, been vaccinated at the same time and from the same child as our patient. The vaccinator told me that he knew them all, and that, with the exception of a little trouble in the healing of the sores in one or two, none of them had shown anything peculiar. He was very anxious that we should not excite alarm in the neighbourhood by instituting any inquiry about these patients, and as he promised to get to know quietly how they were doing and to inform me if he found anything suspicious, it seemed best not to press the matter further. I ascertained from our patient himself that his own children, three in number, who had formed part of the series, had all done perfectly well. The vaccinator told me that the infant from whom he had vaccinated was a model of vigour and health, and he courteously procured for me an opportunity of seeing it.

The Vaccinifer.

I found it a very large and very fat baby, eight months old. It had no rash nor any trace of condyloma, and the only point about it suggestive of syphilis was the state of the bridge of the nose, which was decidedly broad and sunken. Its mother appeared in good health, but she told me that her first two children had died in infancy and that this, her third, was the only one she had living.

I have, in my own mind, no doubt from the appearance of the child's nose that it is the subject of inherited taint, and shall confidently expect that future years will prove the correctness of this suggestion; nor do I see any way in which the symptoms displayed by the man can be accounted for, excepting on the supposition that he contracted syphilis from vaccination. If we suppose that from some other source he acquired a chancre at or near the date of his vaccination, it is remarkable that no trace of such sore should have been left; and it is yet more remarkable that the vaccination spots should have become indurated and have caused an axillary bubo. Nor does it seem in the least probable that the vaccination sores had become accidentally contaminated. No plausible source of such contamination can be suggested, while, as already stated, the dates fit exactly with the supposed introduction of the virus at the time of vaccination. Thus, we seem to have an instance in which only one patient out of twelve vaccinated from the same subject became contaminated; at any rate there is, as yet, no proof that any of the others have suffered, but under the peculiar circumstances of the case I can by no means accept this absence of evidence as conclusive. It is not improbable that something more may in the future be heard of some of these patients.

I will now relate the particulars of the fourth example of vaccination-syphilis which has come under my notice. They are in most points very similar to those of the preceding case; out of three vaccinated only a single individual became diseased.

Fourth Series (one case).

Mrs. M—, æt. about 46, came under my care December, 1872. Her ailment was a vascular growth in the urethra, but in the course of the examination I found that

she was covered with the stains of a syphilitic rash. On my asking about it she told me that she had been very ill after vaccination and had suffered from a severe eruption and from inflammation in one eye.

The following, on inquiry, proved to be the facts of her case:—She was vaccinated in May, 1871, and her two daughters, one aged 30 and another 15, were done at the same time. Four punctures were made in her arm and all of them soon healed, not having taken; but a month later one of them again became sore, and a hard-edged very troublesome ulcer resulted which lasted for three months. Within a few weeks of the formation of this ulcer, *i. e.* within seven or eight weeks of the date of the vaccination, she became covered with rash. It was especially copious on the chest and back of the neck and affected also the palms of her hands. From the date of the vaccination in May until the beginning of September she remained under the care of her own medical attendant by whom the vaccination had been performed. In September, as the rash remained out, she consulted another practitioner. Under her second adviser she remained for nine months, taking almost continuously iodide of potassium and bichloride of mercury in small doses. In July, 1872, when the rash had been out eleven months and was still but half cured, iritis occurred in the left eye. It was so severe as to threaten the destruction of the organ, and after some delay she got admitted into the Ophthalmic Hospital. It should be stated that for two months before the outbreak of the iritis she had suspended all treatment and had been staying at the sea-side for the benefit of her health. She was in Moorfields from July 19th to August 1st, and was treated by mercury and atropine. The diagnosis given, as I ascertained from her prescription paper, was "Iritis, specific (?), after vaccination (?)." At the time of the iritis her rash relapsed and her palms became covered with scaly patches, her finger-nails also thickened.

At the time that this patient came under my observation she was much out of health, and was still covered by the stains of an eruption, about the nature of which there could not be the slightest doubt. There were adhesions of the iris in the left eye. I found that she had been much annoyed with the gentleman who had vaccinated her, attributing what had followed to his having done it when she was not in a proper state of health. She had not, however, the slightest idea of the nature of the disease from which she had suffered. Her surgeon had not suspected it either, and consequently, during the first four months, no specific treatment had been adopted. On asking her as to the particulars of the vaccination she told me that it was done from arm to arm in the surgeon's own house. The infant, according to her statement, was puny and its mother looked ill. She was not aware whether the child's arm bled or not. In her two daughters who, with her, were vaccinated from the same child, no definite ill results followed; in both, several spots took, went through their stages and healed soundly at the usual time. In neither of them did any of the spots reulcerate, but the younger one twice suffered from transitory rash, probably urticaria. I afterwards called on the surgeon who had vaccinated this patient; he confirmed her statements in all particulars excepting that he did not allow that the vaccinifer looked puny.*

The Vaccinifer.

I succeeded in tracing the vaccinifer. Its mother was the wife of a lighterman and had borne three children previously. Of these the eldest is a boy of ten who now shows no signs of syphilis and who is said to have had no symptoms in infancy. The second was stillborn. The third was a girl of four who had no special symptoms in infancy excepting that for several months during teething she had very troublesome

* It seems probable that the woman who is the subject of our narrative was the last or last but one vaccinated out of a considerable batch.

ulcers at the anus (condylomata). For these she was long under medical care and had numerous local applications. At the same period she was considered to have "a tendency to water on the head." The vaccinifer was four months old at the date of vaccination and appeared, according to his mother's statement, to be perfectly well. Subsequently, however, when dentition commenced, he, like his elder sister, had very troublesome sores at the anus and a tendency to water on the head. For the anus he was three months under treatment at a dispensary and had blue stone applied. He is living, full grown, and shows no peculiarities excepting a large forehead.*

There cannot be the slightest doubt in this case that the patient had suffered from syphilis, the only question to be raised is how was it obtained? On this point I hold that a vaccination puncture having reopened a month after healing, having formed a large hard-edged ulcer which lasted three months and which was promptly followed by the rash, is an almost conclusive piece of evidence. The dates of each occurrence are precisely what we should have expected.

The patient is a married woman past middle life, and there is not the least reason for suspecting contagion from any other source. I may add that the vaccination-ulcer has left a large dusky scar exactly such as I have seen in other cases of vaccination-syphilis.

Before leaving this case I may ask attention to the fact that the secondary symptoms were unusually severe and protracted, a circumstance not improbably due to the fact that no specific measures were employed during the first four months, and that they were subsequently given very insufficiently.

Fifth Series (two cases).

The patients who were the subjects of this series were brought under my notice by my colleague Mr. Waren Tay during April of the present year (1876). A mother brought her two children—an infant and a child of two—they, as well as herself, suffering from secondary syphilis. The disease had shown itself first in the children. It was not until after a most searching investigation of the facts and interrogation as to the father, without result, that we were led to ask as to vaccination. Then it at once came out that the children had both been vaccinated in September, 1875, that their sores had reopened and remained long unhealed. The mother had contracted a sore on her nipple from her child, and all her symptoms were two months behind those of her children. At a still later date, that is, about May, the father also contracted syphilis from his wife, and attended in September for secondary symptoms. Mr. Tay took the trouble to call upon the surgeon who had done the vaccination, but we did not succeed in obtaining any important facts.

The following are the dates in reference to this series so far as they could be ascertained:

Sept., 1875.—Lydia S—, æt. 3 months (born June 21st), and Alice S—, æt. 1 year and 7 months, were vaccinated. The vaccination sores healed, leaving only a slight mark, the mother said, and then broke out again and remained sore for six weeks or two months. The glands in the armpit (left) in each child enlarged.

Jan., 1876 (or thereabouts).—The mother had her right nipple bitten by the younger child, and on January 19th the elder child came under Dr. S—'s observation for "diarrhœa."

Feb. 9th.—It is noted (on the out-patient's letter) that the elder child's hair was becoming thin; that is about five months after the vaccination. The younger child

* I obtained from the mother the name and address of the surgeon who treated her child. On inquiry he told me that the child had *syphilitic condylomata*, and was, on and off, under his care for months. He stated that it had also snuffles and a slight skin rash, and that it was cachectic and puny. He did not ask the parents any direct questions because he was perfectly certain as to the nature of the ailment.

now attended. There was slight ptosis of the left upper eyelid (noticed from birth), but no special symptoms of syphilis were observed by Dr. S.

23rd.—The mother showed a sore on the right nipple and a simple application was ordered for it.

March 8th.—It is noted there were nodules (condylomata) on the elder child's tongue.

April 5th.—Condylomata at the anus were noted.

12th.—The mother (it is noted) had condylomata on the vulva.

20th.—At this date (seven months from the vaccination) the children came under Mr. Tay's observation, and were shortly afterwards seen by Mr. Hutchinson. The mother was found to have slight thickening about the right nipple and two groups of enlarged glands in the right armpit. She stated that she had had a number of spots on the neck and arms and other parts, and her hair had been falling. The elder child had dusky, scaly scars on the left arm, where she had been vaccinated, an enlarged gland in the armpit, condylomata at the anus, on the tongue, &c., and marked loss of hair. There was no history of thrush or snuffles, and no signs of inherited syphilitic changes in the nose, &c. The younger child had very little hair on the head, a doubtful eruption on the vulva and adjacent parts, dusky and scaly scars on the left arm, and an enlarged gland in the left armpit. It was said she had never had much hair. In neither child had spots on the skin been noticed.

May.—The husband noticed a chancre on the penis.

July.—He noticed an eruption coming out on his neck, trunk, and extremities.

Sept. 1st.—His left eye became painful, and a fortnight subsequently he attended at Moorfields for well-marked iritis, with a large nodule of lymph in front of the iris.

Sixth Series (one case).

In this instance Dr. Hare asked me to see with him a lady recently arrived from abroad, who was the subject of vaccination-syphilis. She was covered with a syphilitic eruption, and had two indurated and dusky chancres on her arm. She had been vaccinated in February. It did not take, but a little spot, "like a mosquito-bite," resulted. This healed, and six weeks after the vaccination the sore formed, which in June, at the time Dr. Hare first saw her, was still present. As the vaccination had been done in India we had no opportunity for making further inquiry.

General Remarks.

I will now make a few general remarks on the subject of vaccination-syphilis, chiefly in connection with the series of facts which I have recorded. It will be convenient to arrange what I have to say under separate headings.

1st. What are we to infer from the circumstance that when syphilis is conveyed in the practice of vaccination it does not affect all of those vaccinated from the tainted source? Clearly, I think, we must believe that the specific poison of syphilis is either not contained in the vaccine lymph at all, or is not equally diffused through it. In my first series of cases, two patients out of twelve were successfully vaccinated and wholly escaped syphilis; in the second series, out of about twenty-six more than half escaped; and

in the third, only one out of twelve is known to have suffered, whilst in the fourth, only one suffered and six or eight probably escaped.

In the first and second series it was repeatedly observed that of those who contracted syphilis, some of the vaccination punctures developed chancres and others did not. There cannot be the slightest doubt that it is quite easy to vaccinate from a tainted vaccinifer without conveying syphilis, and on the other hand that it is possible to convey syphilis either with or without the production of a normal vaccine vesicle. Now, the supposition that it is necessary to convey some of the cell-elements of the blood in order to convey syphilis, seems to my mind by much the most probable explanation. Probably it is not necessary that these elements should be visibly red. That the vaccine virus itself in a pure state cannot produce syphilis seems highly probable, since in several recorded instances vaccination has been inadvertently performed on a considerable scale from a child that was subsequently found to be syphilitic, and without ill consequences. It is probable that in a great number of instances, in addition to those placed on record, this has happened, and the evidence supplied by them in reference to the impotency of pure vaccine lymph in the production of syphilis is very strong. On the other hand, experiment has fully proved, and more especially the well-recorded experiment of Professor Pelizzari, that the blood of a patient in the secondary stage of syphilis can, when inoculated, produce a chancre which will be followed by the usual rôle of syphilitic phenomena. The facts in the case referred to afford, as regards dates, &c., a very exact parallel with what was observed in all the cases which I have recorded.

2nd. Next we may ask, is it absolutely necessary that *blood* should be used in vaccination in order to convey syphilis? It seems highly probable that it is not. At any rate, there is not the least evidence in three of the series of cases which I have recorded that the lymph used was visibly contaminated with blood. The vaccinator in each of these instances asserted that it was his habit most scrupulously to avoid making the vesicle bleed. Probably it is quite sufficient to allow the vesicle to drain or weep. With this drainage no doubt corpuscular elements of the blood and tissues become free. According to this supposition as soon as the first contents of the vesicle are exhausted the risk begins. It is well known that it is the custom of many experienced vaccinators to allow the ruptured vesicle "to weep," and to continue to employ its secretion long after the exhaustion of its original contents.

3rd. *If the syphilitic virus and the vaccine virus be implanted at one and the same time, what will be the course of events?* The cases recorded show conclusively that, if the patient be susceptible to vaccination, the vesicle may pass through all its stages in the most characteristic manner. Then after healing of the vaccination-sore, and at the end of about a month from the inoculation, the syphilitic virus begins to show its effects and the scar becomes irritable, inflames, and indurates. Although this course is the usual one it is not invariable, and deviations from it may be observed in connection probably with the patient's state of health and condition of tissues.

In these exceptional cases the vaccination-sore never heals, and the pus-scab which forms over it combines with the inflammatory swelling around to conceal the nature of the specific changes which subsequently occur. Should the vaccination not have taken, it is usual for the puncture to heal and for the patient to think no more about it until induration occurs at the end of the month.

4th. *What are the usual characters of the vaccination-chancre?* As already hinted above, the amount of inflammatory effusion on the surface of the sore, and of inflammatory œdema at its base, may in certain cases be considerable. In several of the cases in my second series the specific characters of the chancre were in this way quite concealed. In these instances the patients were children. In the man who is the subject of my third observation the history was that the sore had been very acutely inflamed, so much so that the surgeon several times cauterised it, and probably it was on the verge of phagedæna. These conditions are, however, exceptional, and in a usual way the vaccination-chancre shows but little tendency to excess of inflammation. In some cases it does not even ulcerate. It begins as a little red, firm, glossy tubercle, which gradually increases in size and becomes harder. At the end of a fortnight, or earlier, it usually ulcerates and presents a sore remarkable for its small amount of secretion and for the hardness of its base and edges. The cases in which no mercury was given show that it may last for some months before it heals. After healing it leaves a dusky brown scar very different indeed from that of vaccination. The pigmentation of the scar, as of other syphilitic scars, will vary with the complexion of the patient, and is always greatest in those who are dark.

5th. *What treatment ought the vaccination-chancre to receive?* I can feel no doubt that should a vaccination-scar take on the induration characteristic of a chancre, and should the other facts of the case corroborate the suspicion, it is the surgeon's duty without delay to

begin the administration of mercury. The cases which I have recorded show in the strongest possible light the great difference in result between those in which mercury was given and those in which nothing was done. In my *first series* of cases the nature of the accident was recognised during the sixth week after vaccination and prior to the occurrence of any well-marked secondary symptoms. In all the patients, excepting one, mercury was at once commenced, and in all these the progress of the chancre was at once arrested and rapid cure resulted. For a considerable period no secondary symptoms showed themselves, and the success of the treatment was such as to induce not a few to doubt the correctness of the diagnosis. Subsequently, however, secondary symptoms showed themselves in several of the patients. They were so well characterised as to put all scepticism about the nature of the disease out of question, but still they were comparatively very slight. They yielded very quickly to the renewed administration of mercury, and none of the patients in any material degree lost health either from the disease or the remedy. Iritis did not occur in any single one, and I believe they are all at the present date quite well.* The only case which gave any real trouble was that of a young woman in whom suppuration in the cervical glands took place, and in her most probably it was strumous rather than syphilitic. The contrast in this respect was very great between the *first* and *second series*, and still greater in respect to the two cases which I record in the present paper (*third* and *fourth* series). In neither of the two latter was the nature of the disease suspected until the skin was covered with secondary rash. In both the chancre on the arm became very large and remained open for several months. In both the eruption came out most copiously and was attended by great loss of flesh and strength. In both iritis of a very severe character occurred. One of them was cured, both as regards local phenomena and general health, by a course of mercury; in the other the disease under inefficient treatment has lingered for twenty months, and the patient is still suffering much from its effects. It is, of course, too early to obtain data as to the relative liability of the patients to the tertiary forms of syphilis, but so far as the primary and secondary symptoms are concerned I cannot speak too strongly as to the vast apparent advantage of the mercurial plan. The lesson of the cases is very

* The above was written in 1872. At the present date I am obliged to except from this statement Mr. W— and his son, both of whom have since suffered from syphilitic orchitis. The father has also been threatened with cerebral symptoms. In the son, one of the scars is now again, at the end of four years, surrounded by dusky redness (lupoid?). These patients took mercury for a much shorter period than most of the others.

clearly opposed to the too prevalent modern doctrine that it is well to wait for secondary symptoms before beginning specific treatment, and would appear to indicate that the latter should be adopted as soon as ever the condition of the chancre permits of an accurate diagnosis. I may also in passing be permitted to ask attention to the interesting illustration which these cases afford of the manner in which mercury interrupts the evolution of syphilis and delays the occurrence of secondary symptoms. In all the cases which were not treated, secondary symptoms showed themselves from the sixth to the ninth week after the inoculation, whilst those treated by mercury did not show symptoms until from five to seven months afterwards.

In conclusion, a few words must be said as to the best means by which we may hope to prevent the occurrence of these lamentable accidents in future. Foremost under this head I would put the diffusion of the knowledge amongst the profession that such accidents are possible. Until my original papers were published almost the whole British profession was incredulous on this point ;* and in spite of the publicity which was then given to the facts there still remain, I believe, some who are either uninformed or unconvinced. The vaccinator who proceeds in his duties with the fear of syphilis before him can, I think, incur but little risk in the matter. He will in the first place select his vaccinifer carefully, avoiding all children whose parents are not known to him. He will for the most part avoid all first-born† children, and wait until by the development of one healthy child some guarantee of freedom from taint on the part of the parents has been given. There certainly cannot be any difficulty under ordinary circumstances in procuring vaccinifers who are absolutely free from risk. Next to the scrupulous selection of the child from whom to vaccinate come the obvious precautions of avoiding the use of blood and of recent exudation from the walls of the vesicle, but these and many other matters of detail have already been so well enforced that it is needless to allude to them further.

* See answers to queries in the 'Government Report' from all the leading members of the profession.

† Of the vaccinifers in my first four series of cases two were first-born children, the third was the first which had lived, the parents having lost two previous children in early infancy, while in the remaining case, although the child had a brother and sister living, and apparently in good health, there was the fact that the latter had in infancy long suffered from ulceration at the anus. I am bound, however, to admit that if this second child had been presented as a vaccinifer, there would, as far as can be ascertained by inquiry now, have been no facts likely to arouse the suspicion of the surgeon. The mother would have been able to produce the guarantee of an older child in good health.

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Fig I.

Fig. II.

E. Burgess del. ad nat.

W. West & Co. chromo-lith.

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PLATE XXII.

The first figure in this Plate shows a syphilitic papulo-scaly rash on the neck of a young girl, and in Fig. 2 we have the state of the arm in the same patient. The rash occurred on many other parts. The chancres in this case were peculiar, in that a good deal of inflammation had surrounded them and had produced an amount of scale and crust by which the specific induration, &c., was much concealed. The induration was, also, not so great as in most of the other cases. The portrait was taken about thirteen weeks after the vaccination. The following are the brief notes of the case :

Elizabeth T—, æt. 4 years, sister of Case I, Second Series. She was vaccinated for the first time February 13th, and five of the punctures took well. They went through their usual stages and healed. Afterwards the scars inflamed and ulcerated. When she was seen by Mr. Tay on May 5th she presented superficial sores with slightly indurated bases, and covered with a good deal of scab on the seat of the vaccination-scars (see sketch). The glands in the arm-pit were enlarged. She showed deep symmetrical ulcers on the tonsils, nearly healed, and she had a copious rash of papules and small scaly patches on the body, the colour, arrangement, and general appearances of which were most characteristic. This eruption was symmetrical, and occurred especially on the back of the neck, the bend of each elbow, and the thighs and hips. Under mercurial treatment the chancres healed and the rash disappeared.

The eruption had been out one month, having, according to her mother's statement, begun to appear eleven weeks after the vaccination. Her younger brother was vaccinated at the same time and from the same child, and with precisely similar, though less severe, results.

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E. Burgess del. ad nat.

W. West & Co. chrome

PLATE XXIII.

This portrait shows the arm of a girl, æt. 13, and was taken thirteen weeks after the vaccination. There had been three sores, but two of them had joined and formed one very large one, with a prominent mass of granulations in the centre. The third, seen below the larger one, had healed but remained indurated. The child was covered by a dusky scaly rash. The case is No. 24 in my Report presented to the Royal Medical and Chirurgical Society, and published in the 'Transactions' for 1871. The following particulars are extracted from p. 338:

Caroline W—, æt. 13 years, a revaccination; three places took. The sores never quite healed. About the fifth week they inflamed considerably. An abundant eruption appeared in the eighth week, and at the same time she failed in health, lost her appetite, and had pains in her limbs. When seen in the beginning of the fourteenth week she had a large open sore on her arm, with indurated, elevated edges, and prominent, florid granulations in the centre. This sore was formed by the coalescence of two; a third was healed, but indurated. She had symmetrical excavated ulcers in the tonsils, and enlarged glands in the axilla and back of neck. She had a copious eruption of dusky flat-topped papules, occurring on almost all parts excepting the face, and there was also a single, round, condylomatous patch on her tongue. A sketch of her arm was taken on May 19th, and on the same date she was seen by many surgeons. Mercurial treatment was commenced on May 17th. On May 31st she was rapidly getting well, the rash having almost disappeared and the sore being nearly healed. On June 21st the sore on the arm was healed, but its scar was dusky and covered with scales; the only constitutional symptoms which remained were a few spots on the neck and the condyloma on the tongue. Subsequently this child got quite well, but she had to take mercury for more than two months. Towards the end of July she was again under care for a small condyloma at the anus, but it soon disappeared under treatment.

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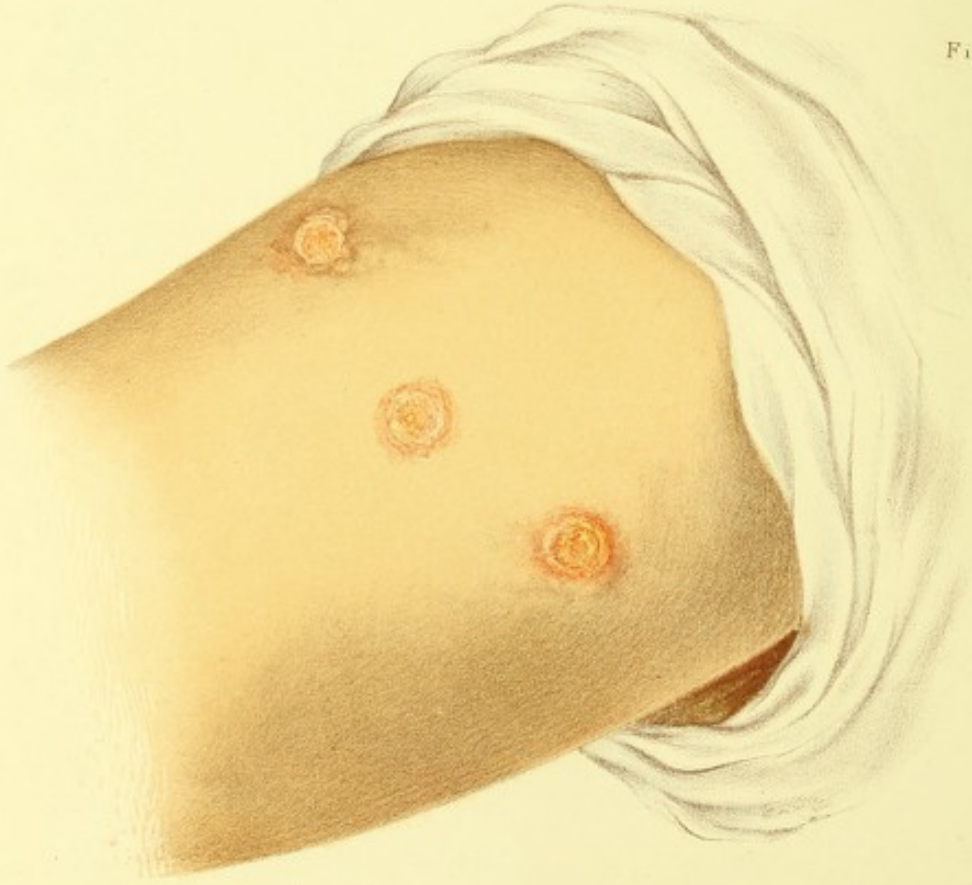
Fig. I.

Fig. II.



W. West & Co. ch. lith.

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PLATE XXIV.

In this Plate we have represented the state of the sores on the arms of two young women, who were vaccinated on the same day from the same child. In each, three indurated chancres had developed, but in Fig. 1 the amount of inflammation is much greater than in the other. The sameness of condition of all the chancres in each case is very noteworthy. In both patients the vaccination-sores had gone through their stages and healed well before the chancres developed. The portraits were taken exactly two months after the vaccination.

The following are the notes of the cases, which I extract from my first paper in vol. liv of the 'Transactions of the Royal Medical and Chirurgical Society.'

Mary Jane L—, æt. 18. Three spots took and went through their stages. About six weeks after the vaccination all three became inflamed, and they subsequently indurated. On April 4th they were all indurated and superficially ulcerated (see sketch). There was an enlarged gland in the axilla, movable, but not very hard. During the preceding week she had had some febrile disturbance. Mercurial treatment was commenced at the end of the eighth week, and was pushed to slight ptyalism. She subsequently had some diarrhœa and could not continue the mercury regularly. The chancres soon healed. In the thirteenth week she reported that she had a rash, which came and went, but I never saw anything positive. She was of strumous diathesis, and a large glandular mass in the neck, which had shown itself in the eighth week, persisted ever afterwards. In the middle of July, all specific treatment having been suspended for more than two months, she had a rash on the neck, fronts of arms, &c. It consisted of small, slightly scaly papules, of dusky colour. She had also symmetrical ulcers in the tonsils. Mercurial treatment was at once recommenced and the rash soon began to fade. She was seen a few days later by the Committee of the Royal Medical and Chirurgical Society appointed for that purpose. On August 1st all traces of the rash had disappeared, but the ulcers in the tonsils persisted. On September 4th she was seen by Mr. Thomas Smith, Secretary of the Committee. At this date she had no rash, but the ulcers in the tonsils were still characteristic.

Annie W—, a florid robust girl, æt. 17. The three vaccination spots took well, went through their normal stages, and healed. On April 4th (eighth week) the outer one showed slight induration, but was not in any degree ulcerated. The other two were reddened, but not at all hard.

She said that they were redder than they had been a week before, and that they were beginning to itch. She felt perfectly well. Three days later all three spots had

become slightly harder. (*Sketch now taken.*) None of them ever passed into open ulcers, and under mercurial treatment all induration disappeared in the course of three weeks. I believe she took the mercury afterwards very irregularly. No constitutional symptoms of any kind ever showed themselves.

Fig

Fig. II.

Fig.

PLATE XXV.

VARIOUS MORBID CONDITIONS OCCURRING IN VACCINATION-SORES.

Two of the three figures in this Plate have no connection with syphilis.

In Fig. 1 we have an illustration of common lupus, occurring in and around a scar left by vaccination. Lupus, as is well known, is often localised by some slight injury: a boil, a slight wound, an insect sting, or the like, may, in a person predisposed, evoke it. There is, therefore, nothing to surprise us in the fact that it is seen occasionally round the scars of vaccination. The fault is not in the vaccination, but in the state of the patient's constitution.

In the present case the lupus patch had been present six or seven years and had followed a few months after vaccination, the patient being a child of 8. The edges of the patch were gradually spreading, whilst in the middle a scar had formed. The kind of lupus is the mildest of the non-ulcerating type, and the one which is most easily cured by liberal cauterisation.

Fig. 2 shows an arm with two indurated chancres which are just healed, but still covered by a hard crust. There is much dusky induration around the scabs. The case was that of a boy, who was one of my second series. The sketch was taken in the fourteenth week.

Fig. 3 is from a very curious case, in which from some unexplained cause the vaccination-sores had never healed. The patient, a child of fifteen months, had been vaccinated nine months before the portrait was taken. The three sores had remained throughout in much the same condition. They were not in the least indurated, but, as shown, their edges were abrupt and their surfaces covered with scab. The child was not strong, but there was nothing special in its condition to account for the state of the sores. There had never been any indication of constitutional syphilis. The contrast in the appearance of these sores with the indurated chancres depicted in the other portraits is most marked.

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Fig. I.

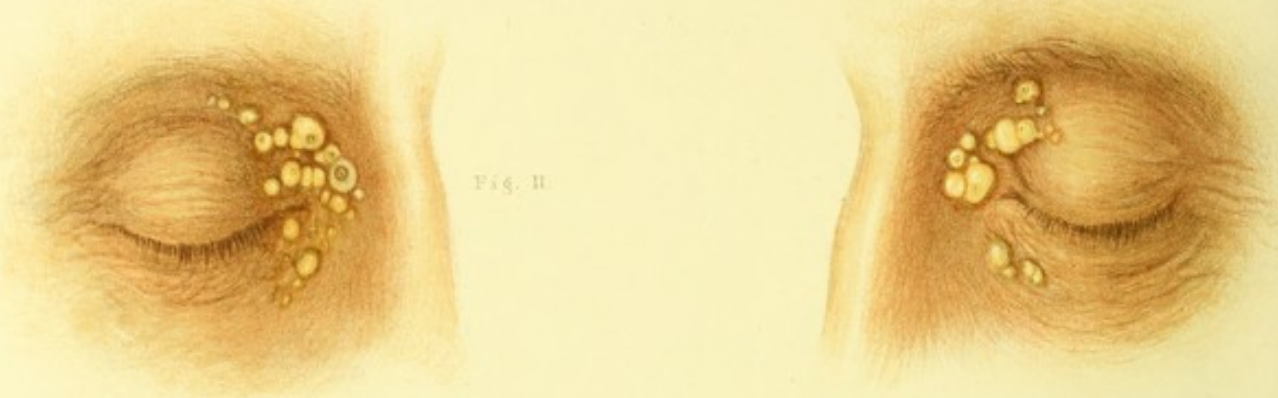

Fig. II. Fig. III.

XANTHELASMA PALPEBRARUM. Fig I. II. III.

Fig IV.

CONFLUENT ACNE IN GROUPS & IN XANTHELASMA POSITIONS.
Fig IV.

F. Burgess del. et lith.

PLATE XXVI.

XANTHELASMA PALPEBRARUM AND ALLIED CONDITIONS.

Fig. 1 shows a single round patch of lemon-yellow deposit in the upper eyelid of the left side just above the inner canthus. The yellow deposit is characteristically xanthelasma, but in its centre is a black spot, the exposed end of a sebaceous plug. This plug was readily squeezed out, and after its removal the yellow deposit in the skin itself still remained. It was clearly a diseased sebaceous gland in the middle of a small xanthelasma patch (see Case 16 in tabular report).

Figs. 2 and 3 show similar but more advanced conditions of xanthelasma complicated with sebaceous gland disease. A considerable group of spots, some of them confluent, but most free, are seen curving round the inner canthus in the xanthelasmic position. Some of these show in their centres sebaceous plugs of considerable size, but most are free from them. Although these yellow patches were in all respects exactly like the more common form of xanthelasma, and did not contain any secretion whatever, yet we may note that they were smaller than usual, more numerous, and showed less tendency to coalesce in large flat areas. The two figures represent the opposite sides of the nose from the same patient.

CONFLUENT ACNE IN GROUPS AND IN XANTHELASMA POSITIONS.

Fig. 4 does not represent xanthelasma at all, but rather a curious condition of grouped comedones which occur nearly in the xanthelasma positions. The conditions are almost symmetrical. An oval patch on each side occupies the inner third of the lower eyelid. It is abruptly margined, and is made up of about seventy closely placed black spots, each of which is the end of a sebaceous plug. Between these spots the skin is pale and somewhat atrophied. There are no yellow patches. In the upper eyelid near the

outer canthus on each side is a small group of similar spots, and on the left side over the inner canthus is a group which has no representative on the right. The remarkable feature in this case, and the one which makes it of interest in reference to our present subject is, that there are no black acne spots on other parts of the face, the sebaceous disease being restricted to a part usually affected in xanthelasma. The patient was a man aged about sixty.

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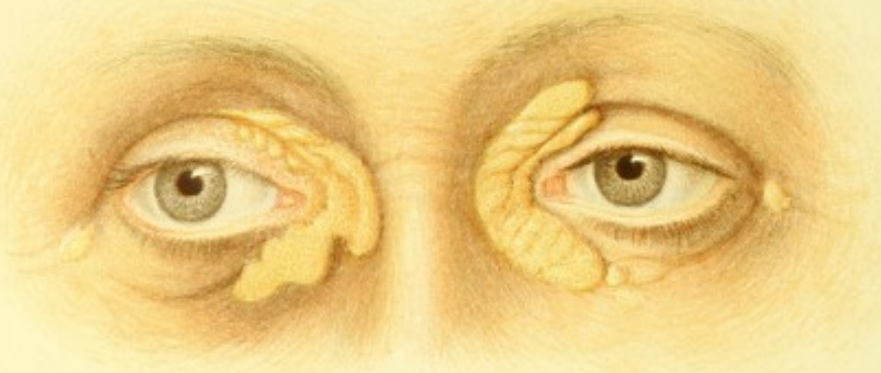

Fig. I.

Fig. II.

Fig. III.

XANTHELASMA PALPEBRARUM.

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PLATE XXVII.

XANTHELASMA PALPEBRARUM.

In Fig. 1 of this plate we have a good example of a rather extensive development of xanthelasma in its usual positions. Raised, smooth, well-circumscribed patches of buff yellow tint surround the inner commissure of the eyelids on each side, extending in crescentic form on the upper and lower lid. From its irregular outline, and yet more conclusively from the existence of little separate patches, we may infer that the large patch has been formed by the joining together of several smaller ones. Near the outer canthus of each eye is a single small patch of the same kind. The conditions are almost precisely symmetrical. There are no cysts nor any evidences of distension of sebaceous glands, the patches being flat, smooth, and soft.

In this portrait not only the most common appearances but also the usual arrangement of xanthelasma is well shown. The parts affected are those which we may conveniently know as the *xanthelasmic positions*. Almost without exception these curious changes are seen first in a crescent around the inner canthus, and the part next to be affected is the outer one. In extreme instances the whole eyelids may be involved, but even in these it is always true that the outer and inner canthic regions were first attacked and quite separately. Now and then the outer canthus may show a spot before any appear near the inner, but this is most exceptional.

The condition of the new deposit here shown is also that which is the most usual, a lemon or buff-yellow patch without hardness, a little raised, and never showing the least tendency to inflame. The comparison long ago made to "a piece of chamois leather let into the skin" is very appropriate.

In Fig. 3 we find the xanthelasmic regions occupied by a series of cysts, near to which are some small patches of yellow deposit exactly like those shown in the preceding portrait. I rely upon the presence of these latter for conclusive proof that the disease is really of the same nature. The yellow patches alluded to are best seen on the right side, but they were present on both, and were far

more definite in the patient than they are in the portrait. Having proved by the presence of these that the disease is really xanthelasma, it becomes of great interest to note the very peculiar arrangement of the serous cysts, and to observe that it is exactly like that usual in the xanthelasma patches, a crescent surrounding the inner canthus.

This sketch was taken from a woman, the subject of Case 11 in the appended tabular statement, in whom the conditions had been present for seven years. She had, as is usual in xanthelasma, suffered much from sick headaches and bilious attacks, and had also experienced very curious nervous phenomena, numbness of hands, dimness of sight, and thick speech, &c.—symptoms which are not very unusual in this disease.

In Fig. 3 we have again symmetrical lemon-yellow patches on the upper eyelids above each inner canthus. They are in all respects almost exactly like those shown in Fig. 1, but are much less extensive.

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GENERAL REMARKS ON XANTHELASMA PALPEBRARUM.

We recognise under the name, Xanthelasma of the Eyelids,* certain curious yellow patches, which form on the eyelids of middle-aged or elderly persons. Their precise position is by no means a matter of chance, for they are almost invariably found above or below the inner commissure of the lids, or, in advanced cases, in a crescent around it. After the inner canthus has been surrounded, but without any extension over the whole lid, spots may form at the outer canthus, and the final result may be coalescence of the several patches above and below and a circle surrounding the whole eye; this, however, is very rare. The most common condition is a little patch the size of a fourpennypiece, or, perhaps, a little group of patches in the skin of the upper lid. In many persons the disease progresses no further, or extends so slowly that its advance is scarcely perceptible. In early stages and in slight forms the condition needs to be looked for, and the patient is not unfrequently unaware of its presence. In more advanced conditions, as in Figs. 1 and 3 of Plate XXVII, it is sufficiently conspicuous. It is never met with in young persons. It occurs to women in the proportion of two out of every three cases,† and it begins in a large majority of instances on the *left* side. It is to be regarded chiefly as a symptom and by no means as a substantive disease, or rather, perhaps, to speak more precisely, we ought to view it as a pathological consequence of frequently recurring physiological processes. Thus its presence enables us to look backwards and to tell the patient what he has gone through in the past, often with great

* Xanthelasma has long been known to writers on skin diseases. It was, I believe, first definitely mentioned by M. Rayer, who spoke of the occurrence "on the eyelids and in their vicinity of little yellowish spots or patches very much like chamois leather in colour, soft to the touch and slightly prominent, without heat or redness, and often very symmetrically disposed." M. Rayer, although he thus very concisely enumerated the local features of the disease in its more common form, gave to it no distinctive name; nor does he appear to have inquired as to the association with it of any constitutional phenomena. Dr. Addison subsequently recorded three cases and gave it the name of *Vitiligoidea plana*. Mr. Erasmus Wilson has more recently designated it *Xanthelasma*, and as this name alludes merely to the most prominent feature of the disease, and involves no hypothesis as to its resemblance to "Vitiligo," I think it much the best. The form of the disease which is by far the most common is so constantly met with on only one part of the body that it will, I think, be convenient to refer to this fact in its name, and to speak of it (with Mr. Wilson) as *Xanthelasma palpebrarum*.

† I should not be surprised if careful inspection should prove that it is present in greater or less degree in one per cent. of all women past middle life.

definiteness, whilst in a less confident manner we may also judge of his present liabilities and future health. When to this assertion I add that it is by no means infrequent it will be clear that it is a condition well worth understanding.

Although the appearances depicted in the first and third figures in Plate XXVII may be referred to as illustrating the commonest and most typical kind of Xanthelasma, yet it is by no means to be understood that it is always exactly alike. Not only do we encounter great differences in extent, but the colour of the patches may vary from a light lemon-yellow to a rich orange; sometimes, also, the patches are not raised but the skin is simply changed in colour. In exceptional cases other pathological changes besides the formation of yellow patches are witnessed; thus there may be disease of the sebaceous glands with accumulation of secretion and the formation of a comedo, or even serous cysts of considerable size may be produced. Respecting these latter it may be conjectured that they result possibly from the distention of the ducts of sudoriparous glands, although this is by no means made certain. These cystic and comedonous conditions are to be regarded for the present as complications of the proper xanthelasmic condition, and the latter name must not be applied unless the characteristic yellow deposit, in greater or less abundance, be present. I say this rather by way of guarding against errors in clinical observation than as expressing an opinion that when the yellow deposit and cysts are found together the latter are to be considered as essentially secondary to the former. It is possible that in the future we may come to regard the special region affected, the age of the patient at which it occurs, and the general symptoms accompanying it, as of more importance than the precise character of the local change, and may admit as closely related to xanthelasma conditions which are not attended by any yellow deposit whatever.* It would be premature, however, to do this yet, and might lead to serious mistakes.

For the present we may enumerate as clinical varieties of Xanthelasma Palpebrarum, the following:

1st. The common, flat, chamois-leather patch, raised, well-defined, and usually occurring not in small spots, but in one or more

* Although I avow this opinion, let me here state clearly that I have not in my Report on Xanthelasma, read in 1871 before the Royal Medical and Chirurgical Society, included any cases under that name in which the yellow deposit was absent. There are several in which cysts and comedones were more conspicuous than the true xanthelasma deposit, but in all these the latter was present also and justified the diagnosis. My friends, Dr. Kaposi, of Vienna, in his paper in Hebra's treatise, and Dr. Pye-Smith, in his Report in the last number of 'Guy's Hospital Reports,' have both, in alluding to my paper, fallen into considerable error on this point. Both appear to think that I have counted as xanthelasma cases which were sebaceous only. Some of my expressions may, perhaps, have been a little indefinite, and this makes it the more desirable that I should state emphatically that I did not do so.

patches of considerable size. The tint may vary within considerable limits, probably in connection with the complexion of the patient, being darkest in those whose tissues are richest in pigment.

2nd. A precisely similar condition, but in patches which are not raised and of which the margins are sometimes not very well defined. This is probably a minor form of the disease, and the patches are not, I think, ever very extensive. Cases in which this form is present may easily be overlooked, but if carefully examined it is unmistakable.

3rd. Cases in which, with the common chamois-leather patch, there are present also conspicuous sebaceous plugs. In these the xanthelasma changes are not usually very extensive, and the patches are often small and numerous. The yellow deposit is often thicker than in the more common form, and thus a rounded instead of a flat surface may be presented. In Group I, in which large flat areas are affected, there is seldom any evidence of sebaceous disease.

4th. Cases in which serous (sudoriparous?) cysts are present. Here, again, as in those with sebaceous complication, the cystic and the xanthelasma changes are usually present in inverse ratio with each other. If the cysts are numerous the yellow deposit is sparingly present. This may, perhaps, be caused by the atrophy of the skin which the cysts, rising from below, cause. This cystic form is rare, and I have only seen four or five well-marked examples of it.

The minute anatomy of the xanthelasmic patch has been carefully examined by several observers, amongst whom may be mentioned Drs. Pavy and Moxon, Simon of Berlin, Kaposi, Howse, Dr. Wickham Legg, and Dr. Pye-Smith. Most of their observations, however, refer rather to the tubercular form met with on other parts of the body than the variety so common on the eyelids. I have myself repeatedly excised patches from the lids, and had them carefully inspected with the microscope, with the assistance of my friends Mr. Tuffen West, Mr. Waren Tay, and Mr. Nettleship. The results obtained have been tolerably uniform, and we may consider it as certain—1st, that the epidermis, papillæ and appendages are seldom affected; 2ndly, that the corium is the seat of a new growth of connective tissue rich in cells, into which a plentiful deposit of yellow oil takes place.* It is this oily matter which gives the colour, and, as Kaposi has pointed out, the oil is to be regarded as a true deposit and not as the result of degeneration,

* In one case in which I cut out the patches I found yellow deposits in isolated specks, just like those so constant in melanosis, *in the cellular tissue under the skin.*

for it does not destroy the cell-elements, but leaves them capable of continuing their life-functions. Certain acicular crystals have also been seen by several observers, and are well shown in a drawing by Mr. Nettleship now before me. The amount of new fibrous or cellular growth varies much in different cases, and is much greater in the tuberous than in the plane variety. It will be observed that during life there is observed no tendency to further degenerative changes, and that the patches once formed remain for years in precisely the same condition—a fact which well fits with the histological observation that the cells which contain the fat are not destroyed by it.

In 1871 I read before the Royal Medical and Chirurgical Society a report upon xanthelasma of the eyelids, which contained the narratives of thirty-six cases, which I had collected chiefly in the hope of throwing light upon its cause and significance as a symptom. The conclusions at which I arrived seemed to me of some value, and I have since been led to attach increasing importance to them. They were briefly these :—that xanthelasma changes are apt to occur in persons in whom, from any cause, there have been frequent changes in the pigmentation of the eyelids; that they occur most frequently to those of dark complexion in whom pigment is mobile; and that they are to some extent an evidence of senility. Any person who has been liable to reveal to his friends from time to time the fact that he is feeling out of sorts, by the development of a dark semicircle round the inner part of the eyelids will be prone as age advances to have xanthelasma patches produced. They occur in skin which has been liable to frequent physiological changes in its pigmentation. This theory explains the relative disproportion of the sexes, since in women pregnancy and menstruation are both very apt to produce the pigmentation of the eyelids to which I refer.* It explains also why we so often get the history of severe sick headaches, or other forms of bilious disturbance, in those who develope xanthelasma, and, lastly, it furnishes a plausible explanation of the occasional occurrence of these patches in those who have never been pregnant, and have never suffered from the ordinary forms of liver disturbance. It is exceptional to meet with xanthelasma with a negative history in both these latter respects, and when we do so I believe it will almost invariably be found that the patient has been liable whenever in the least out of sorts (or

* We may note in reference to this point that in one of my cases the patient (Case 11), a woman, æt. 39, had ceased to menstruate at the age of 25, and that in one of the cases recorded by Dr. Addison menstruation had ceased at 35, and that the patient dated her illness from that time. It may even be suggested as possible that in some the physiological influence of pregnancy may have been the only one at work. Many women during pregnancy have pigment accumulations in the eyelids.

"seedy") to become "dark about the eyes." Sick headaches and definite liver disturbance appear to me to stand first in the list of causes, but undoubtedly there are many cases in which all history of such influences is wanting. It is in these latter that we shall get the most conclusive testimony as to the reality of the temporary pigmentation referred to.* I regard xanthelasma, then, not as the result of jaundice, nor, indeed, as exclusively connected with the liver, but, as has been said above, a direct consequence of frequent disturbances in pigmentation of the eyelids, by whatever cause produced.† Those who suffer from xanthelasma are liable also not infrequently to very peculiar symptoms of nervous disorder. The sudden occurrence of numbness of the arms and hands and inability to use them, or of numbness in one arm and attacks of very sudden failure of sight, are amongst the more conspicuous. The attacks of failure of sight are very extraordinary. They may vary in degree from a mere "swimming before the eyes" to a condition of absolute darkness. More usually only one eye is affected at a time, but occasionally both. The point most worthy of attention is that, although the blindness may be complete, yet it may pass off completely. This may occur to the same patient repeatedly. What the precise cause of such entire suspension of function may be, it is difficult to guess, but the facts are undoubted, and I cannot but regard them as of extreme interest. A very severe headache invariably follows such an attack, whether of blindness or of numbness of one or more limbs. In one instance (see Case 31) a man who had experienced these temporary failures of sight repeatedly, finally became after one of them permanently blind in the affected eye. At first no ophthalmoscopic changes were visible, and this continued for a week or two, and then the disc gradually became pale and passed into a state of white atrophy. In a case of xanthelasma with jaundice which I saw in Guy's Hospital, through the kindness of Dr. Hilton Fagge, the patient, a woman, told me that on one occasion whilst upstairs dressing, after her day's duties as a cook, she became absolutely blind. She groped her way down-

* Whilst compiling this paper, and since the above remarks were written, a remarkable fact in confirmation of them has come to my knowledge. A medical friend who is the subject of xanthelasma, but who has never suffered from sick headaches or any marked symptoms of liver disturbance, tells me that whenever overfatigued or out of health, very conspicuous dark patches appear in his eyelids. To such an extent has this been the case that his friends always know when he is not feeling well.

† It is a fact not without its interest that in almost all the severe cases in which jaundice was associated with the xanthelasma it had taken precedence of the latter as to date of occurrence. It is clear that the occurrence of xanthelasmic patches on the eyelids, unassociated with jaundice, whilst it may be interesting as enabling the observer to read his patient's history backwards, and especially to assert that sick headaches, &c., have, in all probability, preceded it, is of but little importance for purposes of prognosis. It is well known that those liable to sick headaches during the early and middle periods of life often lose them as age advances; this fact is noted in not a few of my cases in which the xanthelasma appeared after the subsidence of the other symptoms of liver derangement.

stairs, and soon after regaining the kitchen found her sight returning by degrees. It was in the course of a few hours wholly restored, and a "dreadful headache" followed.

Although all the more marked instances of this occurrence which have come under my notice have been in xanthelasma cases, yet I am far from thinking that there is any essential connection between the two. They are probably both results of the same cause, and either may be wholly omitted. The cause referred to is reflex disturbance of the nervous system in connection with liver disease, or, at any rate, those paroxysms of nerve disturbance (or "storm") to which we give the name of "sick headache" or "bilious attack." A person liable to severe attacks of this kind may experience precisely similar nerve symptoms (loss of sight, &c.), and yet never have xanthelasma, and, on the other hand, a person of dark complexion may easily get xanthelasma from attacks of a comparatively slight character, and by no means severe enough to evoke such alarming complications. The frequent coincidence of the two is due to the circumstance that the liability to each is increased with the severity of the "bilious attacks." More detailed statements as regards this and some other points in reference to xanthelasma of the eyelids will be made further on. Feeling certain that the only method by which we can hope, without risk of error, to arrive at opinions is by the careful collection of facts, I have put together in the appended table all the cases of which I possess notes. The first thirty were published in my paper in the Royal Medical and Chirurgical Society's 'Transactions' in 1871, the others have been added since. For some years I have made a note of every case which has come under my observation. Observations on the conclusions which seem deducible from the facts will follow the tabular statement.

For the present I leave aside the cases of xanthelasma in which it occurs as a general eruption, and confine my attention to the common form met with on the eyelids. There is no doubt that it is the same malady in both, and in the general outbreaks the eyelids are almost invariably affected, and usually, I believe, first in order of time. When xanthelasma is general it is almost always in association with jaundice and severe derangement of health. It assumes, indeed, almost the features of a malignant disease. In a future fasciculus I shall give a delineation of this very interesting malady, and shall for the present reserve any further observations on it.

Tabular Report of Seventy-four Cases of Xanthelasma Palpebrarum (Vitiligoidea).

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
1	Maria Jinks, London Hospital, Sept., 1870	60	About 1 year	Small yellow patches on the upper eyelids of both eyes, near the inner angles	Had enjoyed good health, and had not suffered in any special degree from headache, nor had any bilious symptoms	Her mother had died of "liver disease." She herself died under my care in the London Hospital of cancer of the vagina and bladder; her liver was not diseased.
2	A woman, married	46	?	Elongated patches, with a few small round ones, on upper eyelids near inner canthus. A few enlarged sebaceous glands were seen on the larger patches. More abundant on left side than on right	Sallow; black hair; liable for years to sick headaches and vomiting; headache frontal, and worse on right side; no constipation or indigestion; one attack of jaundice; often numbness of hands and feet on both sides; once loss of sight for an hour or two	An example of what has been termed *Vitiligoidea granulosa et plana*. Note that the disease was more abundant on the *left* side.
3	A woman, London Hospital, Dec. 16, 1867	53	...	Well-marked "vitiligoidea of the eyelids"	...	There is no further note as to the vitiligoidea; she was admitted for a tumour of the femur, suspected to be a node.
4	Sophia Goring, 11, Glaucus St., Devon Lane, Bromley	55	Does not know	A single patch of the plane variety on the upper lid of the *left* eye, near inner canthus; none on right side	Is subject to sick headaches and vomiting; these symptoms have been worse lately; for the last year or two has often had a tingling and numbness in her hands and arms soon after she wakes in the morning	Note that the disease occurred only on the *left* side.
5	R. Arkell, under Mr. Dixon's care for cataracts	79	...	A single small round spot on left upper lid, yellow with a black speck in the middle. It was a xanthelasma patch, with an enlarged sebaceous gland in its centre	Suffered from frequent severe headache from age of eighteen to about forty; headache frontal, and usually on right side; was very nervous during this time; jaundice at 44; health improved much after headaches left him; used to lose his appetite, but not vomit; no constipation; no indigestion	Mr. Dixon extracted his cataracts; he had very good sight for a year; he then had an attack of painless glaucoma in his *left eye*. Note occurrence of xanthelasma on *left* side only.
6	Mrs. Fenwick, under treatment in Nov., 1869, for Meibomian tumours	64	...	A small patch of xanthelasma on upper lid of *left* eye only	Florid and healthy; for many years has had very severe sick headaches, with retching; no jaundice, but often under treatment for what she considers "liver attacks"	Note its occurrence on *left* side only.

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
7	Mrs. Q—	59	1 year	Symmetrical patches near each inner canthus, chiefly on upper lids; those on *right* side came six months before those on left	Fair complexion, florid, healthy looking; no sick headaches, but frequent indigestion and vomiting after eating indigestible things (*e.g.* raw fruit or fat); no constipation; no numbness	Disease began on *right* side.
8	Mr. ——, from Winchelsea	75	...	Symmetrical xanthelasma patches, the largest on the upper lids; they are partly in patches and partly in dots	Will not admit any ailment, except a former attack of ague	When the patches first formed he used to squeeze yellow matter from them
9	Thos. Higgins (Case xxxix of herpes frontalis)	58	...	Symmetrical patches of pale yellow at each inner canthus, and group of yellowish spots on each lower lid. More marked on *left* side	Pale, good health; formerly very subject to sick headaches, not of late; jaundice twenty years ago; had "ague and low fever" seven years ago	Note predominance on *left* side.
10	Joseph Pieri, amaurosis of right eye, alopecia, locomotor ataxy (Case lviii, O. H. R.)	57	6 mos. about	Symmetrical groups of yellowish spots on side of root of nose and inner parts of eyelids; most spots had a black dot in the middle; some were, however, large, flat, yellow, and devoid of orifices	No sick headaches; occasional darting pains at lower part of chest; occasional flatulence; for many years blind in *right* eye from atrophy of nerve, and in *left* from perforating ulcer; for sixteen years has been nearly bald all over; some symptoms of ataxy (shooting pains, uncertain gait)	We have here disease of sebaceous glands as a complication of true xanthelasma.
11	Miss Ashpole, Dr. Peacock's patient, by whom she was sent to me	46	7 years	Symmetrical, small spots of yellow, and several cysts in connection with the yellow spots. These cysts are much more easily seen than the yellow spots; there are three on each side; they are near the inner canthus; they are not quite equal on the two sides	Florid, healthy-looking; head bald in middle line; dark hair; ceased menstruation at twenty-five years old; for many years has had occasional attacks of numbness, during which her hands are useless, her sight dim, and her speech thick; after an hour this passes off, and is followed by sick headache for a short time; these attacks do not occur oftener than three times a year	The cystic character of the disease in this case is very remarkable. The characteristic numbness and headache, &c., in connection with the early cessation of the menstrual discharge, are noteworthy. See Fig. II in Pl. XXVII.
12	Dr. ——	40	2 years	Patches of xanthelasma on the eyelids	Dark complexion, sallow, stout; lived formerly in a hot climate; dyspeptic, but no other hepatic symptom	Under treatment for another skin disease.

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No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
13	Mrs. Goldmann, London Hospital	49	2 years about	Numerous scattered patches in upper and lower lids; most of them near the inner canthus	In fair health; skin rather yellow; says she has been jaundiced for two years, and was in the London Hospital for dropsy and diseased liver; she has piles, and has suffered much with them	The patches began to form during the jaundice.
14	A Jewess, London Hospital, April, 1869, inguinal hernia	80	Several years	Symmetrical patches near each inner canthus	Dark, sallow; had had good health; denied having had jaundice or hepatic symptoms	This patient was remarkable for her extreme emaciation, and yet she seemed in good health
15	Mr. A—, Dr. Stone's patient	50	...	A single patch, of moderate size, on the *left* lower eyelid, near inner canthus; none elsewhere	Dark, sallow, stout; severe sick headaches formerly, less severe of late; very dyspeptic (could not eat beef); never jaundiced; "swimming before the eyes" during his indigestion	He attributed the relief from headaches to the formation of a large ulcer on his arm; he had taken much iodide of potassium for its cure. Note affection of *left* eyelid only
16	Anne Wyatt, London Hospital, July, 1869, cataracts	74	...	A single flattened patch, as large as a pea, on left upper eyelid; a black point at centre. See Fig. I in Pl. XXVI	Formerly suffered much from what was called "bilious colic;" she was a woman of dark complexion, and very sallow	It is noted that the patch was on the *left* side; it was excised, and *a small sebaceous cyst found in its centre*, around which was the characteristic deposit
17	Mrs. B—, Selby, June, 1869	49	...	A single patch of rather large size on the upper lid near inner canthus on *left* side; none elsewhere	Pale, of dark complexion; considered herself bilious, and occasionally suffered from sick headaches; never jaundiced	Note its occurrence on *left* side only.
18	A man, commercial traveller, Mr. Rose's patient	64	...	Symmetrical xanthelasma on each upper lid near inner canthus	Had terrible sick headaches till he was twenty-five years old; since then they have diminished; has had rheumatism; has had eczema rubrum of one leg; bowels habitually constipated; florid, very stout, in good health; gray irides and dark hair	—
19	Mary Anne Coterill, London Hospital, Sept. 13, 1869, fract. radius and ulna	60	...	Patches (three in number) on upper lid, near inner canthus of *left* eye; a *single* patch on corresponding part of *right* upper lid	Hair nearly white; is emaciated and rather sallow; has had good health, excepting habitual slight constipation when young; no hepatic symptoms	Note greater extent of disease on *left* side

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
20	"An old lady"	...	...	Symmetrical groups of separate flat-topped papules, in both lids on both sides, near each inner canthus	Dark complexion; good health; liable to sickness from slight causes; dyspeptic; never jaundiced	...
21	Mrs. Self, F., p. 70, Moorfields, no date	84	...	"Xanthelasma palpebrarum slight"	...	No other note as to xanthelasma; she was at Moorfields for cataracts
22	Mrs. Orviss, C., p. 276, Moorfields, Jan. 17, 1870	60	...	Patches (two in number) on the *left* side, one being on each lid; on the *right* side is only *one* patch, less marked than those on left	Sallow; black hair; since girlhood has suffered from severe sick headaches and nausea; sight often becomes dim shortly before a headache comes on; cannot eat fat things; no numbness; headaches began before puberty, and have been less severe since catamenia ceased	Compare with No. 11. Note predominance on *left* side.
23	Harriet Jones, C., p. 306, July, 1869	36	2 years at least	A single patch near inner canthus, on upper lid on *left* side; none elsewhere	Pale; brown hair, freckled; frequently has some headache; dyspeptic; has often been told her liver was out of order; numbness of hands often when dyspeptic; has had several tumours (probably adenocele) removed by Mr. Spencer Wells from both breasts; had abscess in early life; married; no living children	Note occurrence on *left* side only.
24	Clara Hobbs, S. H., Feb. 8, 1870	33	5 years about	Two small patches on each upper lid; quite symmetrical in position; slightly larger on *left* eyelid	Dark, sallow skin; very dark hair, and dark eyelids; liable to severe sick headaches and retching for five years; thinks they are worse at menstrual periods; no numbness or dimness of sight; no constipation or indigestion; jaundice many years ago; has piles	Note slight predominance on *left* side; she believes the patches appeared soon after confinement, and about the same time as her headaches began.
25	Wm. Rollinson, London Hospital, O. P., under care of Mr. Adams, Nov. 28, 1870	45	...	A single patch as large as half a threepenny piece on upper lid of *left* eye; none elsewhere; it is well marked	Considers himself bilious; formerly suffered severely from headache (frontal); but it has been less severe of late; dyspeptic; soon vomits if he eats too much	Note occurrence only on *left* side

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
26	The Rev. Mr. W—	45	...	Symmetrical patches on upper and lower lids of both eyes; small patches and groups of dots, somewhat more raised than usual, and of a brighter yellow	An unmarried man, with dark, "swarthy" complexion; suffered from most violent sick headaches in early life; has had two attacks of insanity within the last five years; after second attack he suffered from very severe jaundice ("black jaundice") and was very ill; during the illness he had a very large liver, some general dropsy, and partially lost the use of his legs; he has recovered perfectly	He always asserted that his insanity was only due to a "liver attack."
27	Mrs. Allen	50	...	Symmetrical patches at inner canthi, on upper lids	Stout, florid, dark hair, good health; no history of sick headaches or other hepatic symptoms	—
28	Mrs. Kirby, Ophthalmic Hospital, Nov., 1868	32	4 years	Small symmetrical spots near the inner canthi on lower lids; that on the *right* side is the larger	Brown complexion, rather sallow, rather stout; not liable to sick headaches; digestion considered good	Her paternal grandmother, now aged 80, is said to have the same extensively.
29	A woman, Hosp. Skin Diseases, Jan. 13, 1871	40	Several months	Symmetrical small patches on the upper eyelids, just above the inner canthi; that on *the left* side *came first*, and consisted of a group of five or six sebaceous glands distended with sebum, around the orifices of which was yellow deposit; this patch had been present a few months	This patient had suffered in a most remarkable degree from sick headaches, which commenced several years before puberty; the pain occurred over the middle of the forehead at a part where her scalp was constantly tender from its frequency and severity; she was not in the least jaundiced; her attacks were always attended by vomiting of bile	Her headaches had been more frequent and more severe during the last year; her mother and her daughter had suffered in a similar way; her mother was believed not to have any yellow patches on her skin
30	Anne Gardner, London Hospital, Jan. 14, 1871	57	...	A number of flat-topped, enlarged sebaceous glands, with yellowish contents and black points in their centres, and probably some deposit in the surrounding skin, but not enough to unite them into a single large patch; on the *left* lids, near inner canthus; on the *right* side there were three or four slightly enlarged glands, with black points, but without any considerable amount of secretion, and without any yellow colour	Sallow, dark hair, becoming grey; liable to bad sick headaches for many years; they began several years before marriage, and have been less severe of late; the pain is frontal, and usually on the right side; has suffered much from dyspepsia, and especially could not eat fat; no special constipation	In this case enlargement of sebaceous glands, a sort of flat-topped acne, was the most marked, but there was also slight deposit in the skin at the bases of the papules; the occurrence of the spots almost exclusively on the left side, and in the usual position for xanthelasma, together with their colour, and the symptoms described by the patient, clearly point to a close relationship between this case and the typical instances of the disease.

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
31	Wm. Savage, 'Ophthalmic Hosp. Reports,' vol. vi, p. 275	45	...	Patches on both lids of left eye, and on upper lid of right eye; the patch on the *right* side is a mere speck, and corresponds with one of the patches near *outer* canthus of left	For long has been very subject to sick headaches and indigestion; the headaches have often been preceded by temporary, but complete, blindness of one eye, generally the right; in the last attack the right eye was affected, and has remained permanently blind; the headaches have generally been unsymmetrical	Note almost exclusive affection of *left* eyelids, also that the attacks of dimness were generally in the *right* eye; it is not stated on which side the headache occurred.
32	Dr. L. J—, 1871	42	2 years	A well-marked patch in left upper lid, and a very small one in right	Never had sick headaches; is very active and abstemious; digestion excellent; has a very dark areola round his eyes, which has often been noticed to be darker when he is tired, anxious, &c.; complexion dark	Inherits a tendency to gout, and his brother also has xanthelasma; no members of the family except these two have dark complexions; is liable to attacks of numbness in the hand if he drinks only a few glasses of wine.
33	J—	62	...	Large patches of xanthelasma in both upper eyelids	Has suffered from sick headaches severely; complexion very dark	Brother of the above.
34	Lady ——, patient of Dr. L. J—	60	...	Patches of xanthelasma over each eye	For many years liable to terrible headaches—"paralysing" headaches; two years ago had epilepsy, and latterly has had attacks of abstraction, during which she forgets what is going on, and what she has been saying	This case and the preceding one were never under my own observation. All the other cases included in the table are from my own notes.
35	Mrs. ——, 1871	50	1 year	A number of flat-topped whitish-yellow spots, around each inner canthus; much more marked on left side	Had bad sick headaches in early life, but now only occasionally; good health; has had ten children	Her daughter, æt. 18, suffers severely from headaches, and becomes very dark around her eyelids
36	Mrs. R—, Feb. 14, 1871	65	...	Patch of light yellow xanthelasma in left upper lid near inner canthus	Liable in early life to very severe nervous headaches; never specially bilious; has borne children; is in fair health; florid complexion and blue eyes	—
37	Mrs. Holmes, Plumstead, sent by Mr. Sturges, May, 1869, Oph. G. 282	33	...	Thin superficial patches of xanthelasma, of considerable size, on the upper and lower lids of left eye, near inner canthus; there are some very slight yellow marks on the right lids also	Liable to headaches, which begin in the forehead, and afterwards fix themselves in the occiput; sometimes the pain is very severe and prolonged; she feels sick during the headaches, but does not vomit; of very dark complexion and bilious aspect	Her mother suffered much from sick headaches all her life; her father died of consumption.

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
38	Miss H—, 1872	40	1 year	Deep yellow chamois-leather patches in the usual positions; it began on left side	Had suffered all her life most severely from headaches, &c.	I excised the patches, and they were examined with the microscope.
39	Mrs. R—, under care of Dr. Sutton, Feb., 1872, London Hosp. (published in 'Brit. Med. Jour.,' 1872, vol. i, p. 367)	46	...	Numerous patches of xanthelasma on the eyelids of both eyes, most abundant near the inner canthi; she said that they first appeared on the left side, but they were, when seen, rather more numerous on the right side	For many years liable to sick-headaches of great severity; during these attacks she generally becomes very dark around the eyes; never had jaundice; dark brown hair, greenish-brown irides, rather dark complexion	—
40	Mr. E. G—, March, 1872, private note-book	60	...	Patches of xanthelasma on each lower lid, near inner canthi	For more than thirty-five years has been liable to most severe dyspeptic troubles, complicated more recently by headaches of great intensity, and temporary dimness of sight; is obliged to be extremely careful about his diet; now suffers also from paralysis of accommodation in his left eye; never jaundiced	About the time when his dyspeptic and nervous symptoms began, he became, from the nature of his employment, much exposed to air containing vapour of alcohol, fusel oil, &c., and excess of carbonic acid; and he was compelled also to break up his night's sleep into short portions.
41	Man, Sept. 1, 1869	64	...	Group of small, flat-topped, yellow papules on inner half of left upper eyelid, rather further from canthus than usual in xanthelasma	No history of sick headaches or vertigo	—
42	Mrs. Smerdon, 1871	64	Several years	Separate round spots, each with minute central dark dot, in a group at the canthal end of each upper lid, more on *right* side	Not subject to sick headaches or any dyspeptic symptoms, but often becomes very dark round eyes; is now pale and rather sallow, with moderately dark areola	Her mother had similar spots.
43	Mrs. Wade, May 23, 1871	...	...	A single patch as large as a split pea on *left* lower lid, near inner canthus	Has been subject to severe sick headaches and "bilious" attacks; never jaundice	—
44	Mrs. Brown, July 25, 1872	52	...	Symmetrical xanthelasma patches, but much more advanced on the left side where it began; only just perceptible on right side	Since æt. 20 liable to severe sick headaches every few weeks, usually better when pregnant; never actually jaundiced, but nearly so several times; dark complexion, very sallow	Has nine children; her mother had a similar patch, a large one, on left side; she had the same headaches, and died æt. 53.

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
45	Mrs. R—, June 4, 1874	44	...	Single characteristic chamois-leather patch over *right* inner canthus only	Formerly headaches, but not severe; brown hair; light brown irides; good health	Has had eleven children. Note affection of *right* side only.
46	Emily B—, April 23, 1874	37	...	Single, rather dark coloured, but characteristic patch, size of a split pea, above left inner canthus	Liable to "biliousness" and "liver disorder," and at such times especially, as well as at others, becomes very dark under eyes; is very nervous	Family history of tumours.
47	A man (Moorfields),	...	...	Very small patch on right upper lid; numerous little pedunculated cuticular outgrowths on the lids	Subject to frequent severe headaches until æt. 50; the pain settled always in right forehead; did not vomit, but was obliged to get into the air; good health; steady; headaches not specially connected with diet, though sometimes brought on by beer; strong tea useful; never constipated; never failure of sight; feet very cold during the headaches; when young was at sea, and had dreadful sick headaches in W. Indies	All his three children suffered in same way from headache.
48	Mrs. M—,	45	...	Single, characteristic, flat, yellow patch at canthal end of left upper eyelid	Formerly severe headaches, with sickness, usually once a month, and lasting a whole day; dark complexion; has lost the headaches since shortly after birth of youngest child, now æt. 15	Two cousins said to have the same.
49	Mrs. Watkins,	67	20 years	Symmetrical patches of large size, but those on left side much the larger; they began on left side; they are unusually large and elevated	Liable to very severe sick headaches till twenty years ago; the patches came about the time that the headaches ceased; "used to turn dark around the eyes"	—
50	Elizabeth Dean, Oph. G., 61, March 21, 1872	57	...	Left lid, near canthus; two sebaceous plugs	Had suffered much from severe headaches, causing stupor and numbness; has had "inflammation of liver"	Three of her children suffered from jaundice in infancy.
51	Mrs. Rooke, Oph. G., 72, May 2, 1872	55	5 to 6 years	Symmetrical patches with distended, enlarged, sebaceous glands at canthal end of each upper lid; they are confluent; larger on right side	After coming to London (æt. 35) became much troubled by sick headaches; of late not so much; much constipation; five to six years ago some jaundice; often dimness and nausea before a headache; good digestion	Father had similar spot on *right* side; her brother similar patches on both sides; he formerly suffered much from "liver complaint," and had jaundice.

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
52	Mrs. Henessy, Oph. G., 81, June 13, 1872	68	20 years or more	Large flat patch curving around each inner canthus	Has been liable to bad sick headaches; never jaundice	—
53	Mrs. Ryan, Oph. G., 21, June 21, 1875	46	...	Small, perfectly characteristic patch on right upper lid, near inner end only; whole skin covering *orbic. palp.* muscles highly pigmented, lax, and somewhat prominent, yet not œdematous; it is partly in freckle-like spots, partly uniform, and on left side is mingled with some faint whitish spots and lines	In childhood and till marriage had headaches and vomiting from errors of diet; better since marriage; never jaundice or "liver complaint"	Under care for ophthalmia; has had syphilis from chancre on nipple. Note beginning on right side.
54	John Mathew, Oph. G., 162, Oct. 17, 1872	68	...	Characteristic patches on both sides; two on left, one above, the other below the inner canthus; one on right corresponding to, but smaller than the upper one on left	Formerly moderate sick headaches; always large meat-eater; for thirty-six years a total abstainer, previously had drunk freely; has done quite well without alcohol	Four and a half years ago sudden imperfect right hemiplegia; has not recovered.
55	Geo. Bristowe, Oph. G., 174, Dec. 2, 1872 (from Mr. Streatfield)	71	...	Symmetrical patches, but more on left side; at each outer canthus on lower lids, and around each inner canthus	—	—
56	Mrs. Rowland, Oph. G., 199, Jan. 23, 1873	33	...	Small, deeply seated patch at inner canthal end of left lower lid only	Since child-bearing began, fourteen years ago, subject to frontal headaches, "dizziness," and nausea; no vomiting; areolæ rather dark	—
57	Mr. C—, H. 2, 11, July, 1872	63	...	Symmetrical dark yellow patches above and below inner canthi	In early life much "biliousness," and often headaches; used to turn extremely dark around the eyes; the headaches nearly ceased after marriage at æt. 25; habitual constipation; stout and florid	10 to 15 years ago severe attack of gout in both feet. 5 to 6 years ago sudden incomplete left hemiplegia, soon well. 2 years ago slight attack on right side. 6 months ago sudden blindness of left; recovery in an hour, and again sudden loss; defective articulation; ? embolism. Loud systolic bruit over base of heart.

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
58	Mr. L—, H. 2, 47 1872	29	...	Single deep yellow patch below inner canthus of left only	Liable to become very dark around eyes when out of health; of very dark complexion; has had rheumatic fever, and paternal grandfather had gout	—
59	Mrs. S. H. S—, H. 2, 92, Jan., 1872	46	...	Single patch below left inner canthus	Liable to bilious and nervous headaches all her life; habitually very cold feet; complexion dark, and she becomes nearly black around eyes when out of sorts	For years liable to painful cracking eczema, with horny thickening at ends of fingers.
60	Miss S. A. S—, H. 2, 112, 1872	48	...	A group of small yellow spots, most of them with black sebaceous plugs, on left side	In childhood had "bilious" attacks, and became very dark round the eyes; but since then free from illness of all kinds; dark complexion	Came for presbyopia, and complained of lately having become so weary and languid, and that reading, even with her glasses, made her feel sick and headachy.
61	Mr. G—, H. 2, 126, 1872	60	...	Symmetrical patches on lower lids near inner canthi	For many years has had to be excessively careful and abstemious in diet; the slightest error is followed by severe pain at stomach and vomiting; has had some very severe attacks; dark complexion and fresh colour	Has also cataracts and myopia, and in *left* complete paralysis of accommodation (?). His wife also has xanthelasma.
62	Mr. L—, H. 2, 177, June 11, 1872	52	...	Single small patch on right upper lid	Liable to headaches, "bilious feelings," and temporary dimness of sight and hemiopia. The hemiopia sometimes vertical, sometimes horizontal. Eggs disagree. Very dyspeptic. Urine often thick. No arthritic history	Came for chronic eczema-psoriasis of scalp and other parts, and disease under free border of nails; bald and fissured tongue, ? from mercury in infancy; took much for convulsions; teeth mercurial.
63	Mrs. S—, H. 2, 179, June, 1872	28	...	Single definite, though ill-margined, patch on left lower lid; deep yellow	Has had four children. Since the second confinement, when she lost a large quantity of blood, liable to frequent severe browache, beginning on left side, never on right side. Not "bilious." Florid clear complexion; headaches chiefly from excitement or fatigue	Lately a peculiar eruption has come out at menstrual periods, and since its appearance the headaches have not occurred.
64	Mr. H—, of Lewes	61	...	Usual conditions, with numerous sebaceous plugs interspersed; began on left side	Had suffered much from bilious headaches, and was often almost jaundiced	

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
65	Mrs. W—, July 3, 1873	60	...	Symmetrical eruption of the cystic variety with small yellow patches close to them	Has had much headache, and been liable to attacks of giddiness, so that she has sometimes fallen down; sight often dim, but has never had attacks of total loss of sight. Florid and stout	Is also subject to bad chronic rheumatism of hips and back.
66	Mr. F—, Aug. 29, 1873	61	...	Xanthelasma in round patches	Formerly very bad headaches, but better of late. Has taken much calomel and blue pill for the headaches. Dark complexion. Came for hypermetropia	—
67	Mrs. H—, July 15, 1874	?	...	Symmetrical in small patches in the usual positions, without sebaceous complications. Began on left side, and still more abundant there than on right	Always liable to become extremely dark around eyes when out of health. Never sick headaches. Light blue eyes; rather fair complexion	Five children. During her pregnancies much sickness. Comes for herpes circinatus.
68	Mr. T—, July 16, 1874	58	...	Symmetrical. Began on left side	Of dark complexion	A total abstainer.
69	Mrs. G—, July 16, 1874	56	Several years	Symmetrical patches of chamois-leather type above the inner canthi. Began on left side	In early life suffered fearfully from sick headaches, and used to become very dark around eyes. Of late years much less headache, and health has improved	—
70	Mr. George T—, Jan. 27, 1875	57	...	A very small, very thin patch on the left upper lid	No note as to headaches, &c. Red hair; florid	Thirty years ago had syphilis, and suffered severely from rupial eruption; now quite well.
71	Mr. T—, June 24, 1875	46	...	—	—	—
72	Mr. S—, July 18, 1875	54	...	Xanthelasma with sebaceous plugs on left side	Never had sick headaches, but formerly liable to flickering before the eyes, &c	Under care for paraplegia probably from syphilitic disease of spinal cord.
73	Nurse B—, Aug. 31, 1875	40	...	Very extensive patches around each inner canthus, and a small one at outer angle of each eye. Began on left side, and still are larger there than on right	In early life used to suffer very much indeed from sick-headaches, and became very dark around the eyes	Florid complexion; light brown hair and eyes, and of nervous temperament. In this, as in many other cases, I excised the patches, with great improvement to personal appearance.

No.	Name, reference, date.	Age.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
74	Mrs. L—, June 13, 1876	55	...	Symmetrical xanthelasma, more extensive on left side	Liable to frequent severe sick headaches	Had rheumatic fever, æt. 27, and now has chronic rheumatism of the joints of the fingers, and is liable to slight lumbago; family history of rheumatism and gout.

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Summary of the Tabular Statement, with Comments on Special Points.

The parts affected.—The disease almost invariably begins near to the inner canthus of the eye, and usually attacks both upper and lower lids, frequently curving round the canthus. When advanced its largest patches are almost always on the upper lid, and when it begins in a single patch that patch is usually seen on the upper lid. It is very common for it to begin in several places at the same time, and for the spots to coalesce into larger patches as it advances. I have not been able to find a single case in which it began on any other part of the face than the eyelids, and only two in which it began on the *outer* canthus.

Its symmetry.—In advanced cases the disease is always symmetrical. Its symmetry is, however, often long delayed, and for several years it may happen that the patches are present only on one side. So far as my own observation goes, when one side only is affected it is almost always the *left*, and it curiously happens that the few cases on record by other observers, in which the side on which it begun is stated, all conform to this rule. The number of cases in which the disease was, at the date of the notes, confined to the left side in my series was 22,* or rather less than one third of the whole. In several in which it was present on both sides it was more extensive on the left than on the right,† whilst in but very few was the reverse the case. In two cases a patient who had it on both sides alleged that it had begun on the right, and in five it was present when the notes were taken on the right side only.‡ It is difficult to avoid an impression that

* Nos. 4, 5, 6, 15, 16, 17, 23, 25, 30, 36, and others.
† Nos. 2, 9, 19, 22, 24, 29, 31, 32, 35, and others.
‡ No. 42, 45, 47, 53, and 62.

this remarkable preference for the left side in the first instance must be dependent on something more than mere accident.

Age of the patient.—The youngest patient in my series was 28 years of age when the disease commenced, the oldest 59 years, the average being 42 years.*

If instead of the age at which the disease began we take that at which the patients first came under care, the two extremes will be 32 and 84, and the average of all the cases will be between 53 and 54 years.

Sex.—Nearly one third of the whole number were males,† thus the disease would appear to be twice as frequent in the female sex.‡

Association with other disease.—My chief inquiry has been as to disease of the liver, and in connection with this my attention was early attracted to the circumstance that most of the patients had suffered in a very unusual degree from sick headaches. In numerous§ cases there was the history of sick headaches of great severity; whilst in others‖ the same symptom had occurred, but with less violence. In several of the patients who had been liable to sick headaches other curious symptoms of functional derangement of the nervous system had shown themselves. One patient, a man (No. 31), had been liable to attacks of temporary blindness, from which he recovered usually within a few minutes. At length one of these left him permanently blind of one eye, without any ocular changes discoverable by the ophthalmoscope.¶ His attacks of blindness had sometimes affected one eye, sometimes the other, and more rarely both at the same time. After the attack a violent sick headache always followed. In another case a woman (No. 11), who was the subject of the cystic variety of xanthelasma (see Plate XXVII, fig. 2), had been liable to attacks in which she lost the use of her hands; this loss of power was quite complete for a time, but did not last long; it was attended, also, with numbness. The numbness would usually not last more than about an hour, and was followed by a severe headache, which, after lasting for about half an hour, gave place to extreme hunger. A third patient, a woman, who had xanthelasma, and had suffered

* The age at which the disease began is stated in only ten cases, and the above statements apply only to those cases.

† Twenty-seven cases out of 74.

‡ Mr. Wilson writes, "It is remarkable that the disorder is almost exclusively confined to women." Dr. Fagge states of a case under the care of Dr. Habershon, that he believed it to be the first instance of the disease together with jaundice occurring in a man. Dr. Murchison has, however, since recorded a fatal case in a man.

§ Nos. 5, 6, 11, 15, 18, 22, 24, 25, 26, 29, 30, 33, 34, 35, 36, and others.

‖ Nos. 2, 4, 9, 17, 23, 31, and others.

¶ Recorded in detail in 'Ophthalmic Hospital Reports,' vol. vi, p. 275, and reprinted at the end of this report (see p. 169).

from jaundice, had been liable to numbness of the hands and feet on both sides, and had, at least on one occasion, become suddenly blind. Her attack of blindness, after lasting for an hour or two, passed completely away. In a fourth case a patient who had had great enlargement of the liver, with "black jaundice," had become insane during the illness. This gentleman's case is given in full in the Appendix.

It must be remarked that the disturbances in nerve function mentioned in these cases, are such as occur now and then in association with sick headaches and other symptoms which are popularly supposed to be connected with the liver. "Swimming before the eyes" is a very common accompaniment of a sick headache, and it is now and then aggravated to a state of partial blindness, and occasional attacks of numbness in one or both of the hands is also sometimes mentioned in the same connection.

The symptom of *jaundice* is noted as having been present in eight cases* out of my series, and in all of these it had passed off at the time the patient came under my observation. None of the patients were severely ill when I saw them, though several gave the history of having formerly been so. In many of my cases I do not possess any positive note as to jaundice having never occurred, but, in spite of this omission, I feel confident that it had not been present, since, if it had been, it would certainly have been noted. Of the cases previously published by others, only seven in number,† jaundice is noted in all. Three of these seven presented the patches on other parts as well as the eyelids; whilst in four the disease was restricted to the latter positions. In all the jaundice persisted at the time the patient came under observation, and we may, indeed, reasonably suppose that it was on account of it that the patient came under medical care. In almost all of these it is expressly noted that the liver was much enlarged. In one or two there is the record of attacks of temporary jaundice which had passed off before the occurrence of the one during which the patient came under observation. It seems clear that when the disease affects the general surface, the constitutional symptoms, and especially the hepatic disorder, are much aggravated. It is believed that at least three of the seven cases to which I have referred, as recorded by other observers, ended fatally. In none of my own cases were there any symptoms which in the least implied danger to life. The majority of them, indeed, came under my observation,

* Nos. 2, 5, 9, 13, 24, 26, 51, and 64.

† The reason of the fewness of previously recorded cases is doubtless in part that it has not been thought worth while to publish cases of the ordinary kind in which the xanthelasma was limited to the eyelids, and in part that they have attracted but little attention.

as it were, accidentally, in connection with other and totally distinct maladies, or, in not a few cases, as the companions of other patients. Dr. Hilton Fagge has mentioned, on the authority of Dr. Wilks, two cases of xanthelasma of the eyelids in which there were no hepatic symptoms, and Mr. Erasmus Wilson states that he has twice seen xanthelasma in *young* women in whom there was no symptom of torpid action of the liver; the most marked case, he says, occurred in a "young woman"* who was "perfectly healthy in all her functions."

I am not aware that any writer has taken note of the symptom of sick headaches in reference to these cases, and it has probably been considered as too common and too trivial to be of much value. As the result of careful inquiry upon this point I cannot feel any doubt that the proportion of those in my series who had suffered severely from this symptom is in large excess of what happens in the population generally, whilst in most the headaches had been also of unusual severity. In about one third of my cases, however, they had not occurred in any remarkable degree, and I believe it may be said of nearly all these patients that they considered themselves in very good health; many of them were already far advanced in life. Whilst, therefore, it is, I think, impossible to avoid the conclusion that xanthelasma of the eyelids does, in a majority of cases, indicate liability to disturbance in the function of the liver, we are bound to admit that in a not inconsiderable proportion this liability is quite compatible with long life and a fair average of health.

Do xanthelasmic patches ever disappear? My belief is that they always either increase, or remain stationary. Although I have sometimes been told by patients that their patches were getting smaller, I have never obtained any proof which was convincing to my own mind.

On cases of great enlargement of the liver.—I wish to ask the attention of physicians to the interesting fact which has come prominently before me in connection with my inquiry as to xanthelasma, that there is a form of hepatic disorder in which the organ may increase immensely in size, in which jaundice may be present for a long time, and may even pass into the black variety, and yet the patient may recover. The two cases which chiefly justify this statement were under the care respectively of my friend Dr. Smith, of Cheltenham, and my colleague Dr. Andrew Clark. Each of these observers assured me that at one time his patient's liver was

* It is to be regretted that the exact age is not stated. Our estimates of youth vary. I have never seen xanthelasma in a young person.

of enormous size, its enlargement easily visible, and "nearly filling the abdomen." In each long persistent jaundice occurred, and the patient's recovery was despaired of. In one case the patient became black. Yet in both instances the patient is at the present time in good health,* the jaundice gone, the liver of its normal size, and nothing left but the patches on the eyelids. I am not aware that any cases quite parallel to these have been recorded. Several observers (Addison, Pavy, Fagge, Murchison) have recorded with much care the facts as to disease of liver with xanthelasma, and have noticed moderate enlargement, but several of their cases ended fatally, and in none did the enlargement approach that just described.

Recapitulation.—Briefly, then, to *recapitulate* the principal conclusions to be deduced from my facts, we find—

1st. That xanthelasma palpebrarum never occurs in children, but is fairly common in the middle and senile periods of life.

2nd. That in a large majority of cases the patient is not seriously ill, nor in any danger of becoming so.

3rd. That in a small proportion of very severe cases, jaundice with great enlargement of the liver is met with.

4th. That when jaundice occurs it almost always precedes the xanthelasma.

5th. That the form of jaundice is sometimes peculiar, the skin being of an olive-brown or almost black tint, rather than yellow, and the colour remarkable for its long persistence.

6th. That the enlargement of the liver may be very great, and that it may subside and the patient regain good health.

7th. That in many cases in which there has been no jaundice there is yet the history of frequent and severe attacks of functional derangement of the liver.

8th. That xanthelasma occurs more frequently in females than in males, the proportion being two to one.

9th. That the xanthelasmic patches always occur on the eyelids first, and that in not more than about 7 per cent. do they ever extend to other parts.

10th. That the patches almost always occur first on the left side, and that, with still fewer exceptions, they † commence near to the inner canthus.

11th. That xanthelasmic patches on the eyelids are of compara-

* The above statement was written out in 1871; since then Dr. Smith's patient has died, but he had enjoyed a considerable interval of health.

‡ In Case 31 the only patch on the *right* side was near the *outer* canthus; the disease had, however, evidently begun on the left side where the patches were not confined to the outer canthus.

tively little value for purposes of prognosis, being usually the evidence of past rather than of coming disturbances.

12th. That it is not improbable that they result from the derangements in the nutrition of the skin of the eyelids which frequently occur in association with both hepatic and ovarian disturbances.

13th. That it is not improbable that patients who display xanthelasma unusually early in life, and who yet have no severe hepatic symptoms, are experiencing prematurely other forms of senile change.

14th. That any cause capable of producing dark areolæ round the eyes—pregnancy, liver derangement, ovarian disorder, or mere nervous fatigue—may predispose to xanthelasma.

15th. That the xanthelasmic patches may show themselves long after their predisposing cause has ceased to exist.

16th. That when the yellow patches are met with on other parts as well as the eyelids, they are almost always caused by liver disease.

17th. That the patches of true xanthelasma are always persistent, and usually tend slowly, but steadily, to increase.

18th. That if any eruption supposed to resemble xanthelasma should show a definite tendency to spontaneous subsidence, the correctness of the diagnosis ought to come under question.

I shall append a few cases of unusual interest which seem worthy of more detailed record. They are all included in the Table.

Narratives of important Cases.

Case 1.—*Xanthelasma palpebrarum. Severe hepatic dyspepsia. Repeated attacks of temporary blindness. Ultimately, persistent blindness of one eye, without ophthalmoscopic changes at first, but with white atrophy afterwards.*

William Savage, æt. 45, of dark complexion. On the eyelids of the left eye are three patches, one at the outer canthus, one above the inner canthus, and a third below that point. On the right lids there is a very small one at the outer canthus, corresponding exactly with that on the opposite side, but there are no representatives on this side of those on the upper and lower lids of the left side. The three patches on the left side are all of considerable size, a third of an inch long or more, and oval; that on the right side is a mere speck. They present the usual characters.

He states that he has suffered much from his liver and from indigestion. He has been very liable to sick headaches. Eight years ago* he was under Dr. Gull's care for indigestion, and believes that he was supposed to be threatened with consump-

* These notes were written out in 1871.

tion; he was so weak that he could not work, and suffered much from pain in the head. He has long been accustomed to "take medicine for his stomach." He takes aperient medicine to prevent sick headaches, but his bowels are not usually costive. His headaches are attended by giddiness. He has never had jaundice. He has had "rheumatic fever" three times.

He has for a long time been liable to attacks of temporary blindness, lasting only a minute or two, and usually followed by a sick headache. On a few occasions both eyes have failed in this way, but generally only one has been affected at the same time, and the right has suffered in this respect oftener than the left. His last attack occurred rather more than a fortnight ago, and it differed from all his previous attacks in ending with *permanent* blindness of one eye. While at work he found a cloud coming rapidly over the *right* eye, and in a minute or two he was quite blind in it, and has remained so ever since. After the blindness came on he had as usual an attack of headache, which he spoke of as "great pressure on the head." His sick headaches have varied much in position at various times; sometimes the pain has been all over one side, while at others only a small patch has been affected.

On admission (Moorfields, April 19th, 1869) he is found to be quite blind in the *right* eye, while with the *left* he reads 1 J. easily (—). Examination with the ophthalmoscope (made on several occasions) discovered nothing abnormal. I lost sight of the man about three weeks after the attack described, and up to that date no improvement had taken place.

Five years later this patient again came under observation. The eye had remained quite blind, and its disc was now white and atrophied; his other eye was still good. His general health was much as formerly.

CASE 2.—*Xanthelasma palpebrarum, with the history of a severe attack of "black jaundice," and of several attacks of insanity. Violent sick headaches.*

Mr. W—, an unmarried clergyman, æt. about 45, has very considerable patches of xanthelasma on his eyelids. The deposit is arranged quite symmetrically, and involves both upper and lower lids near to the inner canthus. It consists of small patches and groups of dots, which differ from the most common form only in being more raised and of a lighter tint of yellow, *i. e.*, not buff but a canary or lemon tint. Being much interested in the case I succeeded in obtaining, partly from Mr. W— and partly from his medical attendant Dr. Smith, the following particulars as to his health. He suffered during the early part of his life from most violent sick headaches. Five years ago he became insane and was put under restraint. He himself always persisted in saying that it was nothing but a liver attack. He recovered perfectly after a time and returned to parochial duties. Another attack of the same kind, however, occurred, and he was again an inmate of an asylum. During his recovery from the second attack, and after the balance of his mind had been pretty well restored, he became very ill; he had an attack of jaundice, which Dr. Smith told me surpassed in severity anything of the kind he had ever seen. The liver was now immensely enlarged, so much so that the prominence of the organ was easily visible. His complexion became after the jaundice so dark that he was sometimes taken for a mulatto; he himself told me that his colour was so dark that the street-boys used to remark, "There goes the black man." This all cleared off, and his complexion at present, excepting that it is swarthy, is not peculiar. At the time of the jaundice he had also a form of general dropsy, and partially lost the use of his lower extremities. It was expected that he would die.

CASE 3.—*Xanthelasma palpebrarum, with symmetrical serous cysts. History of transitory attacks of numbness of limbs and dimness of sight. Severe sick headaches.*

Miss A—, æt. 46, florid and healthy looking, presents a very peculiar form of xanthelasma palpebrarum. On the upper and lower eyelids of each side near the inner canthus, and arranged in exact symmetry, are several serous cysts. One of these is just above the canthus, another a little below it, and a third on the lower lid near its middle. The epidermis over them is so thin that the transparent contents can be seen through it. There is not a trace of inflammation about them. Although symmetrical in position they are not exactly equal in size on the two sides. Above the middle one on each side is a small yellow patch of xanthelasma, and one or two other spots of the same may be found on careful search. I am precise in insisting upon this, because the yellow patches were too small to be made very apparent in the drawing. There cannot be the slightest doubt about these patches, and they are sufficient to prove the true relationships of the disease even if its curious position, symmetry, and history did not suffice to imply the same. The cysts have been present and gradually increasing for seven years, and have never caused the slightest pain.

Miss A— is of active habits, and has never suffered, so far as she knows, from liver disease. She ceased menstruation at the early age of twenty-five, and has never since had any menstrual discharge whatever. She has not been liable to any disturbance of health at her monthly periods, and the only symptoms which can be supposed to have had any connection with her ovaries or stomach are the following:—For many years past she has been liable to occasional attacks of numbness, during which her hands become useless because she cannot feel anything in them. After lasting about an hour this numbness passes off, and is followed by a short sick headache, not usually longer than half an hour, which is in its turn followed by abnormal hunger. She spoke very definitely about these numb attacks, and mentioned them very often. During one such attack, which came on while she was out driving, her sight became dim, "a sort of half sight," and her "speech thick," so that it was with difficulty that she could speak to her companion; she managed, however, to continue driving the pony. This attack lasted half an hour, and was, as usual, followed by a bad headache. These seizures have not occurred regularly once a month, but only two or three times a year. They are always bad enough to require that she should lie down for a time. During the last twenty years the hair on the vertex of her head has been falling, and she is now quite bald in the middle region from forehead to occiput.

At the date of the above notes I excised all the cysts. Six years later I had an opportunity of seeing the patient again at her home near Bedford. She was much in the same state, and had the same liabilities. A good many small cysts had been reproduced.

CASE 4.—*Xanthelasma palpebrarum. Amaurosis of right eye. Alopecia of scalp, trunk, and limbs. Commencing locomotor ataxy.*

Joseph Pieri, æt. 57, an Irishman, who had lived for thirty-eight years in London. Married, and the father of fifteen children; had been a moderate drinker, and had never smoked. He was pale, but in fair general health. He had not been liable to headaches, and had shown no symptoms of liver disease. He had known of the xanthelasma spots on his eyelids for only about six months.

On admission it was found that the inner extremity of the eyelid on each side,

and the sides of the root of the nose, were dotted over with yellowish spots of various sizes, the largest the size of a split pea, the smallest only as large as a pin's head; all of them were elevated, and in the centre of nearly all was a black point, apparently the choked orifice of a sebaceous follicle. Some of the larger were yellow, flat, and level, without any orifices, and in every respect characteristic of xanthelasma. The majority of the spots were situated to the inner side of the eyelid, on the side of the nose; several, however, were on the eyelid itself. Those below the level of the canthus were very small. The disease was remarkably symmetrical, with a few slight variations.

He was quite blind. The *left* eye had been lost for many years; he appeared to have had a perforating ulcer of the cornea, and had had iridectomy performed seven years before. The *right* eye had been blind for nine years; he had the faintest possible perception of light with this eye; the disc was atrophied, and the pupil small, motionless, and incapable of dilatation in the dark.

The hair of his scalp and eyebrows was almost entirely absent, only a few scattered white hairs remaining. He began to lose the hair of his scalp in patches sixteen years ago; it fell rapidly not only from the head but all over the body, and in six months he had lost almost all the hair on his body. He was not in the least ill while his hair was falling.

He stated that he did not know what a sick headache was, and had never had headaches of any kind. The only symptoms which seemed referable to the liver consisted of pain darting across the lower part of the chest; it was very frequent, but generally lasted only two or three minutes at a time. He stated that he had sometimes suffered from flatulence.

There were also present at the time of admission the following symptoms of locomotor ataxy. He complained of sharp shooting pains, "like lightning," in various parts of the limbs and trunk, but never in the head. He had been liable to them for about three years, and considered them "rheumatic." These pains were very severe indeed, but never lasted more than a few minutes; in walking he had often been obliged to stop for awhile on account of the sudden sharp pain in his limbs. There was no defect of sensation in his fingers, nor any weakness of his legs, but his gait was uncertain, and he stated that he would often fall if he were not very careful to catch hold of supports.

P.S.—The above notes were taken about ten years ago, but I have no further knowledge of the progress of the case.

Fig I.

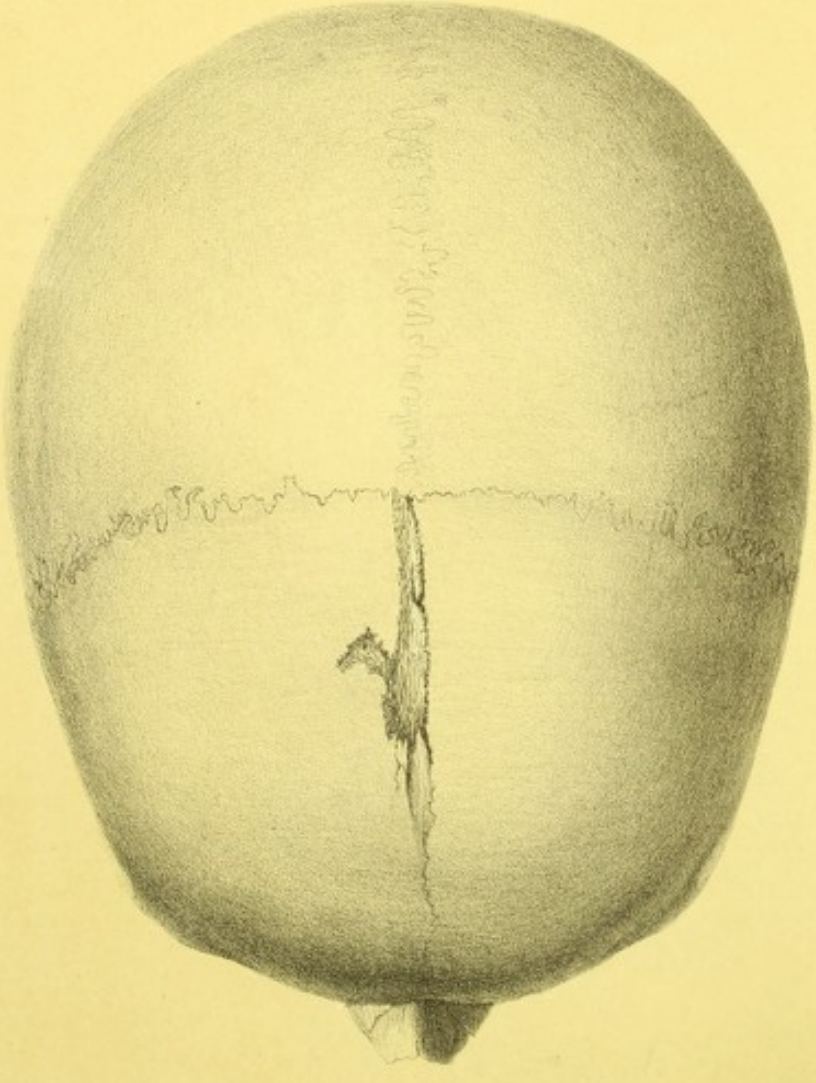

Fig II.

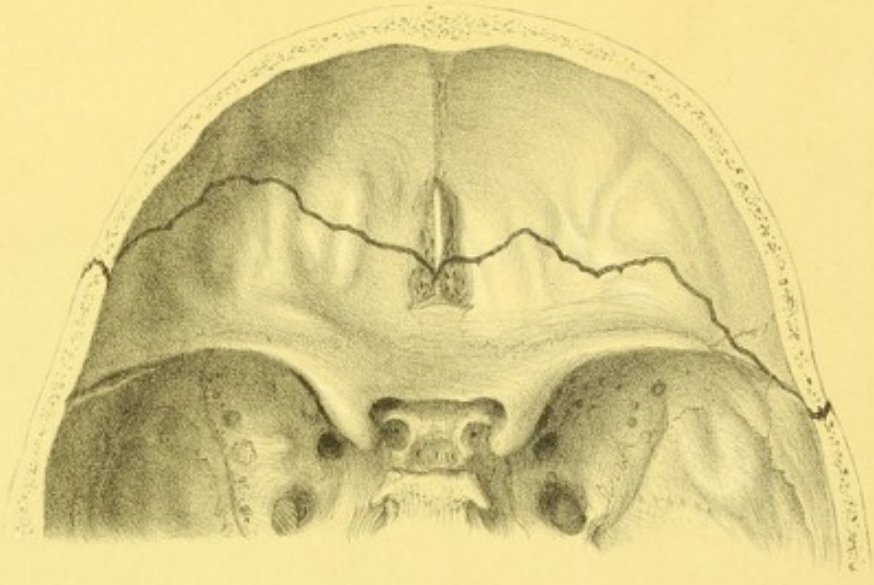

Fig III.

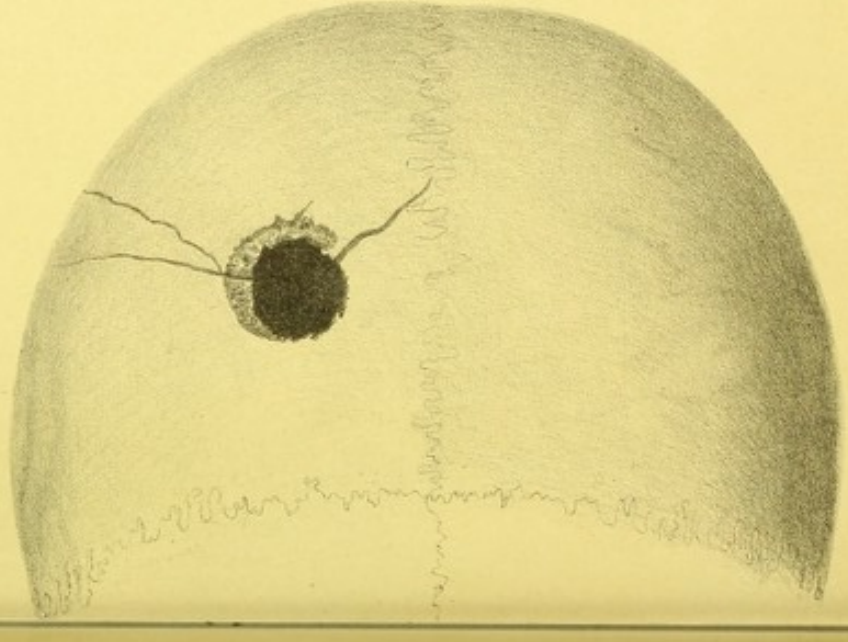

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PLATE XXVIII.

VARIOUS FRACTURES OF THE SKULL.

Fig. 1.—"Scratch-fracture" of the Frontal Bone.

A shallow furrow has been ploughed into the bone in a straight line, extending forwards from the termination of the sagital suture. The injury was caused by a fall head-foremost on some iron presenting sharp edges. The laceration of the scalp was directly over the fracture, and was not extensive, nor was the pericranium torn up excepting close to the fissure. There were no symptoms, and nothing was done excepting the use of water-dressing. About the tenth day some thin, loose scales of bone were taken away. The wound granulated well, but on the fourteenth day a rigor occurred, and death from pyæmia followed. The full particulars of the case are given at page 110 in Fasc. V, and need not be here repeated. There was no fracture of the internal table. The bone had inflamed and the dura mater beneath it. The superior longitudinal sinus contained a purulent thrombus.

It is to be noted that in this case, although osteitis was going on beneath and pyæmia was in process of development, yet the wound showed healthy granulations throughout. It may be suggested as possible that another result might have been obtained had the wound been dressed with spirit lotion instead of water only. In another case of "scratch-fracture," almost precisely parallel to this, which was caused by the fall of a bell upon the head, a similar chain of events ensued. Fractures of this kind always imply much contusion of bone and great danger of osteitis.

Fig. 2.—Circular, Vertical Fracture of Anterior part of Skull.

This sketch exhibits the line of fracture at the base of the skull from a case in which the anterior part was almost completely detached. It will be seen that the fracture passes across the anterior fossæ of the skull from side to side, implicating the roofs

of both orbits and the ethmoid bone. Below it passed across the upper jaws, and above the fissures nearly, but not quite, met in the parietal bone. The dura mater was extensively torn, and the anterior part of the skull was movable, although not quite detached above. During life, in examining the head, I thought I detected crepitus, and the state of the fracture showed that this symptom might possibly have been present. The cerebral injuries were severe, and the patient was insensible during the whole of the four days that she lived.

The following are the full notes of her case :

Fracture of the skull from being knocked down ; laceration of left third nerve ; severe contusion of the brain.

Aug.	23	Tu.	A woman, æt. 50, knocked down in the street. Noon.—Admitted at once in a state of incomplete insensibility. Slight bleeding from nose, none from ears ; indications of paralysis of left third nerve.
	24	W.	Paralysis of left third nerve (complete), and of left fifth and of left seventh (partial), impaired power in left arm ; restlessness ; unconsciousness.
	25	Th.	Dry tongue ; same symptoms as above. Pulse more rapid.
	26	F.	Pulse more rapid.
	27	S.	Is sinking ; rattling in the throat ; dry tongue and mouth. Death at 5.30 p.m.

Autopsy.—Circular fracture of anterior part of skull ; contusion of surface of brain, especially on the left side ; incomplete rupture of the left third nerve, close to its origin ; fracture of posterior clinoid processes.

Mary Edwards, æt. 50, admitted August 23rd. (The following notes were dictated at her bedside) :

August 23rd.—The left pupil is larger than the right. There is ecchymosis into both lids of both eyes, but there is not any under either conjunctiva. The left pupil is more than twice the size of the other. There is marked divergence of the left eye. The left eye *never* looks inwards ; probably there is paralysis of the left third nerve. When the left conjunctiva is touched, she makes a very slight effort to close the eye, but not nearly so much as she does on the right side. She is however in a very stupid condition, and we must not place too much dependence on these symptoms. She is in a state of collapse ; her hands are cold ; her nose is cold ; her lips are rather dusky ; her pulse is 68 in the minute, soft and feeble ; both her feet are cold.

24th.—8.30 p.m.—She is much the same, but her right pupil does now decidedly contract on exposure to the light of a candle. Her left pupil is dilated and fixed. Although she can move her left arm, she makes no effort to do so when you pinch it. She resists perceptibly with her right arm when you try to lift it up. The wrinkles on the left side of her forehead are much less strongly marked than on the right and the eyebrow is on a lower level. She appears to have rather less power in the left than in the right arm. Her pulse is 73, feeble, but regular. She can move

both her legs. She is restless and tries to get out of bed. She cannot be made to answer questions. She is said to have been of feeble intellect for some time. Her mistress, however, for whom she had worked for many years as a seamstress, says that she was quite an intelligent woman.

25th.—Those parts of the skin which are covered are pungently hot, but those which are exposed are quite cool. Her pulse is 108 in the minute.

26th.—Her right pupil acts fairly, but her left is dilated and fixed. Her breathing is hurried. Her pulse 140 in the minute. The facial paralysis more marked. Her tongue is quite dry.

27th.—Her pulse is 100 in the minute. 4.45 p.m.—Here urine and fæces are passed unconsciously. The bowels are often moved. She never moves voluntarily, but will lie on either side as you place her, with her knees drawn up. She lies with her mouth open. Her lips and teeth are dry. You hear mucous râles in her throat in expiration, but there is no stertor. The right pupil on sudden exposure contracts, and then after a little while dilates. The pulse is more feeble, about 100 in the minute. Her extremities are warm and dry. Nurse reports that this morning she was in a profuse perspiration. She still resists when the right cornea is touched, and not at all when the left one is touched. At present when lying on the left side there is no evidence of facial paralysis. On looking into the throat we found much sticky mucus in her pharynx and hanging to the soft palate, bubbles passing through which cause the gurgling which was heard. These bubbles could be easily seen breaking through mucus almost as thick as glue.

The uvula hangs to the left side, her head lying to the left side. When the soft palate is touched and irritated, it is distinctly seen to be drawn up on the right side, but remaining perfectly flabby on the left.

This note was taken at 4.45 p.m., August 27th, and she died in half an hour afterwards; that is, at 5.30 p.m., August 27th, 1864.

Autopsy.—Both elbows were bruised, and there was a bruise to the left of the middle line of the skull and in the substance of the left temporal muscle. There was no evidence of contusion on the scalp externally. There was a fracture extending obliquely upwards under the temporal muscle on the left side. The veins of the pia mater were moderately full of blood. On the right side, in the middle of the lateral region, over an extent of space equal to the size of the palm of the hand, the pia mater was very much congested and ecchymosed in various parts. The brain beneath this was bruised in the middle of the patch, and showed various ecchymoses. The largest of these extended quite through the cortical layer of the convolution and into the white substance.

Left hemisphere.—Upper half, some spots of ecchymosis in the lining membrane of the lateral ventricle, quite small. Near the upper part of the longitudinal fissure, at the commencement of the middle third, were several groups of small extravasations into the medullary substance. None of these were larger than a pin's head, with one exception, which was as large as a pea. These groups extended in a line from before backwards at very little distance from the falx. A few single dots were found at other parts; but for the most part the hemisphere presented no signs of contusion. There was a fracture extending across the orbital plate of the frontal bone on the left side, and the anterior and under surface of the anterior lobe of the left hemisphere was at this part contused and lacerated, the bulb of the olfactory nerve being quite smashed. On the opposite side the fracture had extended across, but with a much less degree of separation, and on this side the anterior lobe of the brain was very slightly contused indeed. The surface of the middle lobe of this, the right side, was considerably contused, The brain substance was not, however, exactly lacerated, but there were numerous ecchymoses of considerable size. The outer side of the right hemisphere was also contused. We removed the brain with great care, in order to ascertain the state of the third nerve on the left side. The whole of the

hemispheres having been removed, the pons was very gently lifted. The tentorium having been divided, the trunk of the nerve was found uninjured, nor was there the slightest ecchymosis about it. Close to its origin with the crus, however, it was torn nearly through. There was not the slightest doubt about this lesion, and I demonstrated it to several who were present before disturbing the parts. The inner half of the nerve was that which was injured. The torn parts were ragged and shreddy. Very slight violence would have detached it altogether. We found afterwards that the posterior clinoid processes were broken.

In this case, the anterior part of the base of the skull, the bones forming the sella turcica and the cerebellum and mesocephale were removed and kept as specimens.

During life, on one occasion, I had fancied on examining her skull that I detected crepitus. At the autopsy it seemed that might very possibly have been done. The anterior part of the skull was very movable, and slight grating might have occurred in the line of fracture which crossed the orbits. We found blood-clot in the upper nasal fossæ, and ecchymosis beneath the nasal mucous membrane. There had been very little bleeding from the nose during life, so little that several asserted that there had been none. In the left antrum was a blood-stained fluid, and there were numerous ecchymoses beneath the mucous membrane of this cavity. The line of fracture had extended downwards through the superior maxilla. As the fracture had crossed both orbits, it was a matter of interest that no ecchymosis had been noticed beneath the conjunctivæ. We again examined the conjunctivæ at the post-mortem. There was no extravasation on any part which during life could have been seen. In each eye at the upper angle of the reflexion of the conjunctiva was a small patch of ecchymosis. There was a little blood in the cellular tissue of each orbit. Probably the patient was one of those in whom the tendency to effusion of blood is remarkably slight. She was a thin, pallid woman.

Fig. 3.—Oblique Bullet Perforation of Skull from without.

In this instance a bullet was fired from an air-gun pointed obliquely from the right side. The aperture shows the external table broken away from a crescent to the right, which includes almost half the circle. On the inner half the margin of fracture of the outer table is sharp and abrupt, and overhangs a part where the inner table had been extensively carried away. Several fissures radiate from the opening. The specimen was obtained as the result of an experiment, which, with several others, my colleague Mr. Little was kind enough to perform for me.

Fig. I.

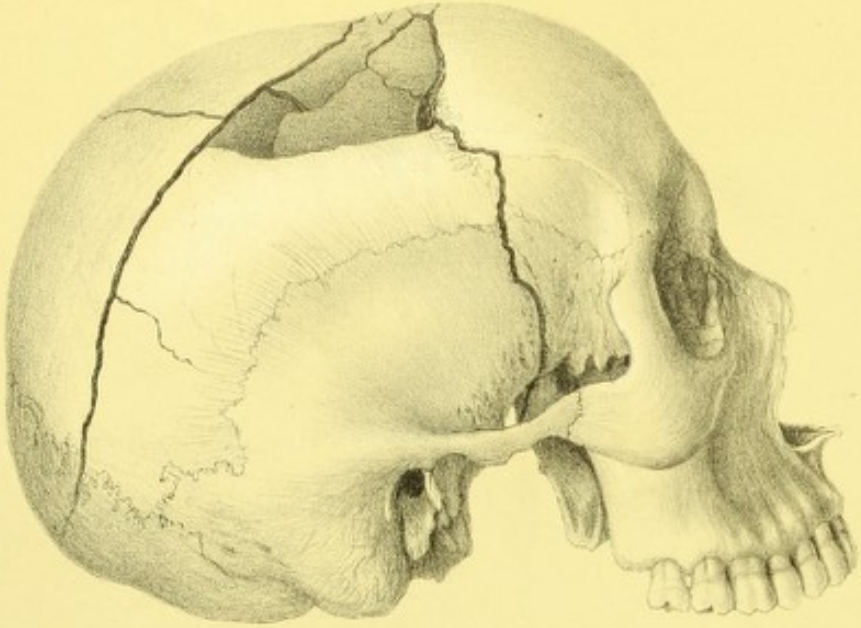

Fig. II.

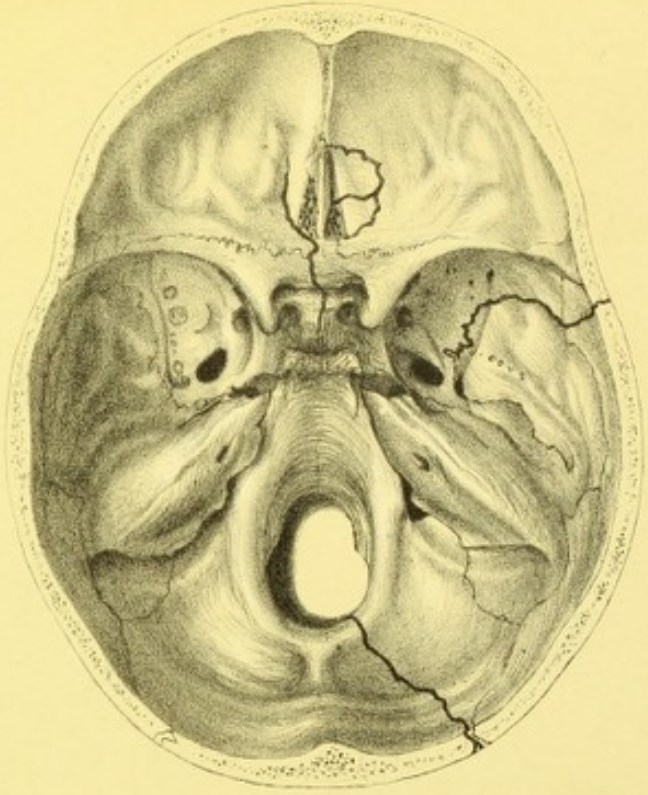

Fig. III.

Fig. IV.

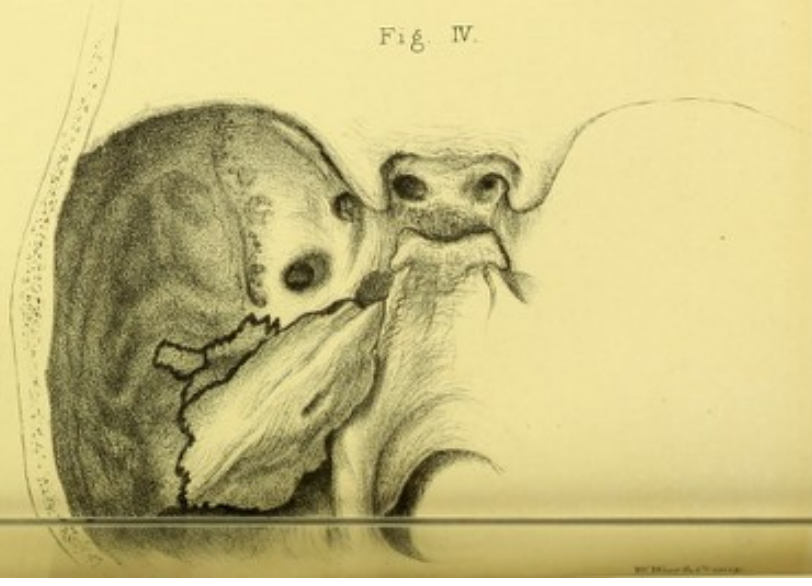

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PLATE XXIX.

VARIOUS FRACTURES OF THE SKULL.

Figs. 1 and 2.—Depressed Fracture of Vault, with Fracture of Base.

Fig. 1 represents the exterior of the right side of the skull of Henry Jay, a man who died from injury to the head, in the London Hospital, about twelve years ago. The fracture was caused by a fall. There was a compound comminuted fracture of the right parietal bone with considerable depression. The cause of death was acute arachnitis.

The lines of fracture are seen in the sketch. The dura mater was extensively torn below and behind the depressed fragment. The surface of the hemisphere was lacerated where the dura mater was torn. The under surface of the brain was contused and ecchymosed in various places, especially at the extremities of the anterior lobes and the middle parts of the sphenoidal lobes. An excellent coloured portrait of the brain is preserved in the Atlas which accompanied my prize Essay* (fol. 35).

In Fig. 2 of this Plate we have represented the lines of fracture in the base of the same skull. It will be seen that the posterior line of fracture passes backwards and downwards to the foramen magnum, that through the squamous bone ends in the base near the foramen ovale, whilst another, possibly a continuation of it, begins in the sella turcica and passes on into the orbital plate of the frontal. To the right of the crista galli is another irregular line of fracture. In connection with these latter, it is to be noted that the anterior cerebral lobes were bruised, as also the apices of the olfactory bulbs.

It is of interest to note that although the depression was locally so considerable, yet it produced no symptoms of compression. The symptoms at first were those of concussion, and the man was conscious. There quickly supervened others due to the contusion and inflammatory softening of the contused brain, and on these followed those of meningitis. The laceration of the scalp

* Now in Guy's Hospital Library.

was not great, and was not over the portion of greatest depression, thus the depth of the depression was not at first suspected, and no operation was performed.

The contusion of the brain at its base was probably too great to have permitted of the man's recovery, but, so far as the vertex of the skull is concerned, there can be no hesitation in saying that an operation would have much added to the man's chance. The case as it is illustrates the progress of events with a depressed compound fracture left alone, and shows the rapid supervention of fatal arachnitis.

A few months ago I operated in a not very dissimilar case in which there was still more extensive fracture and depression with laceration of dura mater and escape of brain substance into the wound. We took away some fragments of bone, elevated others, and brought the wound together with numerous silk stitches. Under the sedulous use of a strong lead and spirit lotion to the part, with mercury to ptyalism internally, the gentleman made an uninterrupted recovery, and most of the wound healed by first intention. The injury had been received by the kick of a horse in the field.

The following are the details of Henry Jay's case :

Compound fracture of right parietal bone, with depression. Symptoms of concussion, with paralysis of left portio dura from the commencement; both eyes directed to the right; gradual supervention of paralysis of the left extremities; frequent unilateral convulsions; death on the fifth day. Autopsy.—General arachnitis, laceration of dura mater and of right hemisphere; contusion of the brain in many parts.

July	18	M.	A dock-labourer, æt. 36, fell into a ship's hold, and sustained a compound fracture of the right parietal bone, with some depression. He was conscious when admitted; paralysis of left portio dura; incomplete paralysis of left extremities; paralysis of left third nerve.
	19	Tu.	Heavy and stupid.
	20	W.	Paralysis of left limbs and side of face decided; eyes constantly directed to the right; occasional spasms of the right limbs.
	21	Th.	Symptoms the same.
	22	F.	Left pupil still widely dilated and left limbs paralysed; severe convulsive seizures, affecting only the right limbs; able to speak at times; left knee hotter than the right. Death at midnight.

Autopsy.—Depressed fracture of right parietal, with laceration of dura mater; arachnitis; laceration of left fourth nerve; contusion of the brain at various parts, and especially of the surface of right hemisphere.

FIG. 3.—FISSURE FRACTURE OF ROOF OF ORBIT.

This sketch illustrates what is a not uncommon consequence of severe blows on the back of the head—a fissure fracture of the roof of the orbit. At this part the bone is in many subjects exceedingly thin and delicate, and may break from a degree of violence insufficient to cause fracture elsewhere. I have, in many cases in which patients had died after concussion of the head, but in consequence of lesions elsewhere, found the orbital plates of the frontal bone on one or both sides showing irregular lines of fissure. Usually a little hæmorrhage under the periosteum is present to draw attention to the part, but in some cases, unless the membrane be stripped up and the bone carefully inspected, the lesion may easily escape notice. Often there is a little blood beneath the bone as well, and these are the cases in which ecchymosis is sometimes noticed in the upper eyelid, although no bruise has been inflicted on the part, and the injury has been received solely at the back of the head. Sometimes the lines of fissure extend into the adjacent walls of the nostril, and, as might be expected, bleeding from the nose is a common occurrence. This extension into the nostril on both sides is well shown in Fig. 2 of the same plate. In this latter, however, the injury to the skull had been very severe, whereas in the case which supplied Fig. 3 it had been very slight. I have selected the latter, therefore, as affording proof that this fracture may occur without other evidences of damage to the cranium.

The patient from whose skull Fig. 3 was taken, was a deaf and dumb man, who was knocked down by a van in the street and run over. He died in a few minutes after his admission into the hospital ward, and there was no time for observation of symptoms. In his chest and abdomen were found very extensive injuries which fully accounted for death. After the head had been opened and the brain removed our attention was attracted by some slight ecchymosis beneath the dura mater on the left of the crista galli and extending backwards towards the lesser wing of the sphenoid. On stripping up the dura mater some irregular lines of fracture through the thin orbital plate were discovered. There was also some extravasation beneath the fracture, between the bone and the periosteum of the orbit. There was no injury whatever to the brain, nor any fracture of other part of the skull. It was believed that the blow which had caused the fracture had been received on the occiput.

Fig. 4.—Fracture of Base of Skull caused by the Condyle of Lower Jaw.

The lines of fracture here shown in the left middle fossa are those produced in a case in which the condyle of the lower jaw was the cause of the injury to the skull. The plates of bone surrounded by the black lines just in front of the petrous portion were quite detached, and adhered only to the dura mater. The dura mater was not torn. The condyle of the jaw was not impacted in the fracture, but it could easily be pushed up into it, covered, of course, by its synovial membrane and inter-articular cartilage. The body of the jaw was broken. The patient was a boy of nine, and ossification was accordingly incomplete.

Injury to the head by the wheel of a carriage; fracture of the lower jaw and laceration of the left ear. Sudden development of brain symptoms on the third day; death on the fifth day. Autopsy.—Fracture of the base of skull by condyle of lower jaw.

	Th.	A boy, æt. 9, was knocked down and his head run over. Admitted with laceration of the left ear and fracture of the lower jaw on the left side.
	F.	No head symptoms; is rational.
	S.	10 a.m.—Sudden collapse, followed by unconsciousness.
		2 p.m.—Unconscious, but somewhat restless; no limb paralysed; surface hot; pupils small. Pulse quick and sharp.
	♑.	Pulse 140. General surface cooler; head hot; no paralysis.
		12 p.m.—Surface quite cool. Sinking.
	M.	Death at 4 a.m.

Autopsy.—*Slight contusions of base of brain on left side; fractured temporal bone, caused by the condyle of the lower jaw; no laceration of dura mater.*

A healthy boy, a Jew, æt. about 9. He was knocked down by a cab and run over. When admitted just after the accident he was found to have his left ear almost torn off from behind, the laceration extending over the mastoid and adjoining parts of the temporal bone. His ear was full of blood, but whether from without or internally could not be decided. His lower jaw broken, and head and face much contused.

It was on a Thursday afternoon that the boy was admitted, just after my visit, and I did not see him until Saturday afternoon following. My house-surgeon told me that there had been no head symptoms at first, and that he had not thought it needful to mention the case to me. On Saturday morning, however, the boy had rather suddenly developed brain symptoms. His mother confirmed the house-surgeon's testimony that until this time she had not thought him seriously ill. He had spoken to her repeatedly, and did so on Saturday morning quite coherently. About 10 o'clock the house-surgeon was called to him, and found him quite unconscious and much collapsed, pulse weak and fluttering. Some brandy was ordered.

I saw him at 2 o'clock, about forty-eight hours after the accident. He lay unconscious, with his face turned to the right side. Face much swollen, especially about the lower jaw and the right eyelid. He could not be roused to speak or to attempt to put out his tongue, but would open his eyes and stare round in a half-stupid manner. Pupils small, although his face was shaded; conjunctivæ not congested; pupils of equal size; no squint; no discharge from either ear, the left full of dried blood-clot. His skin generally was hot, forehead especially so; cheeks flushed. He could move all his extremities, and often did so, tossing restlessly in bed, but never lifting his head. On tickling his feet he at once drew them up. He had as yet taken no medicine and the bowels had not been acted on. I ordered his head to be shaved and ice to be efficiently applied, to be kept in the semi-recumbent posture, a mustard poultice to the calf of each leg, and a three-grain dose of calomel at once.

As I chanced to be called to the hospital in the night I saw him again at 2 a.m. He was much in the same condition. The scalp where the ice touched was cold, but at a very short distance from it it was pungently hot; pupils small, but sclerotics and conjunctivæ white. The mustard plasters had not reddened the skin, and were ordered to be repeated, as also the dose of calomel. A hot bottle was kept to his feet. His pulse was quick and sharp, but feeble.

Sunday morning, 11 o'clock.—General surface cooler. I fancied that the right arm was, perhaps, a little cooler than the left. Forehead still hot where not touched by the ice. Pulse more rapid, 140. He could still move all his extremities, but I thought he moved the left more readily than the right.

Sunday night, 12 o'clock.—Decidedly worse; pulse much quicker and surface quite cool. Scalp warm, but not nearly so hot as it was; tip of nose cool. He still lay unconscious, but occasionally opening his eyes or moaning.

Death occurred a few hours after I had last seen him, August 31st, 1863.

It must be noted that in this case we had no opportunity for availing ourselves of two of the most valuable symptoms in the diagnosis of fracture of the temporal bone. The blood in the boy's ear prevented us from knowing whether he was deaf from other causes or not, and the severe contusion of the left side of his face made it impossible to ascertain whether he could use his left portio dura. Had these symptoms been carefully investigated at the time of admission important information might probably have been obtained.

Autopsy.—Beneath the left sphenoidal lobe were evidences of slight contusion, but no laceration. The dura mater at this part was not torn, but there was blood beneath it. On stripping it up a portion of bone almost as large as the nail of the little finger came with it, leaving an opening beneath which was occupied by blood-clot. On pressing up the jaw bulging occurred, the upper part of the synovial membrane being pushed into the hole. At the sides of this opening were some fissures in the adjacent bone, and a narrow crack extended backwards across the base of the petrous bone, and ended under the lateral sinus. There was a thin blood-clot here, but the sinus was not torn.

No other lesions were found in the brain. There were no indications of inflammation anywhere. It is somewhat difficult in this case to assign the immediate cause of death. Although it is true that the base of the skull was fractured, yet the dura mater was not torn, and there was no proof of commencing inflammation. In the first instance the symptoms of concussion were exceedingly slight, the autopsy showed nothing to account for the sudden supervention of collapse on the third day. The boy being a Jew we were not allowed to examine the trunk, so that it remains possible that there was some other internal injury which took a share in the symptoms, and was, perhaps, the cause of death. Another hypothesis may be suggested, that he sank from the shock of the earliest stage of arachnitis and before any visible changes were produced. The symptoms preceding death were certainly cerebral.

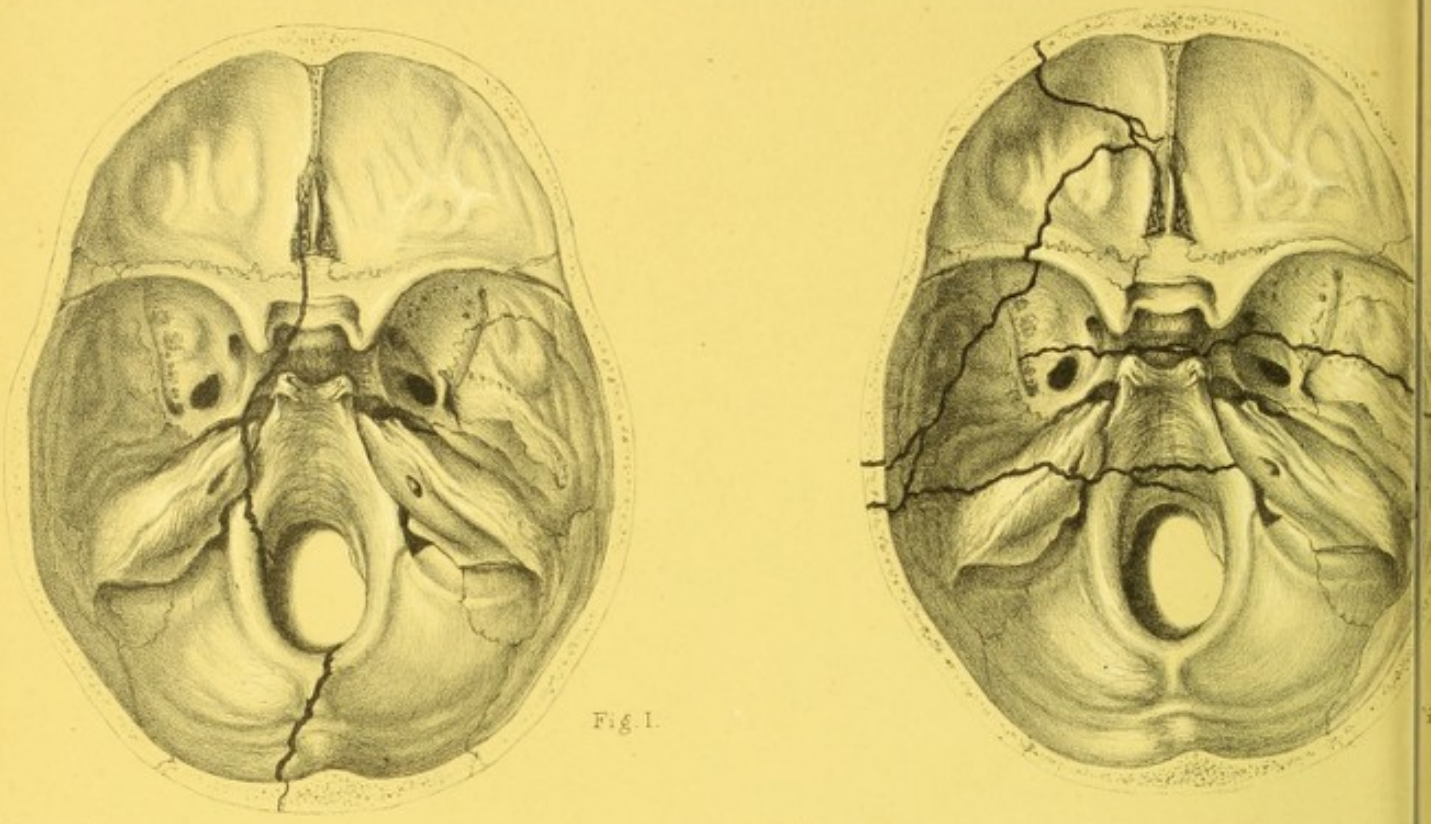

Fig. I.

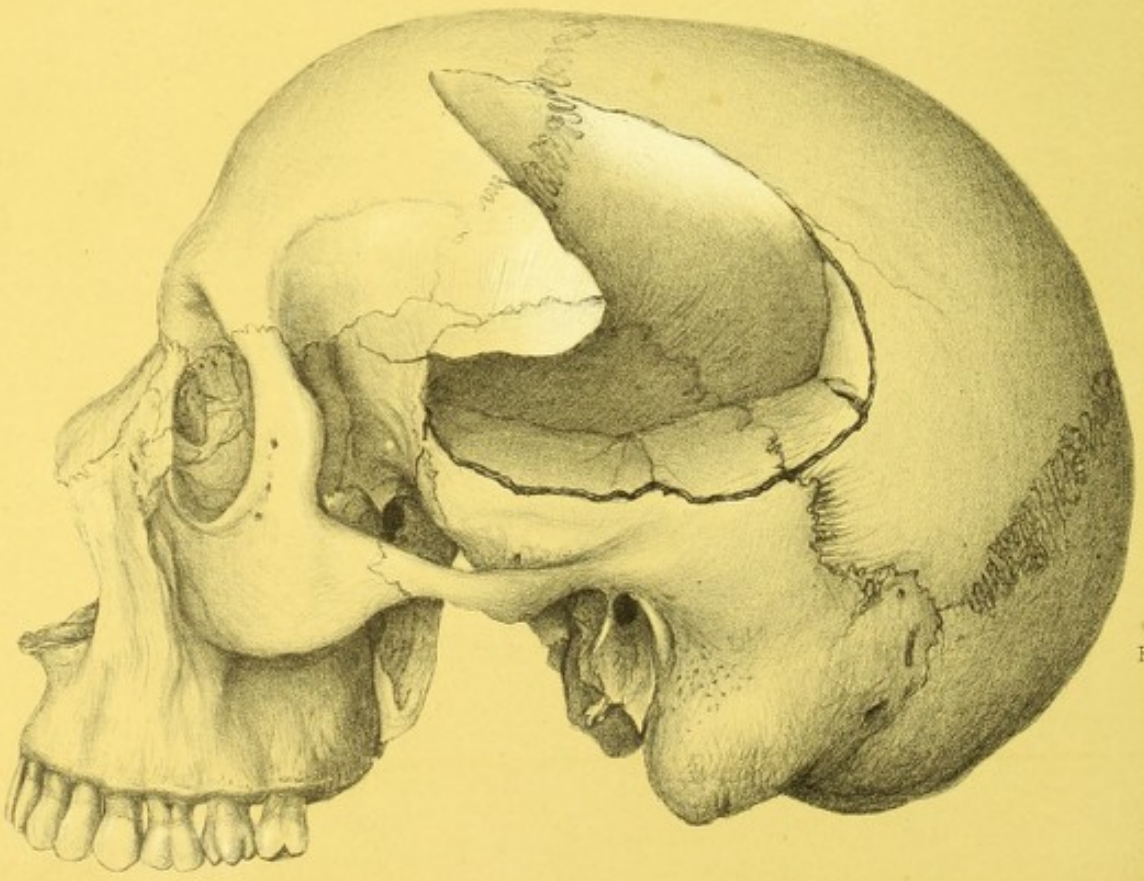

Fig.

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PLATE XXX.

VARIOUS FRACTURES OF THE SKULL.

Fig. 1.—Lengthwise Fracture of the Base of the Skull.

The specimen from which this drawing was made was obtained from a man named Tiljmans, who died six hours after a fall of ten feet upon his head. The line of fracture passes downwards near the middle of the occipital bone into the foramen magnum, on the left side of the front of which it recommences and passing across the tip of the petrous bone and the body of the sphenoid ends in the left cribriform plate of the ethmoid. The following is a synopsis of the case:

James Tiljmans, æt. 35.

Fall ten feet upon the head; total insensibility from the very first; stertorous breathing; full, large pulse; remarkable variations in rate and power of pulse; slight bleeding from the nose; left extremities believed to be more completely powerless than the right ones; death in six hours. Autopsy.—Smash of anterior lobe of right hemisphere; lengthwise fracture of the base of skull through the foramen magnum.

Fig. 2.—Very extensive Fractures in the Base of the Skull.

I have selected this case for illustration because it shows well how extensive and complicated fractures in the base of the skull may occasionally be. It will be seen that four different lines of fracture pass from above into the base. Of these two cross the base, and are only prevented from meeting, and thus constituting a vertical circular fracture, by the fact that one is about an inch in front of the other. Thus, on the left side the petrous bone and the basilar process are crossed, whilst on the right the fracture goes through the great wing of the sphenoid and the sella turcica. Two other lines of fracture in left side of the skull converge in the anterior part of the ethmoid. The fractures were the result of a fall from a window, and were attended by severe contusion of the brain. I append full particulars of the case.

Fracture of the base of skull and superficial lacerations of the brain; death in twenty-four hours.

July	18	M.	9 p.m.—Fall from a window. Insensibility and deep collapse. Symptoms of fractured base. Question as to the existence of compression from fracture of vault. Bleeding from left ear, and fracture of left parietal and squamous bones.
	19	Tu.	Continued insensibility with rapid pulse. Pungent heat of skin and great restlessness. 8 p.m.—Death in coma with greatly embarrassed breathing. *Post-mortem.*—Extensive fractures of the base of the skull and of the left temporal and parietal bones. Superficial lacerations of the brain. Extensive contusion of brain in the side opposite to the fracture.

Catherine Fanning, æt. 23, single. Either threw herself or was thrown from a window on the second floor of a house. She was carried into the London Hospital about 9 o'clock on the evening of Monday, July 18th. When admitted she was quite insensible and apparently dying. Blood was flowing rather freely from her left ear, and there was great swelling from extravasation of blood on the left side of the head. I saw her about a quarter of an hour after her admission, and perhaps half an hour after the accident. She was completely insensible, and could not be roused by any kind of irritation. Her face was pale, and lips rather livid. Her extremities were cool and not cold. Her pulse, though feeble, was quite steady, of moderate size, and not more than eighty-six in frequency. Her left eye had been lost at some former period by sloughing of the cornea. Her right eye, which was sound, was directed slightly to the right side; its pupil was rather smaller than natural, but did not dilate in the least when shaded or contract on exposure to light. I examined her eye with the ophthalmoscope, but could only make out that the arteries were smaller and the veins a little fuller than natural. Her respiration was slightly stertorous, and was constantly attended by the rattling of mucous bubbles in the throat.

On examining the injured part of her skull more carefully I thought I could detect slight crepitus on firm pressure a few inches above the right ear. It must be remembered that the scalp was very much swollen by effused blood. There was a small wound of the scalp over the parietal eminence, but it did not communicate with the bone.

It was clear that there was no material depression of bone at this part, nor could I discover any evidence of the existence of fracture at any other part. Our conjecture was that we had to do with a severe case of fracture of the base of the skull, attended, of course, by concussion, and possibly also by laceration of brain. Our patient was in the stage of collapse, but let us here note that her pupil was not dilated and that her pulse was neither thready nor irregular. On what symptoms could we base a confident opinion as to the absence of compression? The patient being completely insensible it was impossible to ascertain whether she had any unsymmetrical paralysis or not. Thinking it wiser to err on the side of interference, since our patient appeared to be otherwise in an almost hopeless condition, I suggested to my colleague (under whose care she was) that he should expose the bone on the injured part and trephine. The idea that compression by blood effusion might possibly be present was favoured by two symptoms—first, that her breathing was a little stertorous; secondly, that her absolute unconsciousness was scarcely accounted for by the degree of concussion-collapse which was present. Even

should the operation only suffice to restore temporary consciousness it might by so doing afford an opportunity for taking her deposition, which was of great importance. We were about to proceed to the operation when, during the turning of her head, she suddenly drew up both legs with considerable power and also moved her right arm. This made it clear that at any rate the limbs opposite the injured side were not paralysed, and we accordingly abandoned the idea of further exploration. I should have stated that we had carefully examined her limbs to ascertain whether there was any relative difference of temperature, but could detect none.

During the next twelve hours she became increasingly restless, and moved her limbs frequently, but never regained any degree of consciousness. I saw her again at 4 o'clock next day, nineteen hours after the accident. She was now evidently sinking. Face swollen and bloated; lips livid; loud mucous râles in the throat and in all parts of her chest. Pulse sharp, but very feeble, not less than 140 in the minute. Her extremities were now frequently hot, and the curious fact was noted that the most distant parts of them were very much hotter than were those nearer the trunk. Thus, her feet were very hot and her thighs quite cool, and the same difference was noted as to her hands and upper arms. There had been no further bleeding from her left ear. Her only eye was still directed to the right; its pupil was now moderately dilated and quite motionless. She had not been sick since the accident. Her urine had been passed unconsciously. The treatment had consisted in the application of an ice-bag to the head. Although she could move all her limbs, it had been noticed that she moved her right more frequently than her left.

She did not appear to feel pricking or pinching in any part. Restlessness was a decided symptom, and her coverlid had to be tied on, otherwise she would constantly throw the clothes off. She died in the evening about 8 p.m., her difficulty of breathing having gradually increased.

Post-mortem.—Ten hours after death. Rigor mortis moderately well marked. Bruises on various parts of body. Head very much swollen, especially face and scalp. Evidences of contusions in various parts. A large quantity of blood beneath the scalp. The left temporal bone was fractured in various parts, directly above and anterior to the auditory canal. Several fragments were quite loose, and one of the size of a penny-piece was somewhat depressed, not to any great extent. The fissures extended upwards over the vault of the skull, and forwards through the frontal bone by a linear fissure into the orbit at its outer part. The temporal bone was removed for further examination. There was a laceration of the dura mater beneath the squamous portion of temporal bone where the chief fracture was, and another very limited one about three quarters of an inch long at the base of the skull over the petrous portion of temporal bone. Immediately beneath this laceration the petrous portion was crossed obliquely by a fracture, which admitted of free motion. The brain of the under surface of anterior part of middle lobe just above this fracture was lacerated, bruised, and softened. There was a cavity which might have held the tip of the thumb, and the brain tissue for some distance above it was very much softened and ecchymosed. The outer side of the right, middle, and posterior lobes was extensively superficially bruised, ecchymosed, and torn. On first removing the upper part of the calvaria with the brain in it the brain looked everywhere too small, and fell away from the dura mater at the sides. On its under surface it was distinctly bruised in several places, but the bruises were quite superficial, and internally no morbid appearances could be discovered, except that it was decidedly paler than natural. There was no blood at the base of the brain, nor evidence of bruising of the medulla, pons, &c. The heart was flabby. Its right cavities contained a very little blood, perfectly fluid; the left also contained a very small quantity of fluid blood. The liver was soft, and showed patches of yellow fatty deposit, but not to any great extent. Kidneys were healthy. Lungs were healthy. Posterior lobes were congested, containing much fluid blood.

Fig. 3.—Compound Fracture of the Side of the Skull, with extensive Depression.

This sketch was taken in order to show the precise character of a very extensive depression, which occurred in consequence of a violent blow from a bar of iron. The bones implicated are the parietal, frontal (slightly), and squamous portion of temporal.

William Wilkie, æt. 25.

Compound fracture, followed by arachnitis and by paralysis of the opposite side; death on the twelfth day; increased temperature in paralysed side, and unilateral perspiration.

July	23	S.	10 a.m.—A fireman was struck by a bar of iron. He rapidly passed into insensibility. Compound fracture on left side of skull, with depression. 11 a.m.—Violent and general epileptic convulsions. 12 a.m.—Repeated attacks of convulsions. 1.30 a.m.—Elevation of depressed fragment; free meningeal hæmorrhage. 2 a.m.—Entire cessation of convulsions. 2.30 a.m.—He spoke and told his name; remains quite quiet.
	24	♑.	Concussion stupor; will speak; no paralysis. Pulse 64.
	25	M.	Doing well. Pulse 55—72.
	26	Tu.	„ Pulse 56—60.
	27	W.	„ Pulse 62.
	28	Th.	Less sleepy; doing well.
	29	F.	Doing well; surface cool; pupils of normal size. Pulse 48—56.
	30	S.	Paresis of right limbs and side of face. Apathetic and stupid. Pulse 68.
	31	♑.	Paresis of facial, lingual, and trigeminal, on right side. Increased temperature on right side.
Aug.	1	M.	A severe rigor; spasms in the paralysed limbs. Trephining. A second rigor; profuse perspiration on the right side.
	2	Tu.	Almost insensible; paralysis of right side. Pulse 48, intermitting.
	3	W.	Death at 1 p.m.

Autopsy.—Extensive compound fracture on left side, with laceration of the dura mater; acute arachnitis, chiefly on the left side; softened thrombus in longitudinal sinus.

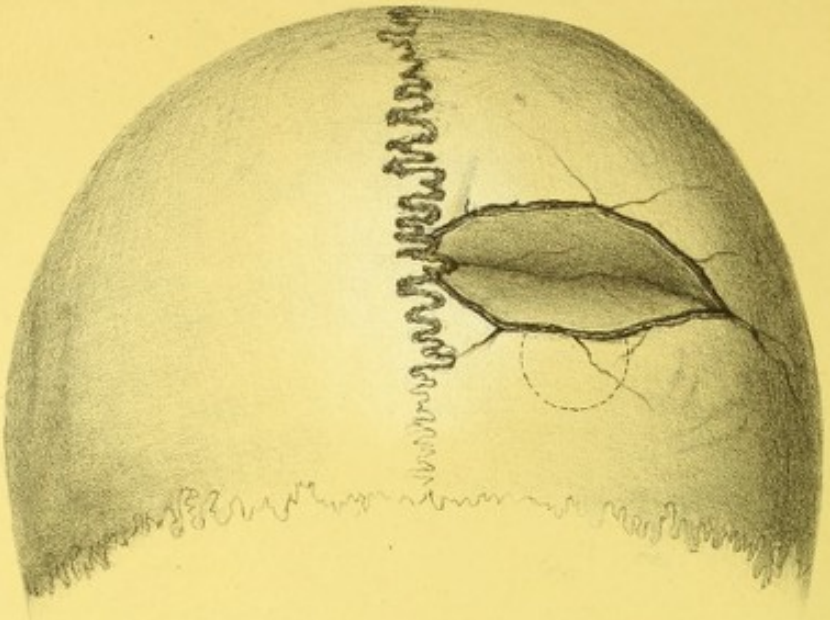

Fig. I.

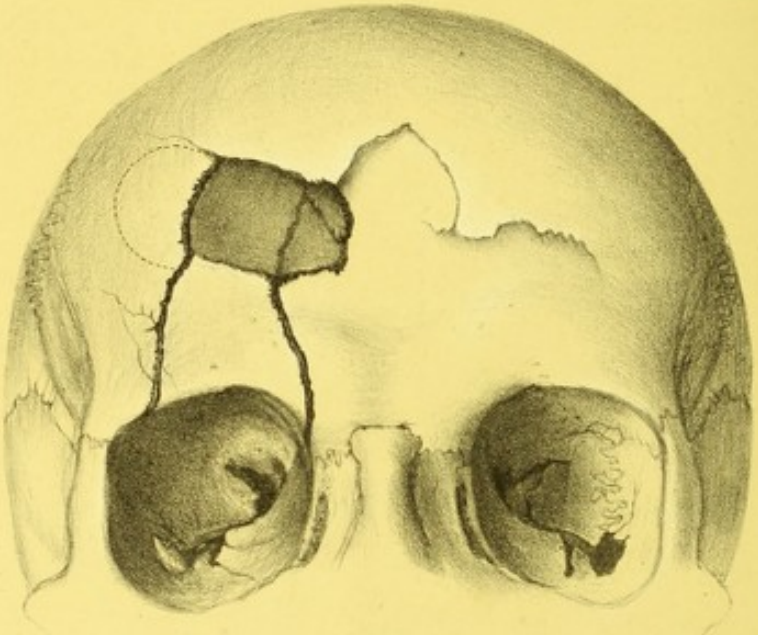

Fig. II

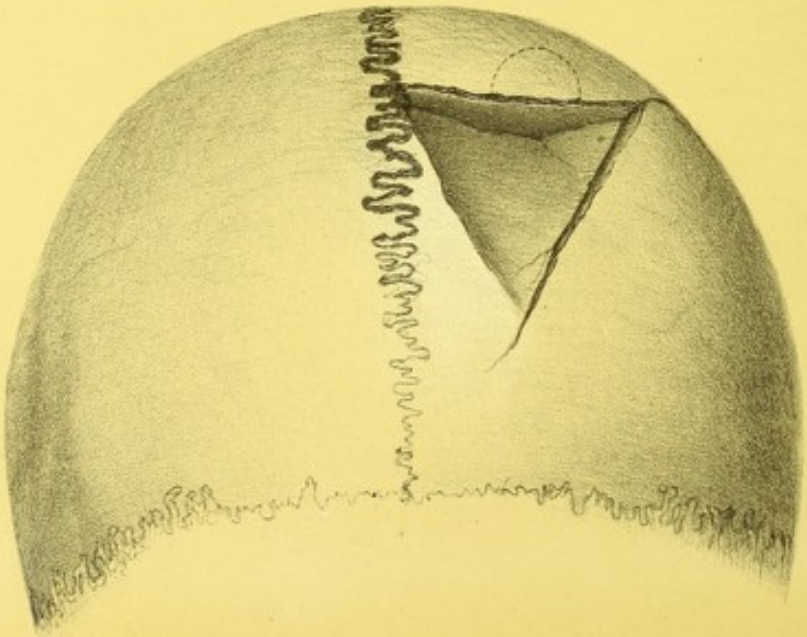

Fig. III

E. Burgess del. et lith.

Compound fracture of the left parietal bone, with depression; no symptoms; primary trephining; perforation of outer table only. Recovery.

A ship-builder, æt. 36, was admitted with a compound depressed fracture of his left parietal bone, which had been caused by a hammer which fell from a great height upon his head. He had walked to his bed, and had, when I saw him two hours after the accident, no head symptoms whatever. The scalp wound was about an inch and a half long, and ran from near the middle of the vertex outwards towards the left ear. The bone below it was quite bare, and the fracture was easily seen. The amount of depression as measured by a probe was nearly a quarter of an inch. The chief fragment which was depressed sloped from behind forwards, being depressed at its anterior part. As the abrupt depression seemed likely to stretch the dura mater and cause irritation, I determined on an immediate operation, to which the man readily assented.

With a small trephine I removed a circle of the bone in front of the depression, not going deeper than just into the diploe. This done, with a little trouble I got away the anterior fragment which acted as a buttress between the depressed fragment and the other part, and would have entirely prevented its being elevated. When this was removed I easily got the point of an elevator into the diploe of the depressed portion, and succeeded in lifting it into place. Wet lint was applied to the wound and ice to the scalp. The patient was kept in bed and on spare diet. He never had a single ill symptom, and left the hospital quite well about a month after his admission.

It will be observed that in the operation described the dura mater was never seen.

Fig. 2.—Compound Depressed Fracture of the Frontal Bone.

The following are the detailed particulars of the case from which the specimen here delineated was obtained:

Blow on the forehead; compound fracture of right side of frontal bone, with much depression and laceration of dura mater and escape of brain-substance; no symptoms for twenty-four hours, and no interference; violent convulsions, followed by collapse; trephining thirty hours after the accident, and removal of bone; death twelve hours after the operation.—Autopsy.

John O'D—, aged about 35. At six o'clock in the afternoon of August 27th, 1862, I was summoned in haste to the London Hospital to see a man who was stated to be in a most urgent condition after an injury to the head. On arrival, the house-surgeon, Mr. D—, informed me that the patient had been admitted the previous day, under the care of one of my colleagues, by whom he had also been seen about three hours prior to my visit, up to which time no symptoms had shown themselves. Suddenly, however, about an hour after Mr. ——'s visit, convulsions came on, after which the man relapsed into a state of collapse, in which his death seemed imminent. The injury had been received by a blow from a piece of brass which had become detached from a wheel revolving at great velocity. It was easily ascertained at the time of the man's admission that there was a compound and depressed fracture of the right side of the frontal bone, but as no symptoms of compression were present, it was decided to do nothing. He was able to give an account of the accident, and, in fact, remained wholly without head symptoms until 4.30 next afternoon, when, as just stated, violent convulsions occurred. Several hours before the convulsions the

house-surgeon had noticed that the man's aspect was altered—that he looked wild and was flushed, and that his manner was excited.

August 27th.—I found the patient very pale, with rather livid lips; quite unconscious; breathing irregularly, and with a slight stertor; mouth open; eyes closed, but the left not completely; considerable ecchymosis in the right eyelid. The injury consisted in a depressed compound fracture of the right side of the frontal bone, the lower margin being about a finger's breadth above the orbit. The fragment was much depressed at its outer angle; the depression was great, the fragment being considerably below the entire thickness of the skull. A small portion of brain-substance lay in the wound. From the history, the man's insensibility and collapse might be considered to be those consequent on violent convulsions, analogous to what is seen after violent epilepsy. With regard to symptoms of localised mischief, we made out the following facts:—The eyes slightly diverged, and the left pupil was slightly larger than the right (paresis of third nerve). He could move all his limbs, and did so every now and then, moaning and appearing to be in great discomfort. He moved the left arm and leg much more frequently and freely than the right. The right knee was kept drawn up, the other straight out. If any attempt was made to move either limb, he resisted it with considerable muscular force. His cutaneous sensibility was greatly impaired in all parts, yet he would move his left leg when tickled or pricked, but only after a considerable time. No amount of irritation would cause him to move his right leg. The mouth was not distorted. There was occasional twitching (slight) of one or other cheek. His pulse was quickened and feeble; skin of all parts rather warm (a very hot day).

Operation.—Having laid bare the bone, during which he moved his head and made several slight cries, I applied the trephine on the outer side of the fracture, and easily by its aid obtained access to the under surface of the most depressed portion. It could not be elevated, however, until I had removed a sloping buttress which slanted down from the orbital margin of the opening to the depressed fragment, and acted as a wedge between the two. This removed, I elevated the depressed fragment, but could not get it into apposition. With Hey's saw I then removed the angles between the trephine half-circle and the hole, and drew away the large fragment. Afterwards numerous splintered portions, chiefly of inner table, and several of them lodged at considerable distances under the bone, were removed, being quite loose. During the operation, at one time there was profuse hæmorrhage from a sinus or large vein at the inner and lower angle of the opening. The blood was exceedingly dark; its flow ceased when the fragment was extracted. There was an aperture in the dura mater beneath the most depressed angle of the bone—viz. outer one—which just admitted the top of my forefinger. I passed in my little finger half an inch in order to ascertain that no foreign body had been driven into the brain itself. The brain did not bleed, and there was no clot under the dura mater. The brain pulsated with tolerable vigour. In the middle of the operation the man at one time ceased for at least a minute all respiratory movements, but his pulse remained of fair power. After the operation he looked better—*i. e.* less pale and corpse-like; his pulse was slower and fuller. No alteration in sensibility of surface. His left eye looked outward more decidedly than before, and the pupil was twice the size of the other. Both pupils acted on exposure to the light of a candle very near. Ordered a turpentine enema.

At 10.30 (four hours and a half after the operation) I saw him again. He had twice called for "Ann" (his wife), but had not otherwise manifested consciousness. The chief difference was that his general surface was cooler. There was less divergence of the eyes, and the pupils were nearly of equal size. He bore the conjunctiva being touched without wincing, and no amount of pricking or tickling would make him move either leg. After my last visit he remained much as he had been before, until about two o'clock, when he began to sink. He had no convulsions,

but gradually sank; and died about five in the morning, twelve hours after the operation, and thirty-six from the time of his admission.

Autopsy.—The dura mater beneath the opening, which at the time of the operation was pressed forcibly upwards into it, had now receded considerably, leaving a large hollow (collapse of brain).

The line of fracture extending to the left crossed the median line; downwards the roof of the orbit was involved. The dura mater was only injured at one spot—that, namely, immediately below the most depressed angle of bone. At this spot it admitted a finger. Having removed the dura mater, we found the brain-substance below the seat of injury much contused and broken up. The effects of the injury did not, however, extend deeper than the cortical substance. There was no effusion of blood beneath the dura mater. On the arachnoid adjacent were a few small patches of recent lymph. The pia mater generally was congested, as was also the substance of the brain itself. This congestion was apparent on both sides, but most so on the injured one.

All the cerebral nerves were carefully examined, more especially the left third, but there was no injury discovered in any part of their trunks. A small quantity of blood-stained serum had accumulated in the middle fossa.

Fig. 3.—Compound Depressed Fracture.

The chief facts of this case are almost a repetition of those given as to Fig. 1. The patient had no head symptoms, but the depression was considerable and the fragments firmly wedged. In both cases I trephined through the outer table only, and in both the recovery was interrupted. The following are the details:

Compound depressed fracture of the left parietal bone; no cerebral symptoms; primary trephining; perforation of outer table only; recovery.

A man, æt. 50, was admitted under my care with a compound fracture of the skull on the vertex, a little to the left of the median line. There was an irregular laceration of the scalp of about three inches in length, and near the middle of this the bone was exposed and fractured. The injury had been inflicted by his wife, whom he described as subject to maniacal fits of passion. In one of these she had struck him with a "flat-iron." The blow knocked him down and stunned him for a short time. He soon recovered, however, and when admitted at the hospital an hour later was able to walk into the ward and had no cerebral symptoms.

When I saw him he had been about two hours in bed. He had no particular pain in the head, was perfectly conscious, and gave me the above account of his injury. I could detect no symptoms of cerebral injury. On examining the injured part I found that the chief fissure ran transversely from the posterior part of the sagittal suture outwards to the left. In front of this was a triangular fragment the size of half-a-crown, which at its posterior edge was much depressed. By measurement with the probe the depression was found to be about a third of an inch, and was greatest at the inner angle. On account of the limited size of the fragment and the very considerable degree of depression I judged that the dura mater must be much stretched by it, and determined, in the hope of preventing meningitis, to elevate. I applied the trephine to the sound bone just behind the outer part of the fracture, and was careful to desist as soon as I had cut through the outer table. It chanced that this table was unusually thick. Having done this, I was able with the forceps and elevator to

get away some small fragments which were impacted edgewise in the line of fracture, and which acted as wedges in entirely preventing all possibility of elevation. When this was done, I introduced the point of the elevator very carefully into the diploe of the depressed fragment, and was able with gentle force to lift the latter into its place. The dura mater had not been exposed, and beneath the trephine hole a thin layer of the inner table remained entire. I had touched the dura mater with the probe through the cleft, but had not seen it. Water dressing was applied to the wound. The man was kept quiet in bed and on low diet.

The subsequent narrative is one merely of uninterrupted recovery. The man never had any head symptoms whatever. His wound began in due time to suppurate and granulate freely. It was then treated by poulticing. We insisted, as a precaution, on his remaining in bed for about three weeks, but during the latter part of this time he was quite well. Some very small bits of bone came away in the poultice, but the fragment which had been depressed remained in its place. In about five weeks from the date of the operation the wound was healed, and the man left the hospital in excellent health.

Fig. I.

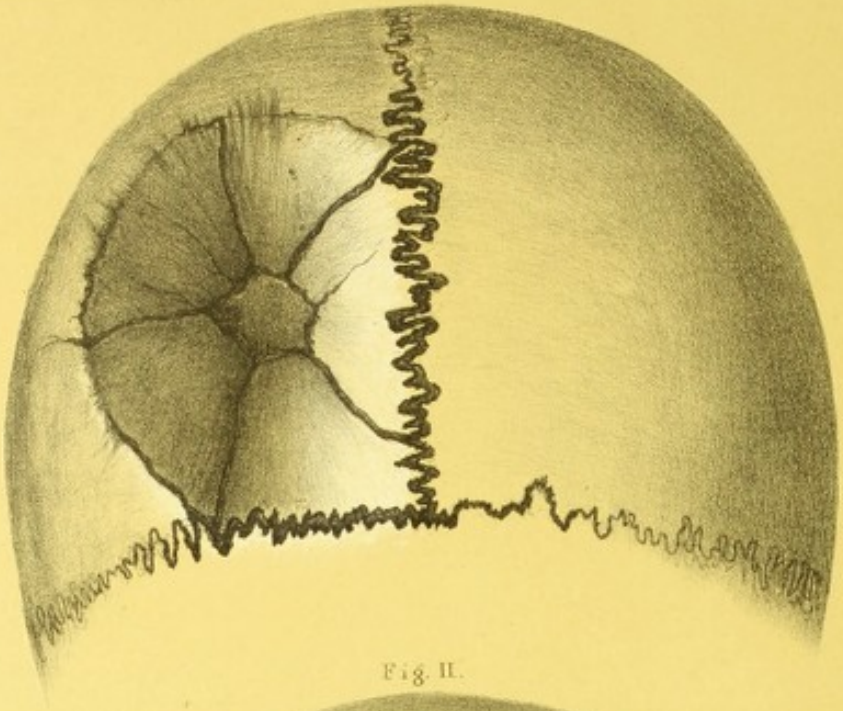

Fig. II.

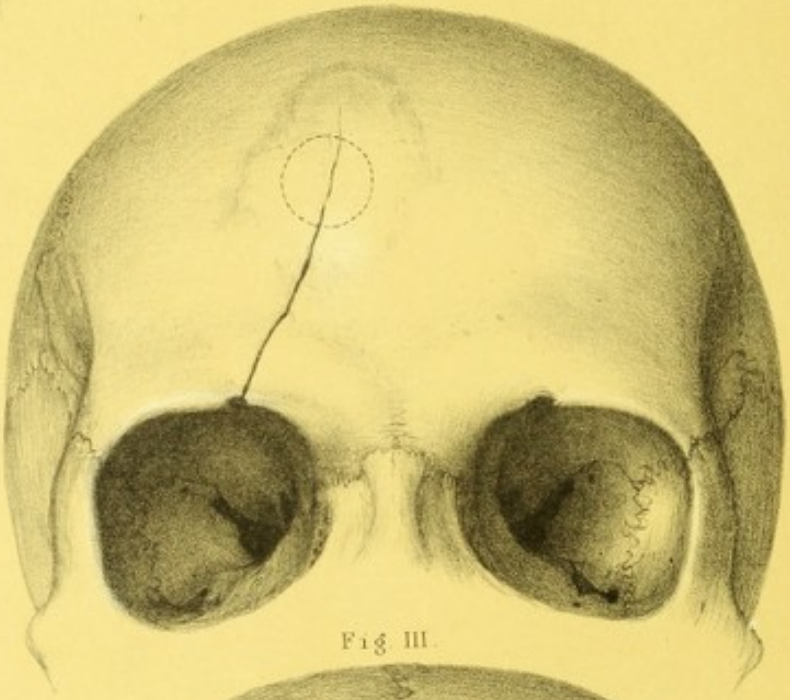

Fig. III.

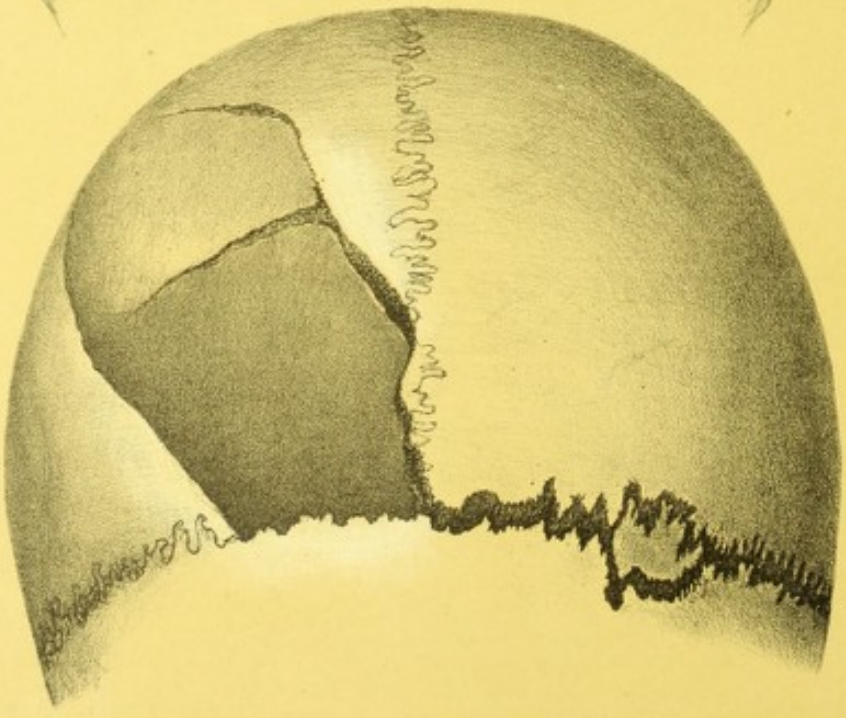

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PLATE XXXII.

DIFFERENT FORMS OF FRACTURE OF THE SKULL.

The three figures which make up this Plate illustrate as many different forms of compound fracture of the skull, and have been selected as especially instructive in reference to the operation of primary trephining. In none was the operation performed, and all ended fatally by meningeal inflammation and osteitis. In Fig. 2 there was only a fissure fracture, and no one would have thought of operating, but in the other two there was depression, and the operation was, I think, indicated.

Fig. 1.—Radiating Fracture with "Pond Depression."

This sketch shows a good example of what I have often called a fracture with "pond depression." The depression is greatest in the middle, and all the fragments slope towards the middle. It is one in which it is usually impossible to elevate without using the trephine or saw, since the several fragments wedge one another, and are firmly fixed. It is one in which the dura mater has a much better chance of escaping laceration than when one edge is alone depressed, and it is one in which supposing the scalp to be entire there is a good prospect of recovery. If the scalp be untorn operative interference should, of course, be avoided, but if the fracture be compound then in my judgment it is much better to trephine and elevate. It will be seen that the adjacent sutures, coronal and sagittal, have been started for a considerable length. This form of depression usually results from a blow with a blunt implement or the fall of some angular body upon the head.

In the case from which this sketch was taken the injury had been caused by the fall of a large lump of coal upon the head. The patient was an Irish labourer, aged forty-eight. He walked into the hospital, and had no head symptoms whatever. The scalp was torn, and we could ascertain the precise position of the fragments and the depth of the depression. As the latter was not great, and I judged that the dura mater was nowhere put much on

the stretch, I decided not to operate. A poultice was applied over the wound, and the man was made to keep his bed. About a week after the accident he became feverish, had severe pain in his head, and a rigor occurred. During the next few days he got worse, and became stupid and heavy. The limbs of the opposite side became weak. He had much sickness and was jaundiced. Subsequently there was effusion into his left knee-joint. He died of arachnitis with pyæmia on the sixteenth day. His friends refused to allow the head to be opened, but the symptoms had been so definite that no doubt could be entertained as to the diagnosis. This case occurred many years ago, and the treatment differed in two important points from that which I should now adopt. I should certainly now prefer to use the trephine and elevate the fragments, and having done so should apply sedulously a lead and spirit lotion instead of poulticing.

The local conditions which we should probably have disclosed, had an autopsy been permitted, are illustrated in Fasciculus V.

Fig. 2.—Linear Fracture with Contusion followed by Osteitis.

A linear fracture will be seen passing upwards in the right frontal bone from the supra-orbital notch. Around its termination an area is mapped out by shading, and in the middle of this a dotted circle indicates the position where the trephine was applied. The shaded border indicates the limits of the inflamed patch of bone and the part from which the pericranium was detached. Already a shallow furrow marked the commencement of a process which would end in exfoliation of the exposed portion. The patient died in the third week after the accident from pyæmia and arachnitis. The injury had in the first instance been supposed to be a trivial one, and she was not admitted into hospital until a fortnight afterwards when the secondary inflammatory processes had declared themselves.

I will give the full particulars of the case as they are very important.

Contusion of the skull with linear fracture and scalp-wound; no symptoms for ten days; arachnitis with hemiplegia of the opposite side; death about three weeks after the accident.

The following case is of great interest in reference to the connection between diffuse arachnitis and paralysis, and also as an instance of the almost entire absence of some of the symptoms which have formerly been supposed to attend arachnitis.

A woman, æt. 45, received an injury to the right forehead in a fall. During about a fortnight she had no symptoms, and went about as usual.

March	8	Tu.	Admitted hemiplegic and imperfectly conscious; incontinence of fæces and urine.
	9	W.	Left hemiplegia; partial unconsciousness; paralysis of left fifth and seventh nerves; trephining; incision through the dura mater; escape of small quantity of pus.
	10	Th.	Death.

Autopsy.—Inflammation of bone at seat of injury; extensive arachnitis over the whole of right hemisphere; softening of thrombus in the longitudinal sinus.

On the afternoon of Wednesday, March 9th, I was asked by the house surgeon to see a woman "who was dying," and who had been admitted under my care the previous day. I found Mrs. ——, a woman of about 45, totally paralysed in her left side, unable to speak, with an exceedingly feeble and rapid pulse. Her right frontal bone was laid bare over its eminence to the extent of a half-crown, and was quite dry. Her lips were dusky, extremities and nose cool, almost cold. A grumous fluid escaped in gulps from her mouth, but she made no effort to vomit. She appeared to be semi-conscious, and there was no coma nor any stertor in the breathing. She could not be got to put out her tongue, nor would she make any attempt to speak, but when asked where she had pain she raised her right hand to her right forehead, the seat of injury.

Her mouth was drawn slightly, but decidedly, to the injured side, and the left side of face was expressionless. It was with great difficulty that I could get her to execute any muscular movement of the face whatever, but once or twice she did so, and then she moved only the right side. I pulled her eyelashes, touched her cornea, pinched the skin, &c., and on the left side she never resented these in the least. When her left eyelids were held widely open there was not the least resistance on the part of the sphincter, and as soon as the fingers were removed the lids partially closed by elasticity, but not completely. As far as I could observe she never shut her left eye. From this I judged, firstly, that her left portio dura was certainly paralysed, and, secondly, that her left fifth nerve was probably also paralysed as regards sensation, either wholly or partially. Touching her left cornea never made her raise her right hand, which she could use. Now, on the right side it was quite different; here, on touching the cornea, a spasmodic effort, of some force, to close the eyelids ensued. If the lids were held apart there was resistance, and as soon as the fingers were removed the lids were closed completely. Her pupils were of equal and moderate size, and both acted on exposure, though only sluggishly.

Here, then, we had complete hemiplegia, including the face, with partial unconsciousness, and an injury exposing bone on the opposite side. There was no delirium. Occasionally she would pick the bedclothes, but not often. Her aspect was that of extreme debility and apathy rather than stupor. A few hours before my visit she had made signs to the nurse, by pointing to her ring, that she wished her husband sent for.

A few of the symptoms of compression by abscess were absent, such, for instance, as complete stupor, stertor, and dilatation of pupils.

I determined, however, to give her the chance afforded by an operation, and at once proceeded to perforate the skull at the site of injury. Having washed the exposed bone, we noticed extending vertically across it a small linear fissure. There was not the least displacement, it was a mere crack. I placed the point of the

trephine in this fissure; it was about three quarters of an inch to the right of the median line. The bone was quite dry, and the bone dust throughout the trephining might be blown away like that of dry wood. Not the least blood or moisture was seen until the inner table was touched, when a greasy fluid escaped. On removing the portion of bone two or three drops of pus escaped, and the dura mater was seen of a dull grey aspect and coated with lymph. It adhered to the bone, although there was a small quantity of lymph infiltrated between them. The dura mater did not bleed, nor could we observe that it pulsated in the least.

I carefully cut through the dura mater, and a few drops of pus at once escaped. I enlarged the opening, but no more followed. On carefully clearing away the blood and pus, and waiting a few minutes, we noticed that the brain pulsated with tolerable force.

Having satisfied ourselves that there was no large accumulation of fluid we desisted and covered the wound with a poultice. The woman appeared a little relieved by the operation. Her pulse had better vigour, though still very feeble. The symptoms as regards paralysis remained as they were before. No material change took place, and she died about twelve hours afterwards.

At the autopsy we found that the linear fracture noticed in the exposed bone extended downwards through the orbital ridge and into the roof of the orbit. There was, however, no separation of the bone anywhere—a mere linear crack. (The specimen shows other fissures, but these were caused in the autopsy.) The dura mater adhered to the bone, but beneath the injured part there was lymph effused between them. A certain quantity of turbid serum escaped as the skull-cap was removed, and the arachnoid cavity opened, but it was not large, and the hemisphere showed no signs of compression.

The arachnoid was, on the right side, everywhere covered with soft purulent lymph, which adhered both to its visceral and parietal layers. This was largest in quantity in front and near to the injured spot, and diminished as we passed backwards. In front it had passed under the falx and extended over the anterior part of the left hemisphere also. The tentorium on both sides was quite free from effusion, as was also the base of the brain everywhere. The parts at the base of the brain appeared perfectly normal; there was not a trace of effusion or congestion. The surface of the right hemisphere on the anterior part was bruised and ecchymosed, and on slicing it we found it much softened, almost, indeed, in a state of abscess. A little deeper at this part were numerous small isolated extravasations not larger than pins' heads. The left hemisphere was everywhere free from congestion or softening. It is to be clearly understood that on the left side the arachnitis extended only over the anterior part of the anterior lobe. There was no injury to any of the cerebral nerves. We especially examined the left portio dura and the temporal bone, but found nothing whatever.

The lungs were much congested, especially in their posterior lobes, but no purulent deposits were found. The kidneys, liver, spleen, &c., were inspected, but nothing discovered. The left Fallopian tube, more especially its fimbriated extremity, was purple with congestion, the opposite one being quite pale.

On slitting open the Fallopian tube it contained at one part a pale glutinous secretion, like mucus and pus. The ovary showed a recent cavity containing a clot (menstruation). The uterus was empty, its mucous membrane being congested. The bladder was immensely dilated, but nearly empty. It would easily have held a child's head, and hung in loose folds. It was very much congested, both externally and internally, being of a livid purple colour. Where its fundus touched the intestines and the parietal peritoneum a like kind of congestion had been induced, looking at first sight almost like extravasation. There was no bruising whatever of the muscles or skin.

I have no doubt that these appearances were induced solely by the paralysis of

the bladder and its consequent distension, but they were of very deceptive aspect, and in a medico-legal inquiry might have easily caused error.

The superior longitudinal sinus (see preparation) was occupied from its commencement to nearly the vertex of the skull by a greenish-yellow thrombus. This lymph adhered most firmly to the lining membrane, and could only be scraped off with great difficulty. It passed into the veins which entered into the sinus at this part. It had softened in the interior. The sinus was not completely occluded, although it must have been very nearly so. The posterior half of the sinus has a smooth lining membrane, but contained long clots of yellow fibrine, which adhered to the lymph in the anterior part and gradually tailed off into the sinus itself and its tributary veins.

The skull at the seat of injury was on its external surface marked by a very shallow line of ulceration just where the scalp adhered to it. In the specimen this is still seen. The portion thus marked out is dry and non-vascular, but its diploë did not contain lymph or pus.

The history of this patient before the time when I saw her was obtained under disadvantages, but the following facts may, I think, be relied on. The injury, a scalp laceration with exposure of bone, occurred nearly three weeks before her admission, and was received in a fall into a sewer. She attended as an out-patient at one of the hospitals, and there was for some time nothing to excite anxiety. Her husband was at this time in the London Hospital, and she frequently visited him, her head being covered with dressings. At length she had a shivering fit, and "head symptoms" gradually developed themselves.

When admitted the day before I saw her she was hemiplegic, and but imperfectly conscious; she spoke, however, several times quite rationally, and could move her right limbs. Her urine and fæces passed away without her knowledge. She had become much worse on the day I saw her, and was believed to be dying, as indeed she was.

Corollary.—That arachnitis over a large superficies of one hemisphere will, without actual compression, induce paralysis of the opposite side. That this hemiplegia will involve the face (fifth and seventh nerves) as well as the extremities. That it will not be attended by coma or complete loss of consciousness.

I wish particularly to ask attention to the fact that in this case the osteitis which led to the patient's death did not supervene whilst she was a hospital inmate, but whilst she remained at her own home. It was not due to contagion, but was one of the not unusual results of contusion of bone. The case is almost exactly like those to which the term "Pott's puffy tumour" has been given, with the difference that, inasmuch as the scalp was lacerated, no external abscess or "puffy tumour" could possibly form. In other respects it is an exact counterpart of the cases in which the celebrated Bartholomew's surgeon was so successful with secondary trephining. Although we adopted the practice which Pott recommended it was not with his success, but with the more usual result of finding that the local condition did not admit of relief. Instead of a large circumscribed abscess under the inflamed bone we found diffuse and extensive meningitis, the amount of fluid being quite trivial. There can be no doubt that in modern practice it is very

uncommon to find large abscesses in cases of this kind, and secondary trephining is almost invariably, as it was in this instance, an abortive operation.

Fig. 3.—Compound Fracture with Considerable Depression of One Edge of the Bone.

In this portrait we have fracture of the anterior part of the right parietal bone, a large fragment being quite detached, and its front border depressed. The coronal suture on the left side is also widely started. The effect of the depression had been to tear the dura extensively, but not, perhaps, as might have been expected, just below the edge, but considerably in front of it. At the moment the violence was inflicted the depression produced was probably much greater than that found subsequently. I must again express my regret that trephining was not performed, although probably the injury to the hemisphere was too great to have permitted of recovery.

The following are the notes of the case:

Compound fracture with depression; aphasia (?); venesection on the third day; death from contusion of the brain.

July	5	Tu.	11.30 p.m.—A woman admitted in collapse with compound and depressed fracture of right parietal bone. No operation performed.
	6	W.	Partially rallied, but still feeble. Restless and partially conscious. Does not speak, and does not use her right limbs so much as the left.
	7	Th.	Incomplete reaction. Restless. Does not speak, though she appears to be conscious.
	8	F.	Reaction complete. Surface frequently hot. Pulse 86. Venesection. Increased rate of pulse.
	9	S.	Much more feeble. Pulse 120. Surface cool. Death near midnight, having lived ninety-six hours.

Autopsy.—Contusion of upper surface of left hemisphere and under surface of middle lobe of same. Laceration of the dura mater at a little distance from the depressed fracture.

Mary Fitzgerald, æt. 22, a single woman, was found in a state of insensibility in the hold of a ship. It was not known how long she had been there. She had probably attempted to cross the vessel in the dark and whilst partially intoxicated. When found she was quite insensible and almost cold.

She was carried at once to the hospital (during the night of July 5th), and I was sent for to see her shortly after her admission. I found her in a state of collapse;

the extremities cold, the face pale, the nose cold, lips rather dusky. She was insensible, but moaned occasionally and moved her limbs. The respiration was feeble, and there was not the slightest stertor. There was a considerable wound on the right side of the vertex, exposing part of a large depressed fracture. The fragment depressed was two inches long by an inch square, and at no part was it depressed quite to a depth of the thickness of the bone. As there was no evidence of compression, and as the depression was diffused over a considerable area and not great at any one part, I determined not to trephine. Warmth was ordered to be applied to her feet, &c.

6th, 4 p.m.—Hands cool, face pale, pupils of moderate size, lips rather dusky; she appears unwilling to use her right arm, but it is not absolutely powerless. She has been very restless, and several times has got half out of bed; she did not, however, stand, and the nurse's impression is that she found she could not stand. She can draw up her right leg, but does not do so readily. There has been no sickness. At present she is lying quite quietly in a state of partial consciousness. She has never spoken.

7th.—Is better. The nurse says she has several times tried to make her understand what she wanted, but has never spoken. Her pulse is still feeble. She has decidedly less power in the right limbs than in those of the other side, and her face is a little drawn to the left. The right portio dura is not paralysed, but seems much more feeble than the left.

8th.—To-day the reaction is complete; her face and ears are flushed and hot; hands hot and dry. Pulse sharp and full, but not hard, about 86. Several doses of opening medicine have been given without result. She is a little restless and frequently moans. She looks in one's face when questioned as if she understood, but she will not try to speak. I directed her to be bled from the arm; about twelve ounces were taken from the right arm in the recumbent position. The chief effect was to increase the frequency of the pulse, and render it more feeble. It rose to 114. She was less flushed. Almost immediately after the bleeding her bowels acted very freely.

9th, 10 a.m.—Her aspect is better, that is, she looks more conscious and is less flushed, but her nose and cheeks are quite cool. The hands are warm, not hot. The lower extremities are hot, but rapidly cool when exposed. Pulse 120, feeble.

From the time of the last note she became more and more feeble. Her face cooled and the hands became cold. The lips were livid, and the respiration very feebly performed. She died in the night of July 9th, near midnight.

At the autopsy we found a depressed fracture of the right parietal bone. The fragment was large, and very firmly impacted. The dura mater was not torn on this side, but was stretched on the edges of the depressed portion. On the other side, almost close to the falx, was a large crescentic rent in it. There was a considerable blood clot between the bone and the dura mater of the left side, near to the laceration. The under surface of the left hemisphere was contused, lacerated, and ecchymosed. The chief contusion was of the under surface of the middle lobe at its anterior part. The left hemisphere, on its upper surface over the anterior two thirds, that is, at the part corresponding with the laceration of the dura mater, was greatly contused and softened. When cut its cortical layer was found broken down into a soft brownish pulp. A few small ecchymotic spots were found in the adjacent medullary substance. The lungs were congested posteriorly.

Fig. I.

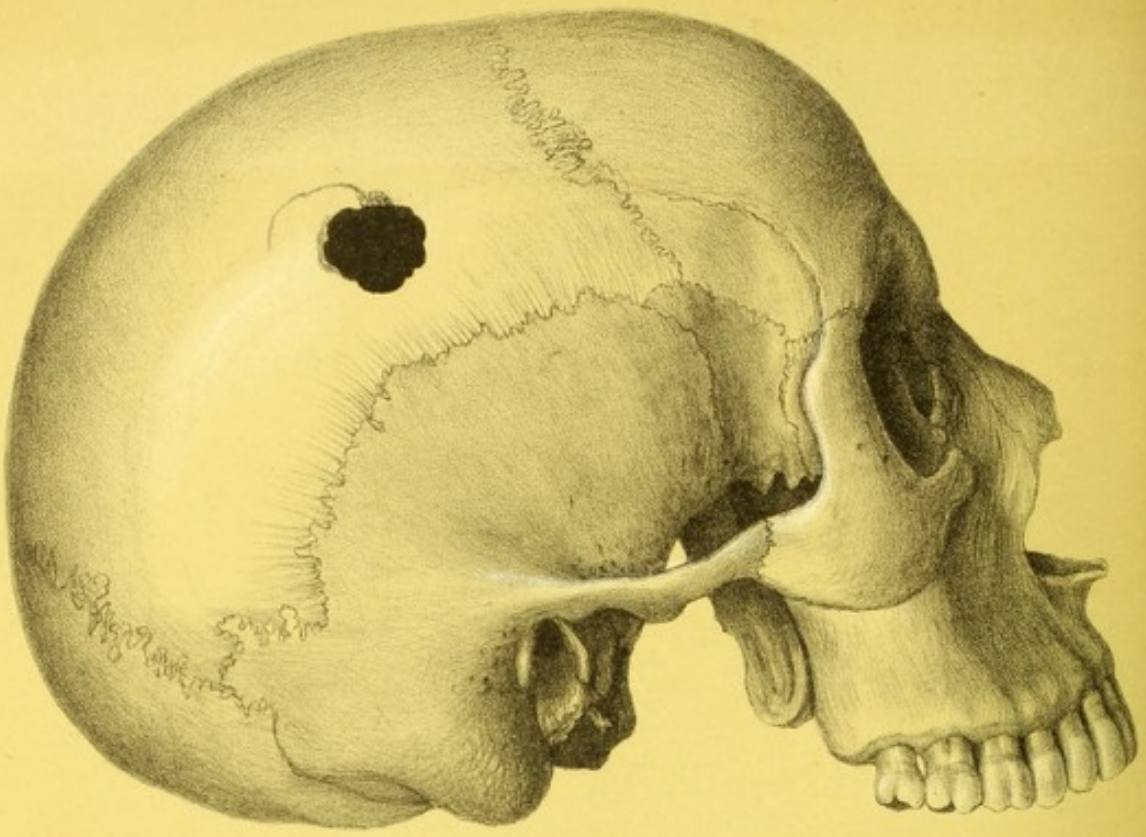

Fig. II.

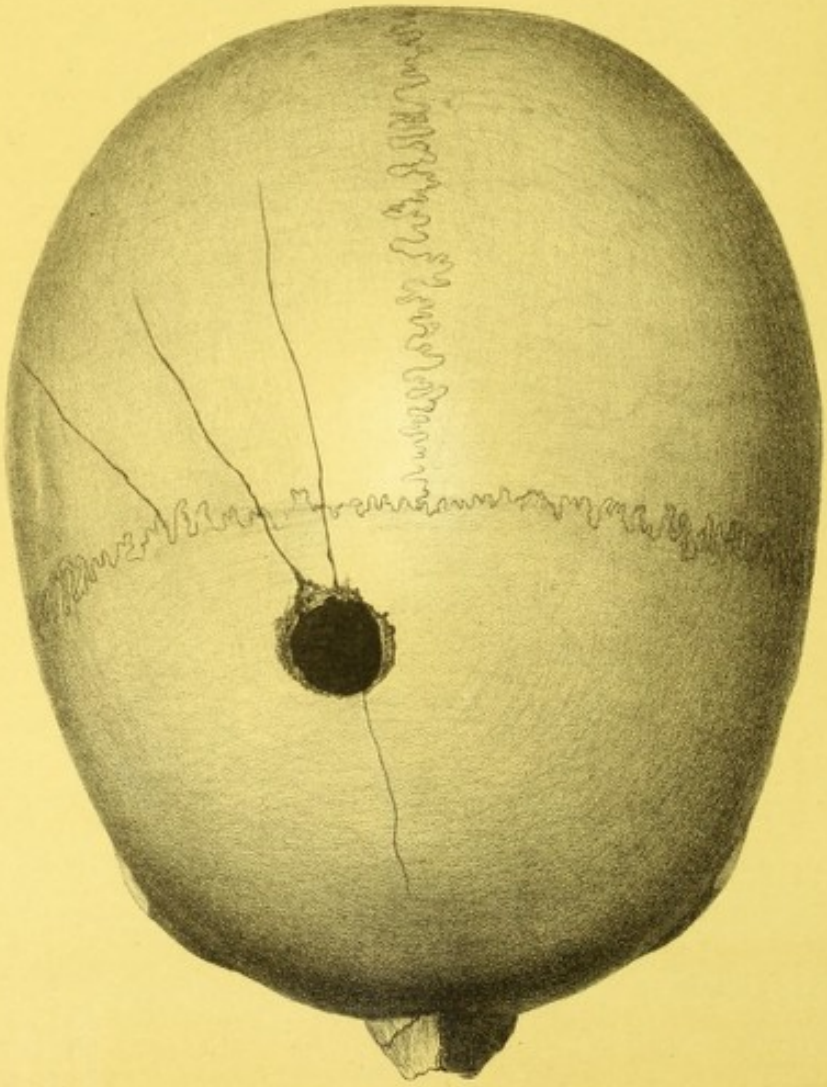

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PLATE XXXIII.

BULLET PERFORATIONS OF THE SKULL.

Fig. 1 shows the exact size and shape of a hole in the parietal bone, produced in the dead body by a round bullet fired from above and obliquely from behind. It will be seen that the aperture is not quite round, being slightly lunated at several places. At its posterior edge the external table is carried off so as to expose over a small extent the inner one, whilst at the other parts the inner table was extensively removed so as to leave an overhanging border of the outer one. These conditions are due to the obliquity of the direction of the missile.

Fig. 2 shows the results of a similar injury. The bullet entered the frontal bone obliquely from without (behind and above). The external table is carried away from a narrow rim round three fourths of the aperture, whilst it overhangs at the remaining fourth. The internal table was extensively fissured. Four narrow fissures are observed in the adjacent bone. Of these, three pass from the aperture, but the fourth does not come within an inch of it, but ends in the coronal suture.

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STATE OF EYES AFTER PARALYSIS (FROM LACERATION)
OF THE CERVICAL SYMPATHETIC NERVE.

J. Burgess, del. et lith.

W. West & Co. Imp.

LEEDS & WEST RIDING
MEDICO-CHIRURGICAL SOCIETY

PLATE XXXIV.

STATE OF THE EYE IN VASO-MOTOR PARALYSIS.

The chief object of this Plate is to illustrate the peculiarities displayed by the eyelids and pupil in complete paralysis of the vaso-motor nerve on one side of the neck. The upper figure shows the eyes in full light, the lower one when as much shaded as possible consistently with the artist's convenience. They are, of course, from the same patient, and were executed on the same day. Paralysis of the sympathetic may occur under various conditions, and may sometimes become a symptom of very great importance; and on this account, as well as because some inaccuracies are frequently met with respecting it, I have thought it advisable to demonstrate, as far as pictorial art can do it, the precise conditions. The case was, I may here say, an uncomplicated one, the roots of the cervical sympathetic having probably been torn across. The details of the case, which is one of great individual interest, will be given subsequently; for the present I have to ask attention to the symptoms displayed, and which, let me add, are common to this lesion, whether produced by injury to the cord, by the pressure of a tumour or aneurism in the nerve trunk, or by direct laceration of its fibres.

A careful inspection of the upper plate will, I think, reveal only a somewhat diminished fulness of the left eye. It was on the left side that the injury had occurred, and it will be seen that the palpebral opening is slightly less in depth than on the right. A greater depth of cornea and sclerotic is seen on the right; the right eyeball looks, indeed, a little the larger, or at any rate its lids are rather more widely open. The pupils of the two eyes are of exactly the same size. If we turn to the lower figure (done in shade) we shall see at once that whilst the same peculiarity as regards the wider opening of the lids on the right side remains, we have now added the fact that the right pupil is twice the size of the other. This difference has been brought about by the dilatation of the right pupil (uninjured side), not by the contraction of the left. If we measure the pupils according to the scale of

catheter sizes we shall find that in the upper figure both are at the size of No. 4, and that in the lower one the left remains at No. 4, whilst the right has dilated to No. 9. One of the inaccuracies which is frequently repeated respecting the effect of vaso-motor paralysis on the pupil is that it causes contraction. It is clear from this demonstration that it simply prevents dilatation. When in full light the pupil of the uninjured side is moderately contracted, then there is no difference, and a difference only becomes apparent when by shading the eyes the uninjured one is allowed to dilate. A clear understanding on this point is essential, as otherwise this symptom may easily be overlooked. If the patient be examined only in full daylight or by the aid of a candle in bed, the surgeon may easily be misled into believing that vaso-motor paralysis is not present, when in reality it only requires to be looked for in the proper manner. The pupil in vaso-motor paralysis is not "contracted," it is simply unable to dilate, maintaining usually a condition of immobility. Its size varies with the age and other peculiarities of the patient, but it will mostly be about that of the healthy eye when in full light. I will not deny that it may sometimes be somewhat less; but from observations of a considerable number of cases, I believe the above statement will be found fairly accurate.

We have, then, two eye-symptoms which denote vaso-motor paralysis in the cervical region:—(1) Diminished palpebral aperture, and (2) inability of the pupil to dilate when shaded.

The first of these is much less conspicuous in the portrait than it usually is in the living patient. In the man from whom this sketch was taken several observers, who were not aware of the peculiarity, drew my attention to the fact that one eye looked smaller than the other, and this point is well shown in a stereoscopic portrait which I possess. Its explanation is to be sought, I suppose, not in any paralytic state of the sphincter, but rather in that of certain extrusor fibres existing, but not easily demonstrated in the human orbit. The symptom is well known in the lower animals, and is in them more pronounced than in man. These fibres being paralysed the recti muscles draw the eyeball a little deeper into the orbit, and hence the appearance of smallness of globe, and of slight drooping of the lids. This symptom is present from the first, and it continues to the last without diminution or increase, however long the case may last. In the present instance I had the patient under observation for many years, and the conditions remained precisely the same. The second and more conspicuous symptom (inability to dilate on the part of the pupil) is

easily explained by the paralysis which exists of the dilating fibres of the iris. The circular fibres supplied by the third nerve remain intact, but they show no tendency to throw the now unopposed constrictor into spasm, but leave it in a passive state, such as would suit the organ for an ordinary and moderate amount of light. If exposed to a very bright light a further degree of contraction may be produced, and by calabar bean the contraction may be increased to an extreme degree. Thus, it is clear that the condition is one of paralytic myosis and without any degree of spasm.

In addition to the two symptoms just described, and both of which may be appreciated in the portrait, there are certain others to be inquired about in connection with paralysis of the cervical sympathetic. We have to ask,—1st, as to any evidence of dilatation of blood-vessels; 2ndly, as to alteration in vision (whether due to defective power of accommodation or other conditions); 3rdly, as to any lesion in nutrition; and 4thly, as to glandular function.

Experiments on animals have shown that when the sympathetic is divided the blood-vessels dilate, and that an increase of temperature results in the overflooded parts. It is known, however, that the increase of temperature is usually only a temporary condition. In the human subject I feel sure that it is rapidly followed by a slight diminution. It is not very often that we have opportunities for observing in man cases in which the vaso-motor and it alone is paralysed. In that which I am about to record we had in the same patient in one region paralysis of the vaso-motor only, and in another of the vaso-motor in conjunction with the nerves of motion and sensation only. It becomes, therefore, of extreme interest to note what followed as regards circulation and nutrition in the parts which were simply deprived of the services of the vaso-motor filaments.

I have already stated that through more than ten years we had conclusive proof, in the state of the pupil, that this nerve remained wholly paralysed. Now, during this long period there was never the slightest evidence of impaired nutrition, nor did the circulation suffer in any marked degree. The cheek on the paralysed side was not redder than the other, and after repeated careful ophthalmoscopic examinations at long intervals, I was never able to appreciate any difference in size of the retinal blood-vessels. The ear on the paralysed side was also a little cooler than the other. It is scarcely possible to estimate the temperature of the ear beyond risk of fallacy by the thermometer; but by the touch of many observers on different occasions it was established, I think, beyond chance of error, that the left ear was always a little cooler

than the right. The difference was but slight, and it was never attended by any perceptible impairment of the circulation, that is to say, the ear was never dusky. Probably the short period of increased temperature had long passed over before I saw the patient. I am far from wishing to lay much stress of the relative decrease of heat in the affected ear, for it may easily have been due to some congenital difference, and it probably did not amount to more than one or two degrees. It was not nearly so marked to the touch as was that between the two hands. In the latter we had in addition to the vaso-motor defect paralysis of the sensory and motor trunks. At a later period (six years) there was no difference between the two ears, whilst between the hands it amounted to no less than twenty degrees. At this date the scapular muscles, the biceps, and the serratus magnus had to a large extent recovered. This recovery of the biceps was to me very interesting, since it supports an observation which I have repeatedly made in cases of injury to the cervical spine that the biceps and its two associates may escape when all the other muscles of the arm and forearm are wholly paralysed. This results from the fact that it receives its nerve-supply higher up than the others; and in the present instance we must suppose that the uppermost nerve-roots had been but partially torn. The following are the details of this important case:

NARRATIVE OF A CASE IN WHICH IT IS PROBABLE THAT THE ROOTS OF BRACHIAL PLEXUS WERE TORN THROUGH, AND PERMANENT PARALYSIS OF THE UPPER EXTREMITY AND THE CERVICAL SYMPATHETIC WAS PRODUCED.

There is a class of cases in which, after a violent blow on one shoulder, with perhaps fracture of the clavicle, the patient becomes completely and permanently paralytic in the whole of the upper extremity. The hypothesis, in explanation of this, is that the nerve-roots constituting the brachial plexus have been torn through, and with them the roots of the cervical sympathetic, which is well known come out in the lower cervical and upper dorsal region.

I have seen three or four examples of this state of things, but the following is the only one in which I have had opportunities for careful observation over an extended period. If the eye be examined in such cases the symptoms of paralysis of the sympathetic will usually be found, and their presence tends in a very conclusive manner to support the diagnosis. The knowledge of the true nature of this symptom is in these instances of the utmost value in enabling us to diagnose between injury to the nerve-trunks and laceration of their roots. I am not aware that any record of a dissection has yet been made,* but it may be inferred from the implication of the sympathetic that the nerves give way at their roots and not in any part of their trunks. If the lesions were in the latter, then the vaso-motor filaments, which are given off from the anterior roots, would escape.

* I do not, indeed, know where to turn for any mention of the subject or of similar cases. No doubt such is to be found, and I cannot profess to have made any very extended search.

Fall from a height, striking the head and shoulders against poles of scaffolding. Slight concussion of brain. Rapid recovery from concussion. Permanent paralysis of the left upper extremity, both as to motion and sensation. Tract of skin supplied by the intercosto-humeral, not affected. Paralysis of cervical sympathetic with contracted pupil and retracted globe. Sight almost perfect. No congestion of the globe.

A very healthy man named Sexty, æt. 42, was admitted under my care at the London Hospital, in December, 1862, on account of paralysis of the left arm consequent on injury. His arm hung useless by his side, and all its muscles were much wasted and flabby. The wasting of the muscles was especially evident at the shoulder-joint where the complete atrophy of the deltoid allowed the acromion to project and left a remarkable hollow below it. The head of the humerus hung very low, and, at first sight, the idea of dislocation into the axilla suggested itself, but this was soon corrected by the observation that the deltoid was absent, and that the axis of the humerus was quite parallel with the chest.

He gave me the following particulars of his accident, which had happened five months before. It occurred in a fall from some scaffolding, the whole height being sixty feet, but the fall being broken several times by striking against the projecting beams of wood. He was taken up quite insensible and carried to the Poplar Hospital. Those who saw him fall told him afterwards that his arm and neck were both very much twisted. He believes that he was insensible,* more or less, for two days afterwards, but on the Friday following (the accident was on a Tuesday) he was so far recovered that he left the hospital at his own wish and walked home, a distance of three quarters of a mile. As far as he is aware he never had any difficulty with his urine or fæces, nor had he the slightest impairment of either lower extremity. His intellect, memory, and special senses have all been quite perfect since the accident, and were so as soon as he had fairly recovered from the first stunning. When he left the hospital his whole arm was very much swollen and very painful, and when he got home he had "erysipelas and abscesses" in it. There is a large scar in the front of his elbow where the abscess opened. Although he complains of having suffered much pain in the arm, during the attack of inflammation, yet he avers that it has been quite paralysed as at present, as regards both motion and ordinary sensation from the day of the accident. During the first fortnight he was at home he had poultices applied to his neck, because it was stiff and painful, but he suffered nothing whatever in his head. He was assured by the surgeons who attended him that he had no broken bones. In spite of persevering treatment, by electricity and other measures, he has not made the slightest improvement.

Present state (five months after the injury).—In excellent general health and every function perfect excepting those concerning the innervation of his left arm. He has not the slightest power of motion in this limb. The contour of most of the large muscles can be made out, but they are all greatly diminished in size. He cannot use his pectoral muscles, nor the *latissimus dorsi*, and these muscles are decidedly wasted. The *trapezius* and *levator anguli scapulæ* seem in good condition. The *rhomboidei*, and *supra-* and *infra-spinati* are, on the contrary, powerless. All the motions of his head are perfect and easily performed. No difference can be detected in fulness on the two sides of his neck, with the exception that there is on the left side a decided hollow between the three upper dorsal vertebræ and the scapula.

* This was afterwards contradicted by the House-surgeon of the Poplar Hospital, who informed me that the man never was insensible, not even at the time of his admission. I was further made acquainted of an interesting fact corroborative of the diagnosis I have given—that his shirt was found torn transversely across over the injured shoulder, near to the neck.

Sensation.—Below the elbow he has not the slightest degree of cutaneous sensibility, and can permit deep pricking without knowing it. On the outer, front, and posterior aspects of the upper arm the loss of sensibility is also complete. In the axilla sensation seems perfect, and from the axilla downwards to the inner condyle he can also feel well. Over the shoulder-joint, above and in front, sensation is lost, but he can feel well behind it and across to the spine from the infra-spinous fossa. Over the supra-spinous fossa he cannot feel in its outer half, and the line of commencing sensibility at about the mid-distance from tip of shoulder to spine is very abrupt. Wherever he has sensation at all it seems as perfect as in corresponding regions of the opposite side, and very often the abruptness of the line where it commences is remarkable.

Temperature. Subjective.—He is aware that the paralysed arm is a little colder than the other, but in the night he says it is often hot and burning. *Objective.* The hand, foramen, and upper arm are all decidedly cooler than the other and in about equal degree; at the shoulders no difference in heat can be detected. The thermometer confirms these impressions.

Front of shoulder-joint . .	right 91°	left 89°	difference 2°
Above elbow-joint (outer side) .	„ 88°	„ 83°	„ 5°
Below elbow (inner side) .	„ 88°	„ 84°	„ 4°
Cleft between middle and forefinger	„ 88°	„ 83°	„ 5°

The capillaries of the skin are evidently much relaxed, and the skin is brick red, neither florid nor livid; somewhat mottled. When emptied by pressure the capillaries refill slowly. The appearance of wasting of the limb would, I think, be very much greater were it not that the skin is thickened and turgid with blood. It does not actually pit, but there is a tendency to œdema in a slight degree. Under galvanic excitement the muscles did not act at all.

His pupils in a bright light are of equal and normal size.

It will be seen that, excepting slight concussion at the time, we have nothing in the least denoting cerebral lesion. The paralysis is of the parts supplied by the brachial plexus and by the cervical sympathetic and of those only. The escape of the intercosto-humeral nerve is clearly proved by the retained sensibility of the integument supplied by it. We must also note that the paralysis is most complete, and keeping clearly in mind its completeness in degree and abrupt limitation as to extent, we can, I think, come to no other conclusion than that the nerve-trunks, or perhaps both their sensitive and motor roots, have been injured (torn across), and that the lesion is not central.

The following are some additional details which I noted on different occasions during the year following the accident:

September 16th, 1863.—His condition is much the same as heretofore, except that the arm is thinner. This thinning seems to be more from diminished œdema of the cellular tissue than direct muscular wasting. The hand is still somewhat œdematous. The anæsthesia and loss of motion are still absolute. Temperature much as before, *i. e.* several degrees below that of the other. The back and outside of the elbow feel much colder than any other part. During the last few months I have on many occasions tried the temperature of his ears, and have always found the left slightly but very positively cooler than the other. This evening three observers were all unanimous in their impressions in this point. I carefully examined his chest, and there is, I think, no doubt that the serratus magnus on the left side is quite atrophied. The trapezius and levator anguli scapulæ are in good condition.

Eye.—The left eyeball looks smaller than the other, being retracted, and the palpebral aperture diminished. He says that the sight has improved of late, but considers it still not quite so good in this eye as the other. On trial, however, first in a strong light and then in a duller one, we found that he could see about equally

well with each. The left pupil is much smaller than the other and does not dilate materially in the shade; it does, however, act somewhat, more especially it contracts when exposed to a very bright light. It dilates well with atropine. The fundus is normal. In good light he can read equally well with either eye; he considers the left a little dim. With the ophthalmoscope we could not discover any alteration in the size of the retinal arteries.

November 23rd, 1863.—The arm remains in the same state. It is much cooler than the other. The capillary circulation is most feeble. On pressing a portion of skin until it is pale, two or three minutes are required for it to regain its colour. The finger-nails and the thumb-nail especially are becoming curved, and the finger-ends clubbed—an interesting additional proof that this symptom is produced simply by retarded circulation. The finger-ends of the sound hand contrast most markedly with those of the paralysed one.

The man having never learnt to read we had difficulties in testing his vision accurately. The right appeared to be perfect both for distance and near, and the left a little defective for both. The right was not improved for near objects by convex glasses; he could see brilliant without them and no better with them. With the left eye he could just see a few words of brilliant at 12″, but complained that he could not see them long. With + 20 he seemed to have some advantage, but not much. At 20′ with left eye he only saw letters of Snellen 40, and he was not improved by glasses. His own statement was that there was "a little mist before the left."

We must bear in mind that the vaso-motor nerve of the left internal carotid is probably paralysed. In a former note I have mentioned what he stated as regards the influence of stimulants. This condition of susceptibility still continues; a small quantity of beer, especially on an empty stomach, at once disturbs his head and makes him confused. He also frequently suffers from giddiness. Before the accident he never felt giddy; now he has an attack once every two or three weeks, and often it lasts for some time—ten minutes or more. The usual time is on rising from bed. All the things in the room appear to be going round, and he is obliged to cling to the nearest support in fear of falling. He finds that to stand up or to walk about, taking firm hold of the furniture, &c., is the best plan to get rid of it. Probably we have here an interesting illustration of the cause of one form of vertigo—the inability on the part of a tract of the vaso-motor nerve to regulate the calibre of the cerebral arteries, and thus control the supply of blood to a certain portion of the brain.

Note of condition six years after the accident.—The following notes were taken at an examination of the patient one evening at my house six years after the injury, and are of great importance, as showing that some improvement in certain muscles had taken place in the interval. I had seen the man at the hospital repeatedly in the interval, as he was always willing to attend for purposes of clinical teaching. The improvement in sensation and in the power of some muscles had been repeatedly observed. The state of the paralysed hand varied much with the season, but it was always much colder than the other.

Symptoms as regards the eye are as at first. The pupil never dilates widely. At 20′ vision with right is perfect, with the other $\frac{20}{40}$, and not improved by glasses. The trial was made by candle light.

He cannot read, and it is difficult to test his sight accurately, but there can be no doubt that he is a little amblyopic in the left eye. The defect may possibly have been due to inability on the part of the pupil to dilate, for at the time it was not more than half the size of the other.

With the right eye he reads ——— easily, and is not improved by convex glasses. He can just read a few words with the left, but complains that he cannot keep it up. The advantage from + 20 is not definite.

He has sensation on the back of the thumb over the metacarpal bone, not over

the phalanges, also over the metacarpal bone of forefinger; it is wholly lost in all other parts (radial-nerve). He can use his biceps muscle and probably the coraco-brachialis and brachialis anticus, but none others in the arm.

The muscles of the scapula and the pectoral muscles act vigorously, as also the serratus magnus and rhomboidei. The paralysed hand has a very feeble capillary circulation. When the skin is made pale by pressure it remains so for some time, whilst in the other hand the vessels refill instantly. Temperature 95° and 75° respectively between middle and ring fingers of the right and left hand.

He can feel fairly in the integument of the upper arm, excepting near to the external condyle and in a line extending upwards from it. The arm measures 9½ against 11½, and the forearm 8½ against 11 (sound limb).

He still complains much of frequent giddiness in the head. Before the accident he did not suffer from it. He thinks that during the last two years the attacks of giddiness have been less frequent.

Although his forearm is so completely paralysed, yet by using his biceps he can strike hard with it. His employer told me that he had knocked a man down with it, and he himself admitted that he "could give any one a good clout" During the half hour that he remained in my warm room his hand gained considerably in temperature.

His case seems to illustrate the fact that the cerebro-spinal nerves have to do with temperature much more than the vaso-motor ones. The vaso-motor of the head is undoubtedly paralysed, as proved by the state of the eye, yet the two ears are alike in blood supply and in heat, and never even in the early stages varied to the same extent as the hands. There is now no material difference between the two ears in any respect.

He complains much of pain and heat in the hand. The pain is often very severe —a "gnawing deadly pain." In cold weather it gets livid and swells very much. Even in summer he is obliged to keep it wrapped up in woollen mits.*

He cannot move any of the fingers in the least, and they remain slightly flexed. The nails are uneven and rugged, and he says that they grow much faster than those of the other hand.

Sometimes the arm aches as high as the shoulder in cold weather, but usually the aching is confined to the hand. The pulps of the fingers are not in the least wasted, rather, indeed, swollen, but the appearance of "clubbing" is less marked than it was five years ago.

I much regret that in this case no experiments were ever made as to the condition of the glandular system on the injured side of the face. I can speak to the facts that the eye never looked in the least dry or dull, that we never noticed the least difference in appearance in the cheeks, nostril, or lips, and that the man never complained of any symptoms of this kind. As to perspiration I can say nothing. Very interesting cases have been recorded by Dr. William Ogle† and by Dr. Payne,‡ in which, in addition to the conditions described in my case, there was inability to perspire on

* Paralysed vessels are unduly influenced by external conditions. Cold contracts them and heat dilates them in degrees much greater than would be the case with healthy ones; they cannot steady or equalise the circulation. It follows that great discrepancies will be met with in observations on temperature in paralysed limbs, and the utmost caution is needful in making such, or in drawing inferences from them.

† See 'Medico-Chirurgical Transactions' for 1869.

‡ See 'St. Thomas's Hospital Reports.'

the affected side, and also during excitement a very marked difference in vascular turgescence, the paralysed side remaining pale when the other flushed. On reading Dr. Payne's paper in 1875 I at once wrote to my patient (who for some years had resided in Lincolnshire) to ask him to come to town and let me experiment. I received from one of his friends a reply informing me that he had unfortunately died suddenly a few weeks before. I did not ascertain anything as to the cause of his death.

In Dr. Payne's case very remarkable differences were noticed in the appearance of the two sides of the face, but although it is clear that the sympathetic was involved, it is not so certain that it alone was implicated. The conditions were present at birth, and there was no proof of injury. Moreover, although peculiarities in the skin were conspicuous, and were of degree and kind which I have never witnessed after division of the vaso-motor, this latter was not wholly paralysed; for although the pupil was "decidedly smaller than the other," it "expanded when shaded from the light." I therefore hesitate to accept this case as illustrating beyond doubt conditions which may be produced by paralysis of the sympathetic. It is just possible that there may have been a congenital condition of skin, &c., allied to what we observe in unilateral morphœa. Still, I must admit that Dr. Payne's case gains support, as an instance of vaso-motor paralysis, from what was proved in Dr. William Ogle's. In the latter the nerve had been destroyed by an abscess (possibly syphilitic) two years before the observations were made. At that date perspiration could not be excited on the affected side, and the man complained of dryness in the mouth and nostril of the same. That perspiration could not be produced was proved by repeated and most definite experiments, the result of which showed the most accurate limitation of the perspiratory function by the middle line of the face. Although so long a period had elapsed the ear and cheek were still slightly warmer than those of the opposite side; but Dr. Ogle proved that this relative condition was reversed by exercise. When excited the healthy side became flushed, hot, and moist, the paralysed one remaining as it was, and being relatively cool, dry, and pale. It thus seemed clear that the blood-vessels were paralysed and could neither dilate nor contract under the normal excitement. Dr. Ogle records that the pupil in his case was "very much contracted," even when both were exposed to light. With these exceptions the symptoms presented in this case were just like those in mine. The retinal vessels were not dilated, and there was no tendency to nutritional disturbance anywhere. It remains, therefore, for future

observers to ascertain whether the arterial paralysis which results from permanent and complete destruction of the cervical sympathetic always entails loss of the ability to perspire and dryness of the mucous membranes. It is quite possible that the symptoms may not be always the same, and it is very necessary to keep in mind that they must vary with the nature and stage of the lesion, with its degree of completeness, and with the possible occurrence of repair. I am not aware that any one has noticed any derangement of function in the sebaceous glands (production of acne, comedones, &c.).

It is due to myself to state that the case which I now re-publish (with additions) was recorded, together with other facts and some general comments on the pathology of the cervical sympathetic,* several years before Dr. Ogle's and Dr. Payne's papers. Both these authors had evidently overlooked my paper, and I am sorry to say that I paid both theirs a similar compliment until they were brought to my notice by a friend in the spring of 1875. Had it not so happened, I should certainly not have neglected to note the condition as to perspiration, &c., both in the preceding case and in the one with which I shall conclude.

In the following case the sympathetic trunk in the neck was as neatly divided by a suicidal wound as if it had been done for an experiment. The conditions produced were precisely those of the other case, and the Plate would apply as well to the one as the other. The patient remained under observation only a few weeks. The notes are exactly as written out by my house surgeon.

Vertical suicidal wound of throat, with division of the sympathetic trunk.

Emily Warwick, æt. 32, was admitted April 13th, 1875, under Mr. Hutchinson's care, into the London Hospital. The patient's friends said that for some time before admission she had been mentally depressed, and they brought her to the hospital because she had just attempted to commit suicide. A table-knife was found in the room, and they believed it was with it that the attempt had been made.

There was a *vertical* incised wound of the throat, about an inch and a half long, looking just like a tracheotomy incision, and extending over the cricoid cartilage and the upper part of the trachea. Leading off from the top of the wound were two scratches, as if two attempts had been made. The finger could be passed in and laid directly on the left common carotid artery, not passing behind the artery nor to the right side of the neck. There was very little bleeding, and the trachea was uninjured.

As she was lying in the shade the left pupil was contracted, but not minutely. When a lamp was brought near the pupil contracted a little more, but it could not be made to dilate beyond a certain point, even when the eye was so completely shaded

* See "Clinical Notes on Paralysis of the Ocular Branches of the Cervical Sympathetic Nerve," 'Ophthalmic Hospital Reports,' vol. v, 1866.

as to be but just visible. The right pupil was apparently normal. It was much larger than the left, especially in the shade. It contracted well when exposed to bright light, and still remained rather larger than the left.

The palpebral fissure was definitely smaller on the left side than on the right, and this was due to a slight raising of the lower eyelid as well as to the falling of the upper.

The left eyeball was more sunken than the right, so that several uninformed observers, who were asked to look carefully at the eyes, remarked on the prominence of the right.

There was no flushing of the face or ear, and there was no perceptible difference to the touch in the temperature of the opposite sides. Thermometers were put in the ears, but they did not register any constant difference.

The direction of the wound to the left was afterwards accounted for by the fact that she was left-handed.

In a fortnight the wound had healed, and she left the hospital, still having the partial closure of the eyelids on the left side, the sinking of the eyeball, and the undilating pupil.

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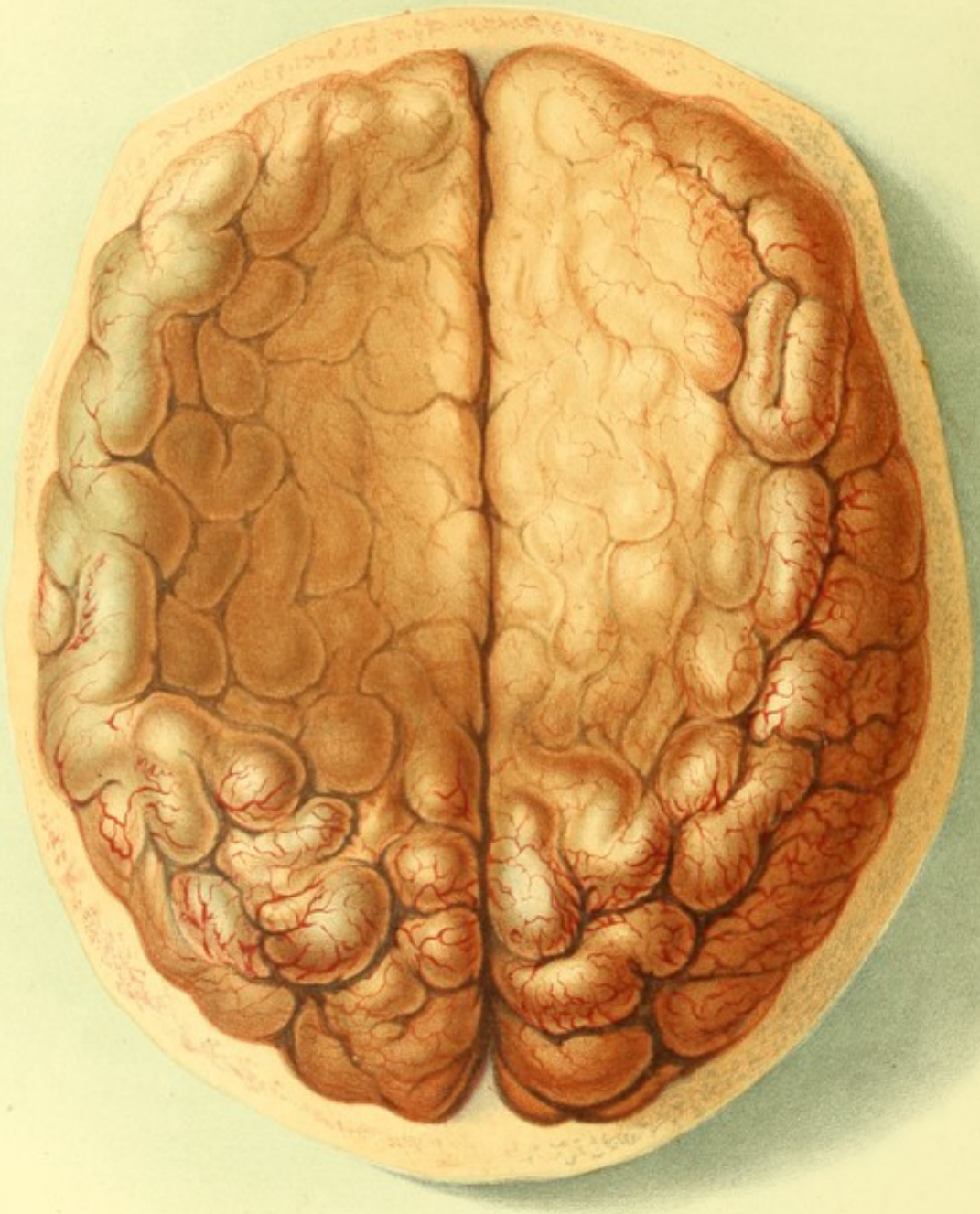

DEPRESSION OF BRAIN, BY COMPRESSION FROM ABOVE.

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PLATE XXXV.

COMPRESSION OF BRAIN BY ABSCESS BETWEEN DURA MATER AND SKULL.

The portrait shows a deep hollow in the middle of the upper part of the brain. It is deep enough to contain a fist, and involves the two hemispheres equally. The drawing was made on the post-mortem table immediately after the head was opened, and it shows without exaggeration the precise condition of things. There was no arachnitis, and the squeezed convolutions are seen to be quite smooth and bright. I will first give the notes of the case, and then append some comments.

The case is one of very great importance in reference to the diagnosis of compression of the brain. There could be no doubt that the man died directly from the pressure of a large accumulation of matter within the cranium, between the bone and dura mater. Yet his symptoms were those of irritation rather than compression, intense wearing pain being the chief one. He was quite conscious until within two days of his death. Even during the last two days, when, after convulsions, he had lost consciousness, there was still no absolute paralysis. Only at the last did his pupils become dilated, and then not persistently so. A laboured pulse, stertorous respiration, stupor, and sleepiness, the supposed cardinal symptoms of compression, were wholly absent from first to last. The man was seen by several members of the surgical staff at different times during the three weeks that he was in the hospital. All made the diagnosis of disease of the bone within the cranial cavity, but no one conjectured that the man was dying slowly from gradually increasing and uncomplicated compression of the brain.

Caries of the cranium of long duration; death from a large accumulation of pus between the dura mater and bone; absence of most of the reputed symptoms of compression.

(Reported from notes by Mr. Rogerson.)

Thomas M—, æt. 36, a wine-cooper, was admitted on the 20th of September, 1864, under the late Mr. Adams' care for caries of the cranium. An ulcer was situated somewhat anteriorly to the junction of the frontal and sagittal sutures, and a

portion of bone had been formerly extracted. He stated that he had never had syphilis or any other venereal affection, was married at the age of twenty-six, and is now the father of four healthy children. He had never received any external injury. He has had three attacks of convulsions, the first nine years ago, the second a year afterwards, the third a year previously to his admission into the hospital. Twenty-two years ago he felt a slight pain for the first time on this part of his head; four days afterwards it swelled to the size of an egg, which swelling was opened by Mr. Adams, who ordered him into the hospital; nine weeks afterwards it was healed and he was discharged.

For eight years after this he enjoyed good health and felt no affection of the head; at the end of this time he had a fresh attack with violent pains. The tumour on this occasion burst and discharged itself. After this he was again admitted into the hospital, where he remained nine months. A large portion of bone was removed; the wound slowly healed, and he was discharged.

Fifteen months afterwards he had another similar attack, and ever since then the wound has continued discharging, as at present, a fœtid pus of a greenish-yellow colour.

External appearances.—A large oval depression on the head, extending over the sagittal suture to the right parietal bone, and to a lesser extent on the left. In the middle of this is a small ulcer discharging a greenish-yellow fœtid matter. On the 21st, a linseed-meal poultice was ordered. Mr. Adams saw him on the 27th; ordered a draught containing iodide of potassium and bichloride of mercury, which proved beneficial, and somewhat relieved the pain.

October 7th:—Pain excessive, one third of a grain of morphia, night and morning. The pill disagreed with him; vomiting ensued.

On subsequent days he complained of the great pain in the head still continuing. A blister to the forehead was ordered. The pain was more severe at night; he experienced no relief.

The symptoms and treatment were unchanged, when, on the 9th of November, Mr. Adams directed mercurial ointment to be rubbed into the thigh night and morning till it affected his gums. The extreme pain still continued unabated. On the 10th, the bowels being constipated, a dose of house-medicine was given. On the 15th, in the night, he had three consecutive convulsions, and afterwards became unconscious. There was still no paralysis, motion and sensation remaining in all parts. Hitherto he had been quite conscious, and could sit up in bed and converse about his symptoms.

16th.—His urine and fæces have passed involuntarily. There is still no actual paralysis. He moves his arms and legs when pinched; his mouth is not distorted. He has complete control over his *levatores palpebrarum* and *obiculares*. Speaking and shouting are unnoticed.

17th.—Left pupil insensible to light, the right, on the contrary, sensible; both of them rather dilated. The breathing has become laborious; pulse very frequent, feeble and compressible; surface cold and clammy. At 10 p.m. he calmly expired.

Autopsy.—On removing the skull a great quantity of pus was found between the bone and dura mater pressing on the surface of the brain, flattening the anterior and middle lobes of each hemisphere. This purulent collection was of an ovoid form, measuring from end to end five inches, transversely four inches.

The brain-substance and the arachnoid layers were quite healthy. The viscera of the chest and abdomen healthy; the lungs and liver being only congested.

The effect of the abscess in compressing the brain was much as if a large doubled fist had been forced into the anterior part of the cranial cavity. The dura mater, including the longitudinal sinus, had been separated from the bone over the whole of the front half of the calvaria. The brain-substance was remarkably pale from the pressure it had suffered, but was not in the least diseased. A minute fistulous track

through the skull was found communicating externally with the ulcer and internally with the collection of matter. This fistula had got accidentally closed, and thus caused the fatal accumulation internally. The calvaria was thickened, but, with the exception of the fistula mentioned, it was not carious.

We may divide the cases of compression of the brain into two groups:—1st, those in which the compression is produced suddenly, as in cases of depressed fracture or of rapid effusion of blood; and, 2nd, those in which it is developed slowly, as by gradual hæmorrhage, by the growth of a tumour or cyst, or by inflammatory effusion. Of the latter class it is scarcely likely that a better example will ever be recorded than the one now before us. Drop by drop the fluid had slowly accumulated between the bone and membranes, until the brain-mass was squeezed beyond endurance, and the vital functions ceased. The compression was in the middle line, and affected the two hemispheres equally. It was also wholly uncomplicated by inflammation or by any other disease of the brain itself. Never, I repeat, could a better opportunity be afforded for the study of death by simple slow compression of the contents of the skull. The interest of the case so much centres upon its typical character in this respect that I shall not divert attention from it by any discussion as to cause of the abscess. On this point it may be sufficient to remark that it was clear that the man had been for many years the subject of caries of the skull, and that it is probable that for long he had a sinus leading through the bone. There was no proof of syphilis either acquired or inherited.

The notes as to the symptoms observed during life are somewhat less detailed than might be desired, and I am not able to add materially to them. I saw the man only once, and he was not under my own care. On the occasion that I saw him, about four days before his death, he was sitting up in bed leaning forwards, holding his head between his hands, and swaying slowly from side to side as if almost beside himself with headache. He was thin and extremely pale. He was quite conscious, but spoke in a dazed way, as if overpowered with suffering. I thought that both upper eyelids drooped somewhat, but he could lift them with effort. There was no paralysis of any limb or muscle. Severe and almost constant headache had been nearly the sole symptom. Immediately preceding death, as will be seen in the notes, some convulsive seizures occurred, and after them he became unconscious. He never had stertorous breathing, and his pulse was always feeble and his face pale.

In speculating as to the immediate cause of the constant headache, it may be suggested that it had, perhaps, quite as much to

do with the detachment of the dura mater from the bone and its stretching as with the compression of the brain itself. No doubt, whatever its cause, it had a considerable share in bringing about death by inducing exhaustion from suffering and want of rest.

As regards the quantity of intruded material which can be tolerated in the cranial cavity, it is probable that in this case it was from six to eight ounces. We may conjecture that the brain will bear more when it accumulates slowly than when it is sudden, but I think that in several instances of hæmorrhage from the middle meningeal artery after fracture I have seen as much. The effect of such intrusions is to exsanguine the brain. Although in the present portrait the surface veins, &c., are conspicuous and moderately full, yet the pallor of the brain on section was very conspicuous. It is quite possible that the convulsions may have been due to bloodlessness of the brain. In all the cases of compression which I have examined this emptying of the vessels has been marked, and my impression is that we have here the chief explanation of the mode in which death is produced.

The cases which are most nearly parallel to this are those just alluded to in which a meningeal artery is torn, and bleeding occurs between the dura mater and bone. Of these I have recorded several,* and I shall have to revert to the subject and to give an illustrative plate in the present work. These cases vary in rapidity, and often are developed in stages which are probably caused by fresh outbreaks of hæmorrhage. My conclusions from the careful observation of several were that it is usually a matter of extreme difficulty to diagnose them accurately by means of the symptoms. Fortunately the history of the case is almost always conclusive, there having been an interval of entire freedom from symptoms before the insensibility came on. I am convinced that if we make the diagnosis of compression of the brain only in cases where the pupils are fixed, the countenance bloated, the respiration stertorous, and the pulse laboured, we shall fail to recognise it in a majority of cases. This group of symptoms is met with more frequently after laceration of the brain, whilst in compression often no definite symptoms are present until near the patient's death, when those which denote failure of circulation and a bloodless brain supervene often with great rapidity. I have never once seen long-continued hemiplegia as a result of compression, and believe that it always denotes some other lesion.

That compression of the brain with any symptoms attributable to squeezing can be produced by *small* intrusions into the cranial

* See 'London Hospital Reports,' vol. iv, three lectures on Compression of Brain.

cavity I wholly disbelieve. It will be seen that in most of the cases which I have published in the 'London Hospital Reports,' as in the present case, the quantity of fluid amounted to several ounces. When in fractures of the skull fragments of bone are depressed, it very rarely occurs that the total of intrusion into the cranial cavity amounts to an ounce. I have seen very few cases, indeed, in which with depressed fracture there were symptoms due to compression. When such symptoms are present they are almost invariably indicative of laceration or contusion of the brain itself. With especial confidence may this be asserted if the symptoms are one-sided (hemiplegia and the like).

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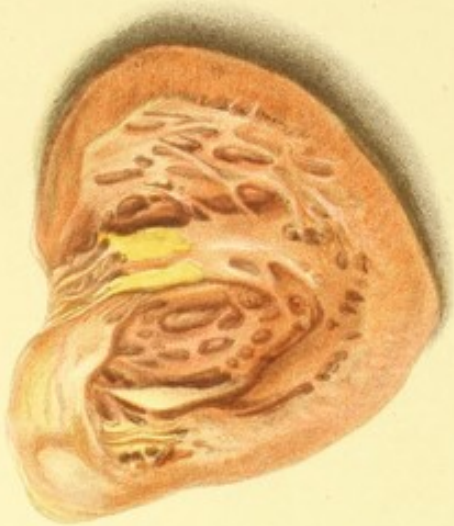

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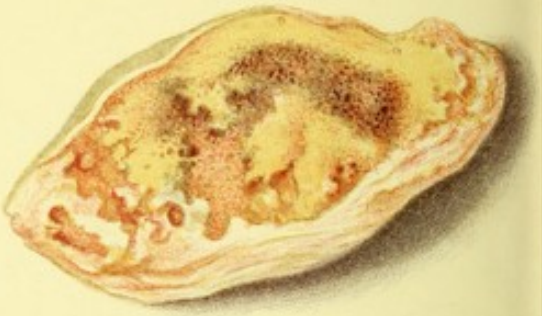
PLATE XXXVI.

PHLEBITIS AND PYÆMIA.

Fig. 1. The femoral vein of a girl who died of pyæmia three weeks after the amputation of her thigh for disease of the knee-joint. Visceral deposits were found at the post-mortem. The femoral and profunda veins supplied a splendid specimen of the suppurative and gangrenous form of phlebitis which is the common cause of pyæmia. Of both veins a considerable tract was involved in inflammation, which had thickened their coats, narrowing or almost closing their cavities, and filling them with greenish fibro-puriform material. This material—in part inflammation-product and in part coagulum—adhered closely to the ulcerated lining membrane of the veins, and in parts the latter were almost gangrenous. In the centre was a small quantity of dirty grumous fluid. At the parts where the diseased conditions were most advanced there was no thrombus, it having probably been destroyed by breaking down. Above and behind the gangrenous tracts, however, thrombi were present, and in each instance they ended, as usual, in large rounded projections at the junction of a branch of some size with the main trunk. It would appear that the disease began in the profunda and spread upwards from it to the femoral, for the lowest part of the latter is seen to be still sound, and thrombus from above projects downwards into it.

Figs. 2 and 3, from different subjects, illustrate forms of secondary pyæmic deposit in the structures of the heart. Both were from the bodies of patients who had died of pyæmia after osteo-myelitis. In Fig. 2 the apices of several of the carneæ columnæ are infiltrated with pus, a condition not very unfrequently seen in pyæmia. Fig. 3 illustrates a much more rare occurrence, the formation of nodular growths on and in the curtains of the tricuspid valve. A number of separate little vegetations are seen resembling on their exterior papillary growths, but of dusky almost livid colour. For the most part the adjacent valve-structures showed no thickening or other evidence of disease. Immediately at the base of the nodule, however, it was thickened and its layers

separated, and in some cases ulceration was present. I have twice found this condition on the tricuspid valves in pyæmia, and in two other patients, in whom no opportunity for post-mortem examination occurred, loud murmurs, supposed to be tricuspid, developed themselves in the course of the disease.



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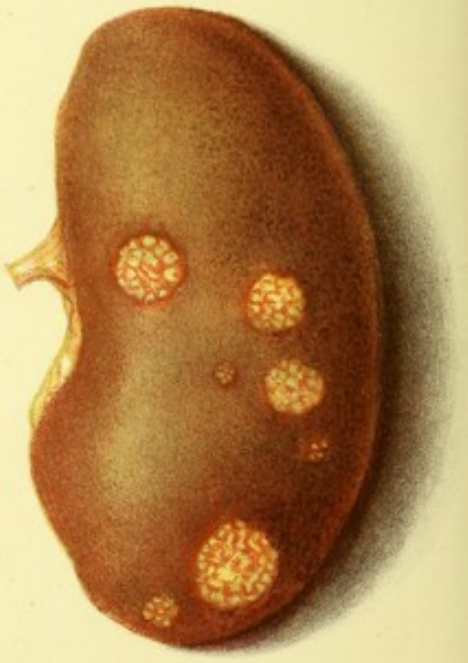

OSTEITIS AND PYÆMIA.

E. Burgess del.

W. West & Co.

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PLATE XXXVII.

OSTEITIS AND PYÆMIA.

Fig. 1 shows the vertical section of the upper third of the femur of a young child in whom osteo-myelitis had followed amputation. Death was from pyæmia, with the usual course and post-mortem conditions. The medulla and cancellous tissue of the bone from the amputation-section to the line of junction of the upper epiphysis is seen to be discoloured and green. This discoloration ends abruptly where the cartilage of the epiphysis for the great trochanter commences. At the junction of the articular epiphysis the limitation is not quite so abrupt. Here a small portion of cancellous tissue below the epiphysal line retains its pink tint, whilst a green line is seen to have formed above the layer of cartilage and close to the bone of the epiphysis itself, which latter is not implicated, and contrasts strongly in its bright pink tint with the discoloured shaft. The cortical layer of the shaft was of dead white, and its periosteum was loose, being partially separated by a thin layer of greasy fluid.

Fig. 2 shows a section of the head of the femur from a lad of about fourteen, who died of acute pyæmia after osteo-myelitis of the iliac bone. In Fig. 3 we have a section of the iliac bone from the same patient. In each the bone shows the effects of recent acute inflammation. In the iliac bone the section was cut near to the hip-joint. The bone is discoloured, being yellow in parts, and of a dusky purple tint in others. The disease had probably begun in this bone and had involved the hip-joint and the head of the femur secondarily. The head of the femur was bare of cartilage in most parts, and the whole of the epiphysis was green and discoloured. The discoloration, &c., is abruptly limited by the line of the epiphysal cartilage, and the shaft of the bone retains its normal tint. In this respect the figure shows the reverse of Fig. 1. In one the osteitis is limited to the epiphysis, in the other to the shaft.

These specimens were obtained from the body of a boy who

died about fourteen days after a contusion of his hip. There had been no wound, only a blow on the haunch-bone. He was in good health previously, but after the accident severe pain set in, followed by a rigor and much constitutional disturbance. He died with pyæmic deposits in some of the viscera and pleuritic effusion. There was dirty pus in the hip-joint, and the periosteum of the iliac bone was separated by purulent effusion at several places. Two boys were in the hospital at the same time with precisely the same conditions and history, but in the second no autopsy was obtained. Both were certainly pyæmic when admitted, and in neither had there been any external wound.

Figs. 4 and 5 show pyæmic deposits or infarctions in the kidney. The same organ is represented in both; its exterior in one case and its section in the other. The conditions are the usual ones. Isolated abruptly limited patches are seen, varying in size from a pea to a small bullet. They are surrounded by zones of intense congestion. The process of suppuration occurring simultaneously in many points with little dissepiments of tissue between them, a peculiar granular appearance is produced. This is conspicuous, both in those seen on the surface and those which have been cut across. It has not been exaggerated by the artist.

General Remarks on Phlebitis-Pyæmia.

These plates will conclude all that I have for the present to give in illustration of the pathological anatomy of pyæmia, and it may be convenient here to introduce a few general remarks upon the subject. Of late years there has arisen a school of opinion which holds that pyæmia is a disease of the blood due to the introduction from without of some definite poison. The older doctrine was that the poisonous material was produced within by a process of inflammatory action in the patient's own tissues; or, perhaps, I ought to say one of the older opinions, for there were those who spoke of the absorption of pus as if the secretion passed bodily as such from a wound into the open orifices of veins. This last rude hypothesis is, I suppose, not now seriously held by any, and need not be here discussed. We may therefore confine our attention to two chief theories, and for the sake of clearness I will state them in the most definite terms I can.

1. That pyæmia is a name for the constitutional results of blood-poisoning due to the circulation of fragments of fibrinous matter, cohering masses of cells, and the like, derived from an inflamed vein or lymphatic, but usually from a vein. The infarctions in the

viscera, &c. (resulting in pyæmic abscesses) are due to the mechanical arrest of these fragments, followed by thrombosis and by local infection of the tissues in which the plugging occurs. The process of pyæmic embolism is not to be compared too rigidly with what occurs in plugging by fragments of dead material introduced experimentally, since the fragments which constitute its plugs are not dead but loaded with living matters in process of active change, and capable, therefore, not only of acting mechanically, but also vitally as foci of infective action.

2. The second and modern theory attributes the phenomena of pyæmia to the introduction of some virus from without, and denies that phlebitis is its cause. It asserts that "it is exceptional to meet with any evidence of phlebitis, general or local," and holds that "it is a question whether in those cases in which the veins are plugged or inflamed, thrombosis and phlebitis are not the local, and pyæmia the general, effect of the same cause" (blood infection). As to the source of the blood poison or the mode of its introduction into the body nothing definite is alleged.*

It will be seen, then, that the question at issue, and a very important one, is as to whether, when pyæmia occurs with phlebitis and osteitis, it is caused by these, or that they are, with it, a common result of blood-poisoning. I may at once acknowledge that to my mind the evidence is overwhelming that the phlebitis is the cause of the rest of the symptoms. I differ entirely as to fact from the assertion that proof of phlebitis is but rarely found, believing it to be rare if proper search be made that no local condition of disease is discovered. Practically, we may class osteitis with phlebitis, and if bone be found discoloured and in process of gangrenous inflammation, we may feel sure that its veins are involved. It is not asserted that in all the cases of marked pyæmia osteo-phlebitis or phlebitis are to be discovered, but the exceptions are few, and, as a rule, in proportion with the definite character of the disease is the clearness of the evidence of the local lesion.

Here it becomes necessary to say a word or two as to the distinction between septicæmia and pyæmia. If we attempt definitions of these terms it is necessary to be somewhat arbitrary, but it is better to run a little risk in this direction than to be vague and indefinite. We may then, I think, conveniently understand that septicæmia is a name applicable to the results of blood change induced by its circulation through diseased structures. It is present

* It even ventures to speak of the "now already abandoned and untenable theory that phlebitis or inflammation of a vein is the cause of pyæmia."

in greater or less degree in all cases of inflammation, and its intensity is always proportionate to the extent and severity of the local changes, being greatest when they are attended by gangrene. It is the inflamed tissues which poison the blood, not any material introduced from without. We may admit that by the injection of poisonous or decomposing fluid material into the blood the phenomena of septicæmia may be induced, for experiments have proved it, but the conditions which permit of this do not occur in practice. If a person gets what is known as a poisoned wound, the poison does not pass directly into the blood, but it first attacks the tissues of the part and induces in them inflammatory action, from which the change in the patient's blood results. It is of great importance that this distinction should be clearly understood. My assertion is that septicæmia may be and usually is induced by disease which has not resulted from any poison introduced from without.

Pyæmia differs from septicæmia in that solid emboli derived from some local inflammation of the vascular system are in circulation with the blood-current. It may be and often is superadded to septicæmia, and the latter may cause death before the more characteristic phenomena of the former have had time to develop. But very frequently the conditions exist singly.

In order that we may be precise as to our creed in this respect I would propose in future to speak of those cases which come into this category as *phlebitis-pyæmia*. It may be left to future investigation to determine whether or not there are other forms of pyæmia—using the latter term as equivalent to embolic infection resulting in secondary abscesses—which are not due to phlebitis. It is very possible that there are rare instances of arteritis-pyæmia, and also that inflammations of the lymphatic channels may sometimes contaminate the blood and supply material capable of producing infective embolism.

The following questions are of much importance in reference to future work on this subject:

1. *To what extent and under what conditions is pyæmia contagious?* That it is not an infectious fever is, I submit, almost certain, since it occurs only to those in whom certain local conditions precede it. We do not fear the spread of pyæmia in a hospital excepting to those who have wounds, and scarcely excepting to those who have injuries to veins or bones. That, however, it is possible to contaminate a wound so as to increase the risk that it will be attended by suppurative phlebitis, and thus become the cause of pyæmia, is highly probable. It is a matter of contagion to wounds, not of blood infection through pulmonary or other channels, and it is to be

met by well-known precautions based upon a knowledge of that fact. It is probable that the secretion from a pyæmic wound or from erysipelas, or possibly almost any inflammation-product, if brought in contact with a broken bone or open vein, may risk the production of suppurative phlebitis or osteitis.

In what relation do the cases of so-called "external pyæmia" stand to those in which internal abscesses occur? It may be that the term "external pyæmia" is founded only on a few coincidences, but there is no doubt that amongst surgeons the opinion prevails that when with pyæmic symptoms abscesses develope in the cellular tissue the case has about it an additional amount of hope.* When repeated abscesses occur in this position, and the viscera continue to escape, then the term "external pyæmia" is employed, and the patients' recovery expected; such cases are, however, very rare, and it may be, as hinted, that they illustrate only rare coincidences. It is, however, a very interesting and important question for the pathologist to consider whether there are any other influences apart from peculiarity in the state and size of the capillaries which give tendency to the localisation of secondary abscesses. We can understand that when emboli are floating in the blood they are likely to be arrested by the first set of capillaries through which the blood has to pass; that if any organ or part has smaller capillaries than others, here the smallest emboli (which may have passed through the first set) are likely to be stopped, and that if any part have been bruised and its capillaries broken across, here are conditions especially favourable to such arrest.

By reference to such considerations as these we habitually explain the frequent occurrence of embolic abscesses in the lungs and liver, their preference for the liver when the umbilical vein or any tributary of the vena porta is inflamed, and in cases of multiple surgical injuries their frequent occurrence at the sites of simple fractures or contusions. Sometimes mere pressure appears to locate them; but the question is, are there other influences at work? It is difficult in the case of true embolic pyæmia to conceive of any such, for it is scarcely possible for emboli so developed to show any other preferences than those which depend upon mechanical conditions. Nor is there any doubt, as a matter of clinical observation, that many cases of phlebitis-pyæmia, with internal abscesses and ending fatally, are attended also by suppurations in the cellular tissue. It may be that we shall be led to the conclusion that there are cases of multiple or successive abscesses

* A very interesting example of multiple abscesses in the cellular tissue developing very rapidly, attended by severe constitutional symptoms and following a carbuncle, will be found in the 'Lancet' for 1875. It is recorded by Dr. Daly, of Dalston, with whom I repeatedly saw the patient.

in the cellular tissue which are not in any relation to phlebitis, and, therefore, not, according to our definition, suitably designated as pyæmia. The tendency to multiplicity of suppuration in cellular tissue is well known as a chronic condition in some states of health allied to scrofula, and it may be that there is a more acute malady of the same nature.

In what relation do cases of multiple acute periostitis stand to pyæmia? It is not very uncommon, especially in young persons, when one bone is attacked by acute periostitis, possibly from an injury, for other bones to suffer also, and necrosis of several bones may ensue. To this condition Mr. Simon, I think, gave the name "necrosial fever." Such cases are by no means always fatal, and they appear, in most of their phenomena, to resemble very closely those just referred to under the title of external pyæmia or multiple abscesses in cellular tissue. The periostitis is usually suppurative, but not invariably so, for it sometimes, after threatening abscess, ends abortively, and results only in great thickening of the bone. Are all these secondary developments of periostitis to be regarded as embolic, or must we suspect that apart from embolism there is some influence under which, when an important structure is acutely inflamed, there is originated a liability for other tissues of the same kind to take on similar inflammation?

Can the local conditions which induce phlebitis-pyæmia be developed spontaneously?—This question should probably be answered strongly in the affirmative. Contagion, although a frequent cause, is by no means an essential one. Whatever induces phlebitis or osteitis may become the cause of pyæmia. Accidental cases of phlebitis-pyæmia from venesection or other injury to veins, and of osteitis consequent on contusions, are probably not very infrequent. They may occur not only in hospital, but in those who have not been exposed to any risk of contamination. Nor are they limited to the human subject, for pyæmia with deposits in the liver is common in young lambs as a result of what is known as "navel-ill," or inflammation of the umbilical vein, and it occurs also in horses after venesection from the jugular.

In its capability for spontaneous origin, and, at the same time, its contagiousness when once originated, pyæmia may be classed with erysipelas. Neither of them are specific diseases in the sense that they can be produced only by the introduction of specific germs, but both of them are attended by the production of cell elements capable of causing inflammation in other tissues with which they may come in contact. As already remarked, many facts support the opinion that the virus of erysipelas, if applied to

a cut bone or open vein, may induce osteo-myelitis or phlebitis, which in turn may cause pyæmia.

NOTE.—The reader who is interested in the illustrations of the pathological appearances in phlebitis-pyæmia should refer back to Plates XVIII, XIX, XX, and XXI, which show the conditions present in inflammation of the skull bones, the meninges, and sinuses. They illustrate in the most definite manner the connexion between the bone and the venous system. I may also be permitted to mention, as of especial importance in reference to the subjects here discussed, the original papers of Mr. Arnott and Dr. Robert Lee in the 'Medico-Chirurgical Transactions.'

Fig. I.

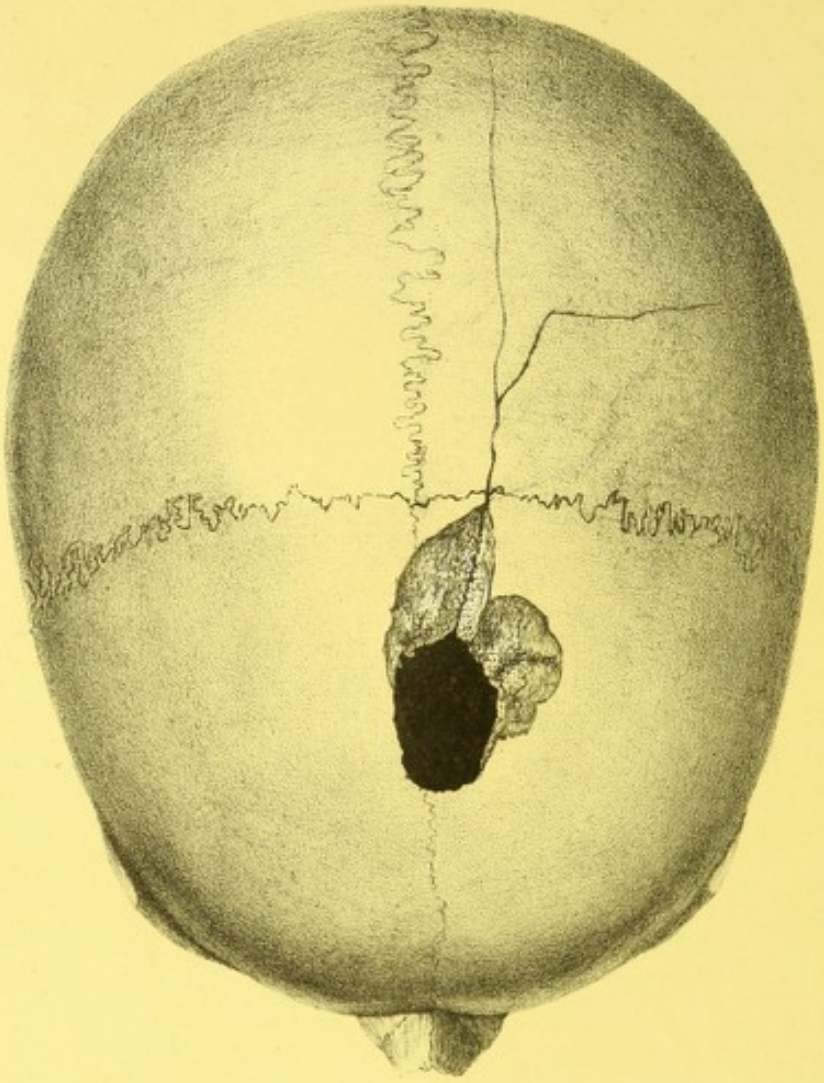

Fig. II.

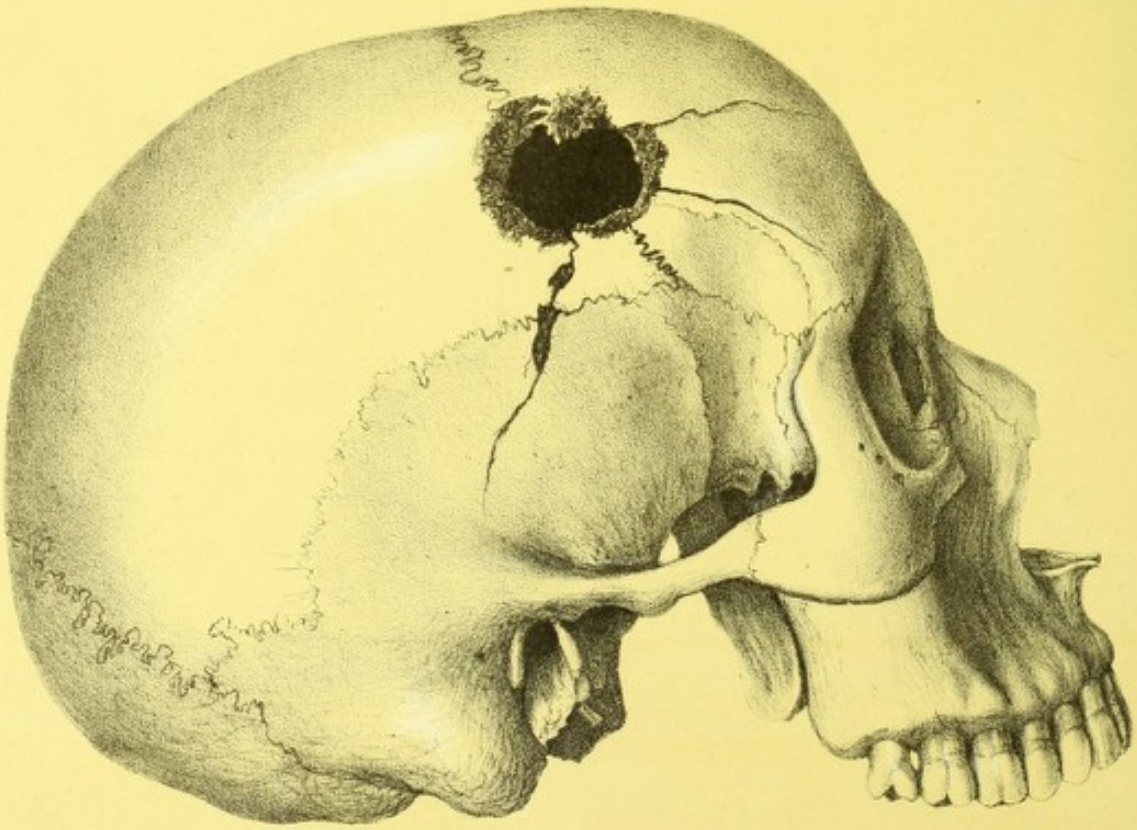

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PLATE XXXVIII.

BULLET PERFORATIONS OF THE SKULL.

Fig. 1 shows the effects of a rifle bullet fired from above obliquely downwards and forwards, and making entrance in the middle of the frontal bone. The edge of the aperture in front is sharp and overhanging, whilst posteriorly large fragments of the outer table have been detached. The inner table was extensively splintered. If we compare this with the other illustration we shall see how much the effects vary with the obliquity or otherwise of the direction of the missile. A long fissure extends backwards from the middle of the hole.

Fig. 2. The hole of exit made by a rifle bullet fired from the opposite side of the head. The external table is carried away from a rim all round the opening, and fissures extend widely downwards and forwards. The external table was much more damaged than the inner one.

Fig I

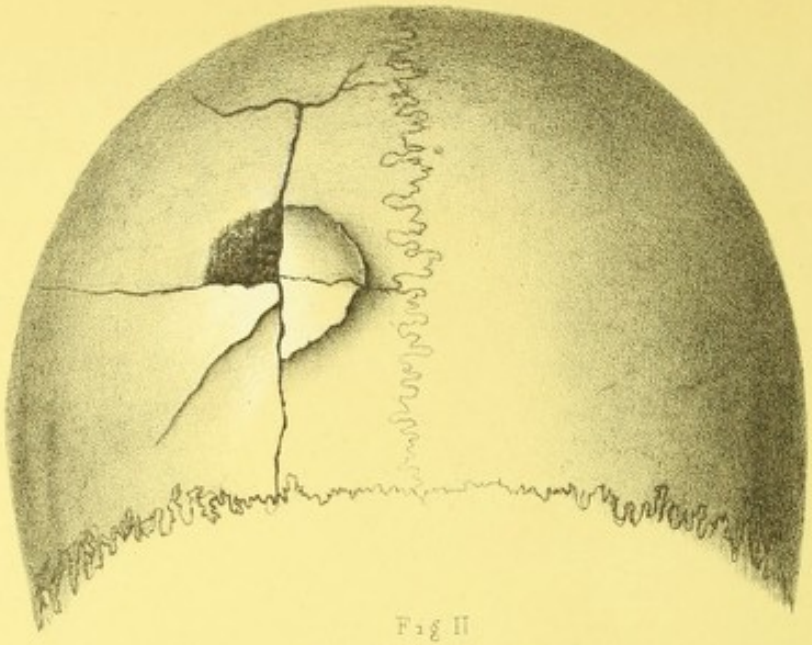

Fig II

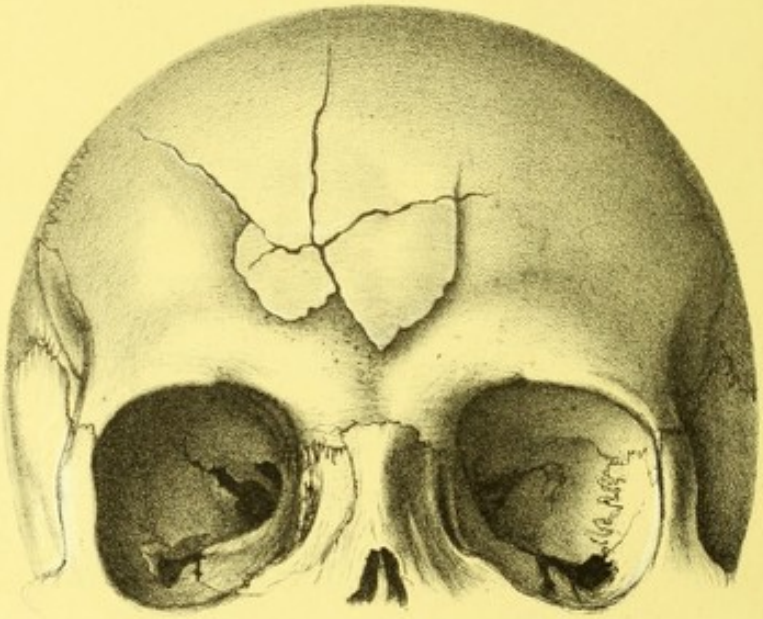

Fig III

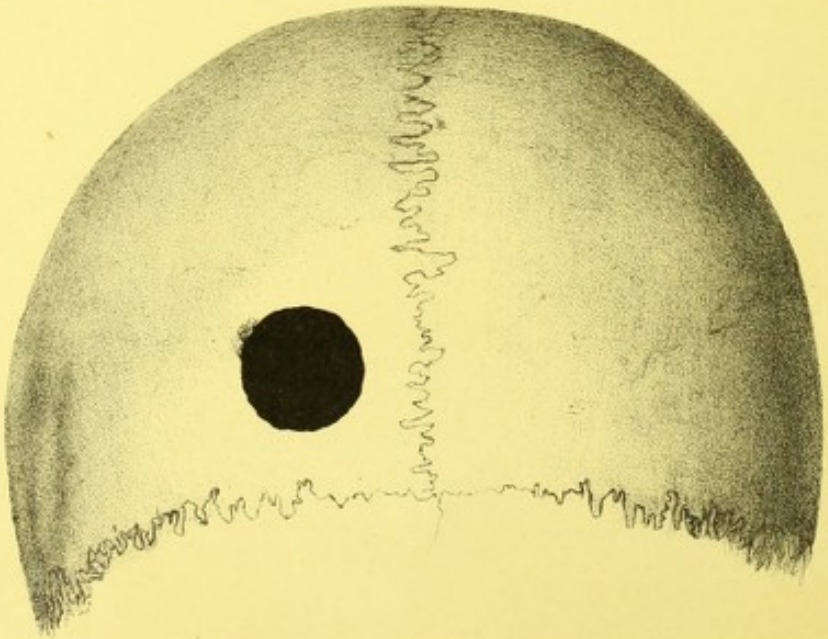

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PLATE XXXIX.

BULLET AND HAMMER PERFORATIONS OF THE SKULL.

Fig. 1 shows the effects of a bullet fired upwards through the mouth, which did not escape, but caused elevation of fragments and extensive splintering. The fissures radiated from the aperture and involved the external table chiefly.

Fig. 2. Fissured fracture of the frontal bone caused by a bullet fired from an air-gun obliquely upwards through the base of the skull. The bullet did not make its exit, but splintered the bone extensively, slightly elevating the fragments in the middle.

Fig. 3. Perforating fracture of the parietal bone caused by a blow by a hammer. The blow was inflicted post-mortem before removal of the scalp, and caused only a single, almost straight laceration in the latter. The hole in the skull is almost exactly round, and it fitted the head of the hammer. There were no fissures in the outer table, but the inner one was extensively splintered. The fragment driven down was broken into nearly fifty fragments.

APPENDIX.

Cheiro-pompholyx. Plate X.

The publication of my portrait of Cheiro-pompholyx has attracted considerable attention to a malady which appears to be recognised as peculiar by all who have observed it. Communications respecting it have appeared in the different medical journals from Dr. Liveing, Dr. Thin, Dr. Tilbury Fox, and many others, most of them containing the reports of fresh cases. Dr. Tilbury Fox has claimed the malady as identical with one which he had previously described under the name of dysidrosis, and in order to save myself from what looked like a charge of plagiarism I was obliged to remind him explicitly that my case had been observed and the portrait taken many years before his first publication on the subject. I also published in the 'Lancet' a verbatim report of a lecture on the subject delivered in 1871. Dr. Robinson, of New York, has published an able essay, illustrated by woodcuts, showing from microscopic examination, that the vesicles are not connected with the sweat-glands. He also appeals to chemical evidence that the fluid is not sweat.

The facts upon which all observers agree are, I think, the following:

1st. That the first stage of the disease is a somewhat deeply placed and flattish vesicle, which resembles a sago-grain, and which often shows a dark point in the centre.

2nd. That these sago-grain vesicles, scattered along the sides of the fingers, often constitute the whole disease, and that after a few days' duration they recede spontaneously.

3rd. That cases of this mild kind are tolerably common.

4th. That certain rare and much more severe cases are sometimes seen in which the sago-grains coalesce, and large bullæ are formed. (It was one of these most severe cases which I figured.)

5th. That, however large the bullæ, the eruption always shows a tendency to spontaneous cure, and seldom lasts more than a week or two, being but very rarely the cause of chronic eczema.

6th. That after intervals, usually of some months, the patient is liable to a fresh attack, and this many times repeated.

7th. That whilst the severity of the disease falls on the hands, yet in some cases a few small vesicles are to be found on the feet, and that now and then a red lichen rash occurs on the trunk. (I was careful to mention both these facts in my first description whilst naming the disease Cheiro-pompholyx from its most usual and most conspicuous seat.)

8th. That it often, but not invariably, affects those who are nervous or out of tone.

Amongst minor matters may be mentioned that the eruption does not occur in young children or in old persons. It has been suggested that it is sometimes due to exposure of the hands to the sun (improbable), and that in one instance it was possibly due to excessive use of belladonna externally.

I did not give any opinion as to the anatomical site of the effusion, but Dr. Tilbury Fox has stated his belief that in the first instance at least the fluid is accumulated in the distended ducts of sweat glands. He bases this opinion chiefly, I think, upon the facts that a black point may often be seen in the vesicle, which is, he believes, demonstrably a duct-orifice, and that the contents of a clear sago-grain, in its early stage, are acid in reaction. If his ingenious conjecture be true it is probable that in the later stages the ducts suffer rupture, and that the fluid changes its character and becomes mixed with serum. In one case the fluid has been proved to be coagulable (which sweat never is), but this may be due to lateness of stage. Dr. Robinson and Dr. Thin are inclined, as the result of careful examination of the vesicles, to pronounce that the disease is not connected with the sweat glands. The question will, however, no doubt receive further attention. Its

definite solution can only be attained by chemical and anatomical examination of the vesicles and their contents. Amongst the clinical difficulties in accepting the sweat-gland hypothesis we have the fact that the eruption is usually grouped, whereas miliaria (an undoubted dysidrosis) is usually diffuse.

Anyone who will look at my portrait will, I think, be inclined to hold it difficult to believe that sweat glands could be affected in such abruptly limited patches as are there shown. On the dysidrosis theory, Cheiro-pompholyx is a sort of miliaria of the hands, deriving its peculiarities probably from the peculiar anatomical conditions of the sweat glands in the hands. I am not aware, however, that it has been observed coincidently with miliaria of the trunk or that the latter has been recognised as a malady likely to recur periodically in association with derangement of health. Still it is very possible that future observation may show that such is the case. Here, again, more detailed observation is needed.

I expressed my belief that Cheiro-pompholyx is a neurosis, and hinted that it might possibly be an expression of catarrhal disturbance. In making these suggestions I meant that it was probably evoked by nerve influence, as is herpes, for instance, and not by the blood. If it were due to blood change it would probably last longer and require treatment for its cure, and would scarcely be liable to periodic recurrence. I did not by any means intend, as some seem to have understood, that a neurosis must necessarily occur solely to persons who were obviously the subjects of nervous debility. Herpes, the most typical neurosis of all skin eruptions, occurs often to those who appear to be in good health. The term "catarrhal" ought probably to be extended and limited to maladies which take their origin in a reflex manner from exposure of some part of the surface or of the whole body to cold, and which are liable to recur (after intervals) whenever such exposure is repeated. Some persons catch cold in one way and some in another, and it is by no means the case that all colds express themselves as nasal catarrh. Thus, all catarrhs are neuroses, and it seems quite possible that Cheiro-pompholyx is in this sense catarrhal, and that it has near congeners in certain forms of recurring erythema affecting the face and hands. At the same time it is desirable not to lose sight of the possibility that it may be due to some unsuspected article of diet, or (like most of the forms of so-called "hydroa") to some drug.

Hydrocele of the Neck. Plate VII.

Account of a case in which the condition was symmetrical.—At the date of publication of this plate I had never had an opportunity for examining a case after death. In the interval which has since elapsed I have, however, through the kindness of my colleague, Mr. Waren Tay, dissected a most interesting example of the malady. The case was one in which the cervical portion of the tumour exactly resembled those given in my portraits. It was congenital. The infant died in consequence of an attempt to cure by the injection of iodine. At the autopsy we found that the tumour consisted of a great number of cysts containing serous fluid stained with blood. The cysts were for the most part distinct from each other. The tumours might have been aptly compared to large bunches of grapes of very various sizes, flattened by mutual pressure and adherent on all sides. Almost all, if not all, contained coloured fluid. The amount of solid material between them was but very little, and the cyst walls in most places were so thin as to allow the colour of their contents to be seen through. Everywhere the cysts adhered to adjacent structures, and it would have been quite impossible to dissect the tumour out. The tumours were not limited to the neck, but passed downwards into the axilla and the chest, surrounding the subclavian vessels and the strands of the brachial plexus. They were symmetrical, but the tumour on the right side, although occupying precisely the same positions as that on the left, was of much smaller size. The comparative smallness, however, was chiefly in the external part. During life only a little fulness was observed in the root of the right side of the neck, and the discovery of a tumour there was unexpected.

This dissection most clearly demonstrated the impossibility of removing these tumours by excision, and also suggested that it might be better even to avoid injection treatment. It is clear that the latter is not unattended with risk, and also certain that it can cure only a small part of the new growth.

In connection with this subject I have to thank Dr. Charles Coates, of Bath, for drawing my attention to a pamphlet by Dr. Ferdinand Ascherson on 'Congenital Fistulæ of the Neck with reference to their possible Connection with the Branchial Fissures.' It appears that Rathke first, and subsequently Baer, Burdach, and Muller, have described the existence of these fissures in

the human embryo at early periods (a month to five weeks). It is far from improbable that they may have to do with these congenital, blood-containing, cystic tumours of the neck as well as with the rare forms of congenital fistulæ mentioned by Ascherson. There can be no doubt that we must look to the facts of fœtal development for an explanation of the production of these tumours. They are far too constant in their characters and position to be other than the results of overgrowth or persistence of some tissue natural to the region.

The following is Mr. Tay's account in detail of this very important case:

Cystic growths in cervical, thoracic, and axillary regions, containing blood-stained fluid. Little solid growth. Death. The solid parts found to consist of nuclear tissue, showing peculiar encapsuled arrangement.—Frederick Stevens, then only one day old, came under Mr. Tay's care May 29th, 1877. He was brought on account of a tumour of the left side of the neck, which had been noticed at birth or very shortly afterwards. It was bluish in colour on the surface, shining through the skin, which did not appear to be intimately connected with it. Fluctuation was evident, and it was clear that the tumour consisted mainly of two cysts occupying the whole of the left side of the neck from the clavicle to the jaw. There was some solid material also at the base observed by the projecting cysts. The mass was as large as the baby's head. There was some swelling of the tumour when the child strained and coughed, possibly due to impulse from the pleura where the growth was in contact with the lower part of neck. No swelling was observed on the right side. Mr. Hutchinson kindly saw the case and suggested tapping. This was done on the 31st, and some ounces of blood-stained serous fluid withdrawn. This fluid did not coagulate, but certainly contained a quantity of blood. The largest cyst was thus quite emptied, and then a deeper mass of growth became evident. The fluid soon reaccumulated, and was again evacuated on June 14th. It presented the same characters. The child was subsequently admitted as an in-patient, as the swelling seemed to increase, and some fulness could be made out on the right side of the neck. On June 26th a small quantity of tincture of iodine was injected into the larger cyst on the left side. This did not refill, and, in fact, seemed shrivelling up, but some inflammation occurred in the cyst and around it, and the child gradually sank, probably owing to the effect of the inflamtion on so young a child, but partly, perhaps, owing to increase of the growth on both sides of the neck, as shown at the post mortem. The child died on July 4th, aged five weeks.

The autopsy (at which Mr. Hutchinson was present:) showed cysts of various sizes and solid masses on both sides, reaching from the base of the skull above, along the neck on either side of the chest. At the lower part of the neck the growths passed along the vessels, both in front of them and behind them, beneath the clavicle to the axilla outside the chest wall, and also within the chest into the anterior and posterior mediastina, ceasing about half way down. They were overlapped by the pleura. On the left side of the neck, where tapped and injected, a large cyst contained some purulent fluid, All the other cysts contained fluid which looked like watery venous blood. It did not coagulate, but under the microscope there were numbers of well-preserved blood-cells and some whitish fibrinous shreds having a granular appearance. There was very little solid growth anywhere. Nearly the whole mass consisted of cysts varying greatly in size, most of them having thin walls showing their dark sanguineous contents, and some of them looking much like dilated veins. A few small ones seemed filled with a glairy fluid. No connection could be made out with the thyroid or thymus glands. The growths on both sides nearly came in contact in the middle line in front of the spine, but were quite separate from one another. The internal organs were all fairly healthy. The growths on the right side were much smaller than on the left, and in the neck was quite unattached to the skin. It felt movable on the deeper parts, but was really continuous with the growth in the chest.

Microscopic Examination.—Some portions of the tumour were taken charge of by Dr. Charlewood Turner for microscopic examination. After hardening for some time it was still difficult to make sections, owing to the very soft nature of the growth. The solid portions presented many of the characters described and figured by Mr. Holmes in the 'Pathological Transactions' (vol. xii, p. 208, and pl. ix, figs. 5—9).

Dr. Turner reports that when examined with a low power (Hartnack obj., No. 4) the sections, which were stained with logwood, showed that the growth consisted of cysts with fibrous walls filled with blood clots of quite recent appearance; and of similarly encapsulated tracts of comparatively limited area of actively growing tissue, with very abundant defined and well-stained nuclei; and, thirdly, of several much smaller masses of a dull and hazy-looking structure (evidently degenerated), of regular oval outlines, and of varying size. These masses had many paler nuclei scattered through them in a granular matrix, and they were also enclosed in complete fibrous capsules. Between these structures ran tracts of fibrous tissue of considerable breadth, which contained numerous large blood-vessels, several of which were occupied by blood-clots, some recent, some of an older date, decolorized and infiltrated with leucocytes.

On examining the specimens with a higher power (Hartnack obj., No 7), it was seen that the actively growing new tissue consisted of numerous well-defined and more or less deeply stained nuclei of various sizes and forms, round, fusiform, and angular, situated in an extremely delicate reticulum, richly supplied with thin-walled vessels.

In the thinnest parts of the sections it could be seen that the reticulum had a concentric arrangement around some of the larger vessels with the thicker walls (arteries). It was also seen that there were many large cells with defined outline and granular contents, and a single large pale nucleus, each of which seemed to occupy and fill up one of the meshes of the reticulum. Here, also, some of the smaller angular nuclei could be seen to be situated at points of junction of the fibrillæ of the reticulum. Traversing the growth in different directions were strands of fibro-nuclear tissue, which seemed to divide it up into irregular alveolar spaces. The duller hazy-looking masses before mentioned, were seen under the same power to consist of a uniform granular

matrix, traversed by very numerous blood-channels with exceedingly thin, nucleated walls, and containing circular nuclei dispersed throughout it. These masses appeared to be organising blood-clots, which had become granular from commencing retrogressive degeneration. It seemed possible that they might have formed in varicosities of the veins in the fibrous stroma of the tumour, as they were very small in comparison with the cysts. Round nuclear bodies (leucocytes) were also scattered through the fibrous stroma of the tumour, and this, when contiguous to the wall of one of the cysts, was seen to be infiltrated and greatly swelled out by extensive masses of red blood-corpuscles.

Ulcerative Rheumatic Arthritis. Plate XII.

I have not much to add to my description of a form of general chronic rheumatism attended universally by absorption of cartilage and unattended by outgrowths or eburnation. It appears to be quite distinct from the common form of senile arthritis, in which these two conditions are so constantly present. It may occur at any age, and is by no means frequently associated with old age. It is probably not rare. My chief object in mentioning it again here is to say that a very valuable symptom of it is *grating produced by movement of the pisiform bone*. It is not usually easy to elicit grating in any other joint, for although the cartilage is extensively absorbed this occurs only in patches, and as the ends of the bones are not denuded nor the ligaments softened, the symptom of grating, so valuable often in scrofulous disorganisation, can in this but rarely be obtained. We may add to this that in most joints forcible and irregular movements are needed to produce grating, and that these in rheumatism would be very painful. The pisiform bone is, however, peculiarly placed, and can be very easily made to move upon its base without causing much pain. If the patient's hand be flexed and the surgeon take the bone between his thumb and forefinger, and gently move it from side to side, he will often in these disorganising rheumatic cases produce a grating, which is beyond doubt in its significance of absorption of cartilage, It is the more valuable for purposes of diagnosis because the other evidences of disorganisation, pain, swelling, &c., are often but slight, and there is never any tendency to suppuration.

Stomatitis-Teeth. Plate XI.

Since writing on this subject some very important facts have come under my notice, strongly substantiating the correctness of the opinion that defects in the formation of the enamel of the second set of teeth are usually due to stomatitis in early life. Further, too, I may go and say that I believe with increasing firmness that of the causes of the stomatitis attacks which so often damage the teeth mercury stands the chief. In one or two remarkable instances I have obtained on enquiry from the surgeon who treated the child in infancy conclusive testimony on this point. Mr. Moon, the dental surgeon (in conjunction with Mr. Salter) at Guy's Hospital, has during the last year read before the Odontological Society a very valuable paper which contained facts in support of my opinions as to the causes, not only of the mercurial, but also of syphilitic teeth. Mr. Moon had taken the trouble in several extreme cases which came under care at the Dental Hospital to enquire at the patient's home and found, as I had done in others, clear proof that mercury had been used. As stated in the description of the plate I by no means wish to imply that mercury is the only cause of the stomatitis which damages the teeth. On the contrary, it is to be expressly understood that defects in the enamel may be produced by any form of stomatitis, and that the mercurial cases cannot be distinguished from those due to severe thrush or other causes. The important point in my hypothesis is that such defects are not due to general failure of nutrition, or want of lime salts, or to rickets, but to local inflammation implicating the dental pulps. That this general proposition is true I feel no doubt, but in asserting its importance I by no means wish to deny that it is possible that attacks of illness occurring during the early periods of first dentition and unattended by obvious stomatitis may sometimes leave marks in the teeth. We know that this is the case with the nails, and although, as yet, no proof of it has been afforded as regards the teeth, it may be supposed to be not improbable. Observations on this point might be usefully made by those engaged in family practice, and who have the opportunity of watching the development of many of their patients from infancy to adult age, of knowing accurately the nature of their ailments and of the drugs administered for their relief.

The importance of carefully distingnishing between mercurial teeth and syphilitic teeth is very great. In two of the figures in my plate both conditions are seen in the same mouth. One of the plates in preparation for a future Fasciculus will show the several types of syphi-

litic malformation, and I shall then have to make some further remarks on the subject.

Ivory Exostoses from Skull. Plate II.

I have recently again seen the man whose portrait is given in Fig. 5 (woodcut). It is now eight years since the photograph from which the figure was executed was taken. The appearance of his nose has altered but very little, the bone having not grown much. It is, however, now evident that there are outgrowths or hypertrophy of bone in his skull in the frontal region, and in his lower jaw. Most of them occur on the right side, and this non-symmetry is very apparent in the lower jaw, but in the upper maxillæ the growths seem to be symmetrical. It is just possible, but not, I think, probable, that the very remarkable appearance of symmetry shown in the woodcut may be due to a growth from the right side only. I possess a skull which shows exactly similar conditions, but all limited to the right side.

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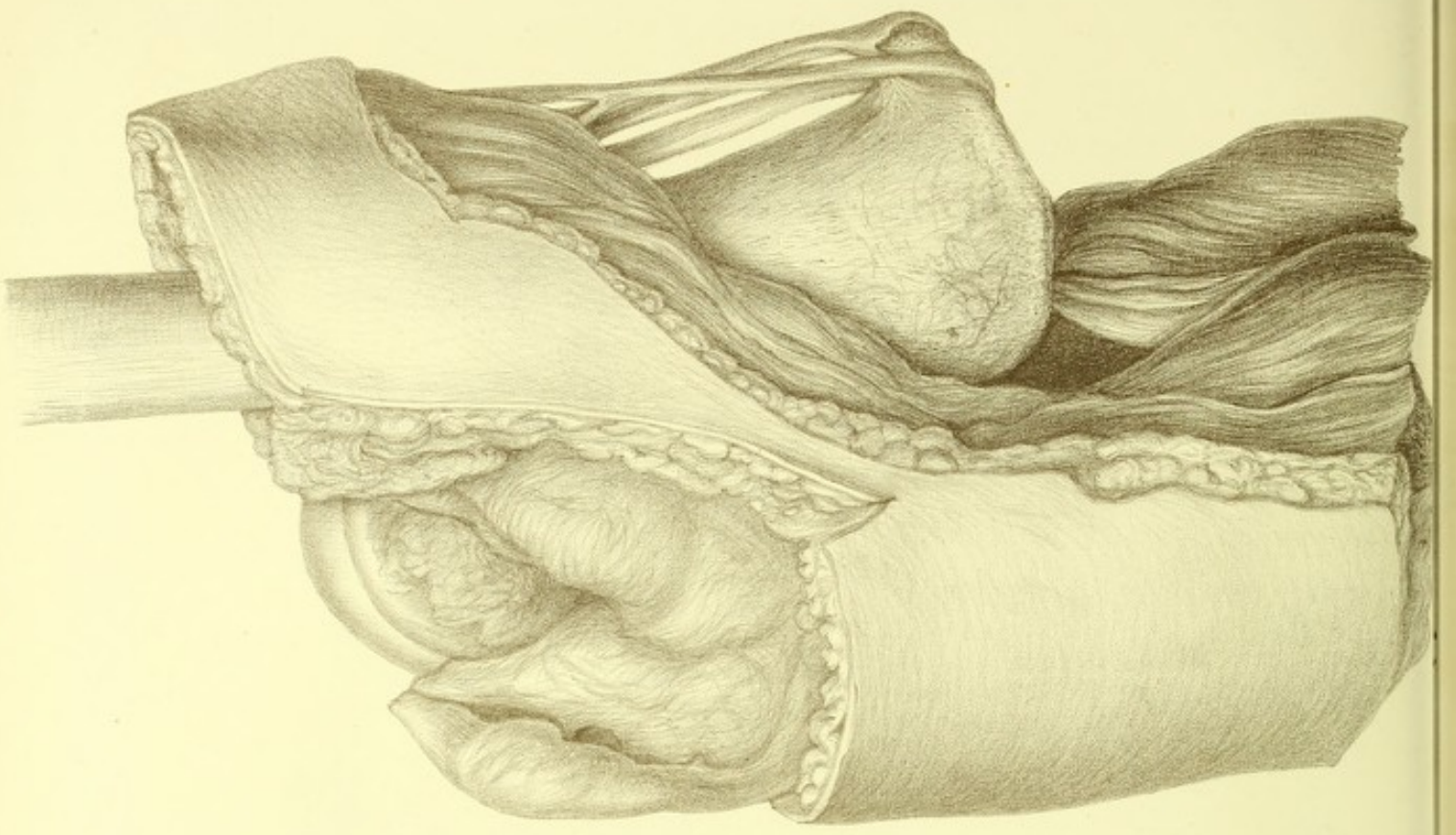

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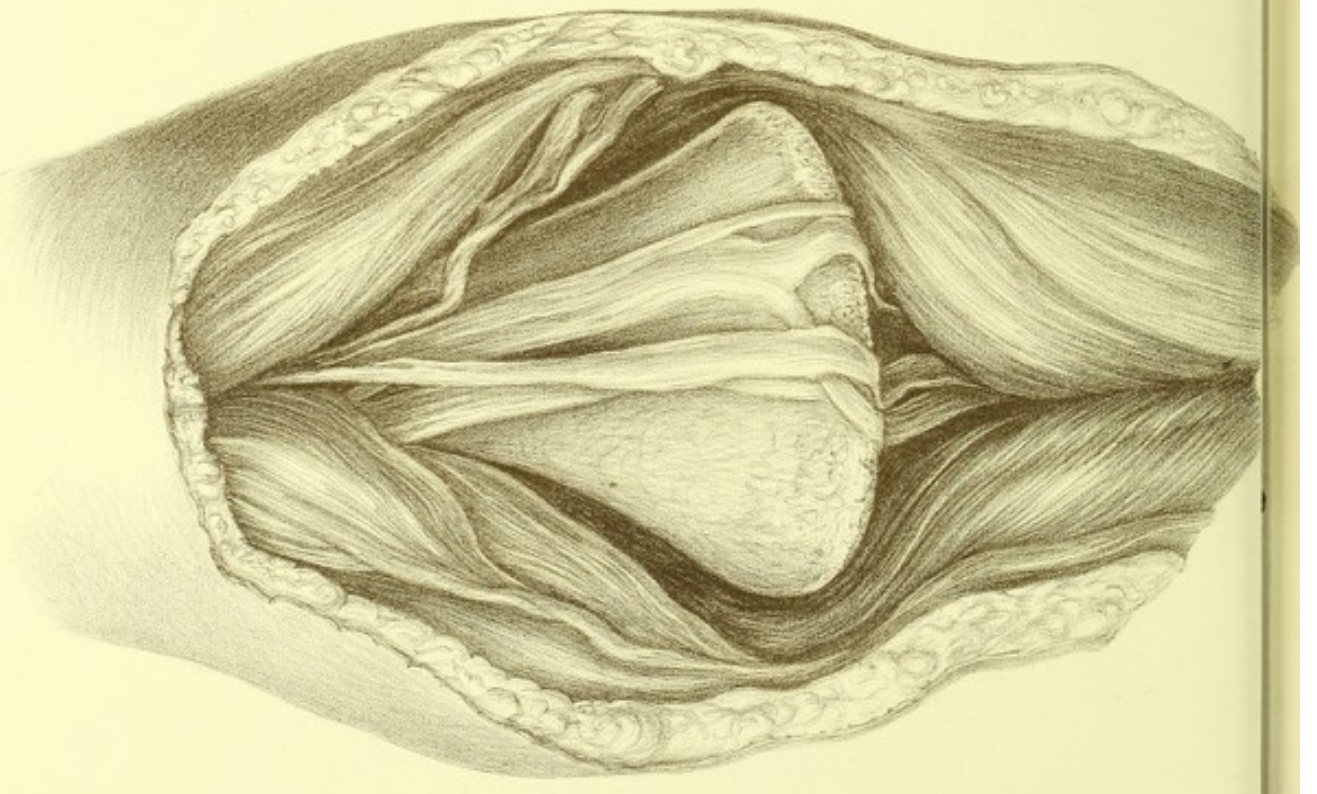
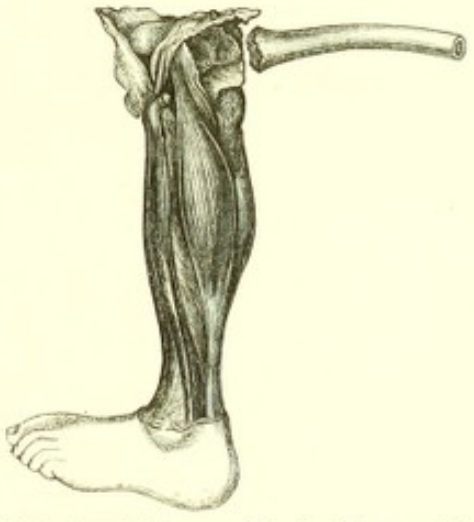


PLATE XL.

DETACHMENT OF LOWER EPIPHYSIS OF THE FEMUR.

The lower epiphysis of the femur is a large mass of bone which comprises both condyles and measures at its sides, when near adult age, an inch in depth. Ossification begins near its centre a few weeks after birth, but it is not complete until the twentieth year. At any period under twenty it is therefore possible that this epiphysis may be detached without actual fracture of the bone. As a matter of fact, this form of detachment not very unfrequently takes the place of what would be in the adult either a dislocation at the knee or a fracture in the lower third of the femur. Sometimes the detachment is without much displacement of the fragments, or, at any rate, they do not leave each other sufficiently to become disengaged and to permit of overlapping. The surfaces are very broad, and it is manifest that the violence which would completely disengage them, so that the lower end of the shaft should wholly leave the upper end of the epiphysis, must be very great. The epiphysis is probably in a large majority of cases merely loosened and displaced backwards or forwards to a slight extent, but still remains properly beneath the shaft. In such cases union is easy, and the treatment offers no difficulties. In cases in which the displacement is great it may be necessary to take measures for reduction, such as in a dislocation, and in some replacement may be found impracticable. In a third class the injury is compound, the displacement extreme, the joint opened, and the vessels and nerves much contused by the pressure of the lower edge of the shaft. In some of these primary amputation may be the only resort.

Fig. 6.



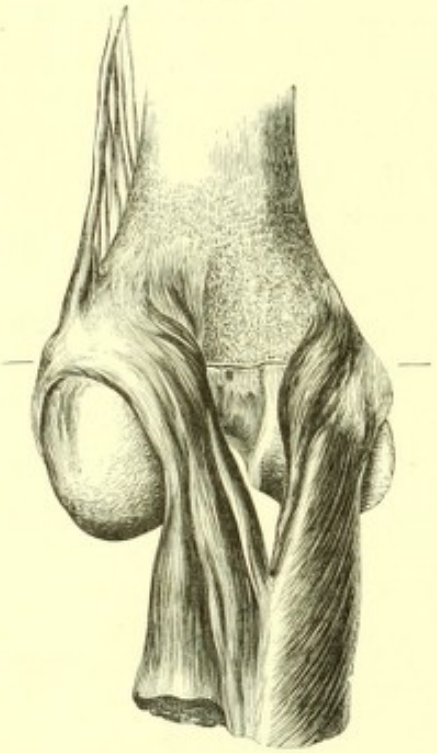
Detachment of lower epiphysis of femur, with flexion of epiphysis (dissected).

Fig. 6 (woodcut) is from the case of a boy of 11, whose limb I amputated, under the circumstances referred to, at the London

Hospital many years ago, and in the Leeds Museum is a similar specimen from a boy of 6. In the latter case primary amputation was done by Mr. Hey. In Fig. 6 it will be seen that the epiphysis is in the flexed position, and that it would not have been possible to effect coaptation of the shaft with it excepting with the knee bent at right angles. It will be seen also that a sort of cup is formed around the borders of the epiphysis by the dense periosteum, with probably some of the outer lamellæ of bone, and that to this the gastrocnemius is still attached.

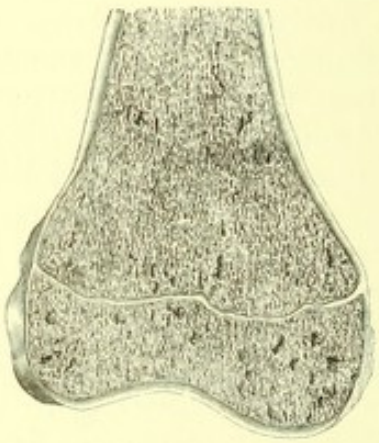
Figs. 7 and 8 have been executed to show the precise direction of the epiphysal line. Fig. 7 is from a lad of 18, and shows the

Fig. 7.



Lower end of femur with gastrocnemius attached, to show its relation to the epiphysal line.

Fig. 8.



Section of lower end of femur to show epiphysal line.

gastrocnemius attached just above the line of the epiphysis, whilst in Fig. 8 a section of the bone is given.

For the drawings which constitute Plate XL, I am, as also for the following plate, indebted to the Leeds Hospital Museum. The drawing was made for me by Mr. Tuffen West during a visit to Leeds some years ago. The illustration shows a complete clean detachment of the lower epiphysis of the femur from the shaft. The lower end of the shaft has been displaced

backwards and downwards into the popliteal space, and the nerves and vessels are seen stretched over its edge. In the side-view the articular surface of the condyle is seen looking forwards, being in a flexed position. It is to be observed that the periosteum has been completely stripped from the end of the shaft. This is, I believe, invariable in cases of detachment of an epiphysis with displacement. The periosteum is always left as a sleeve in connection with the epiphysis, and the shaft is denuded. This condition is well shown in a beautiful specimen of detached upper epiphysis of the humerus in the Musée Dupuytren in Paris, and I have seen it repeatedly in dissections which I have myself made.

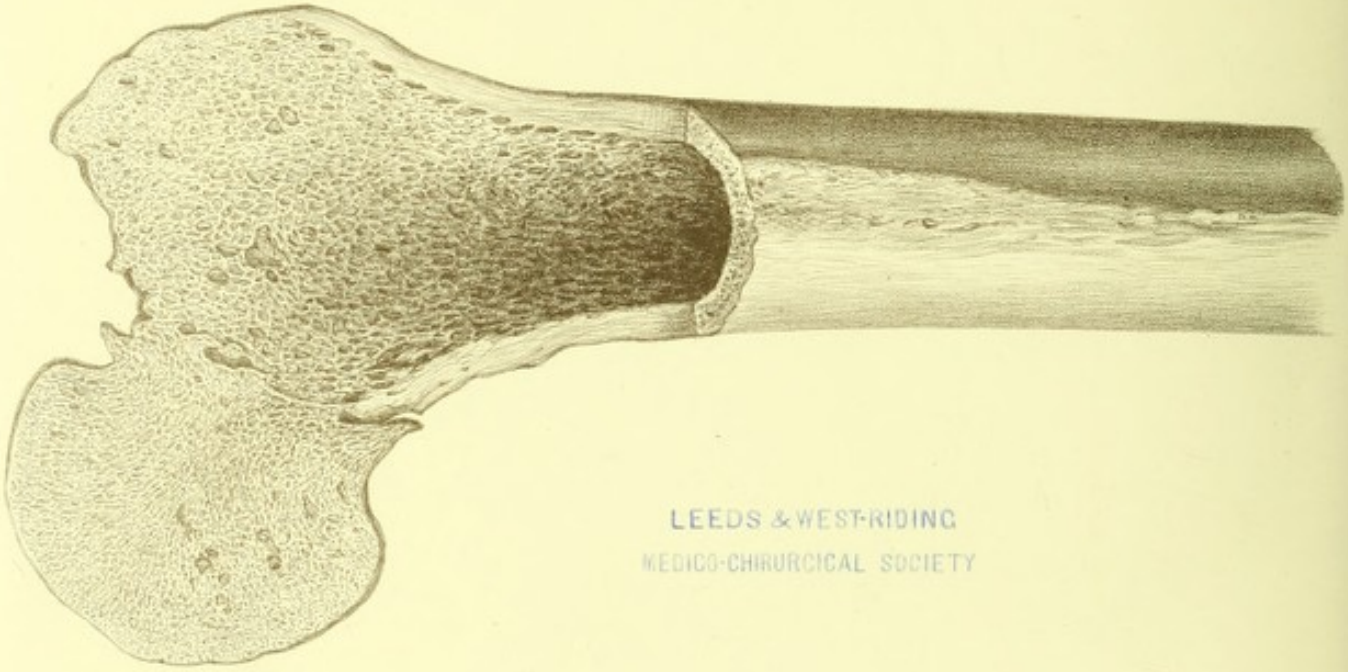
In the present case the patient was a lad, aged 15, who had nearly attained adult growth. The injuries necessitated secondary amputation (43rd day), which was performed by Mr. Wheelhouse, to whom I am indebted for particulars of the case.*

I have seen three or four examples of this accident, and in one, almost exactly similar to Mr. Wheelhouse's case, we were obliged to amputate. In another, under the care of a colleague, secondary amputation became necessary on account of the impracticability of keeping the fragments in place, and the profuse suppuration which followed.

In two, in which I diagnosed this accident, but in which the displacement was not complete, I have succeeded in obtaining good union. Extensive detachment of periosteum, which is common in these accidents, is a definite source of danger, since it may lead to necrosis.

The displacement of the epiphysis into the flexed position, as shown both in Mr. Wheelhouse's specimen and my own, is very important as regards treatment. It is, I expect, the usual condition whenever the shaft has been so detached as to allow the epiphysis to move independently under the influence of the gastrocnemius. When once it has occurred such a displacement is probably impossible of rectification excepting by putting the limb with the knee at right angles, and in that position it is exceedingly difficult to secure the needful extension. I do not know of any case in which after such displacement reduction was proved to have been effected.

* I published this case in the "Museum Notes" of the 'British Medical Journal,' 1869.



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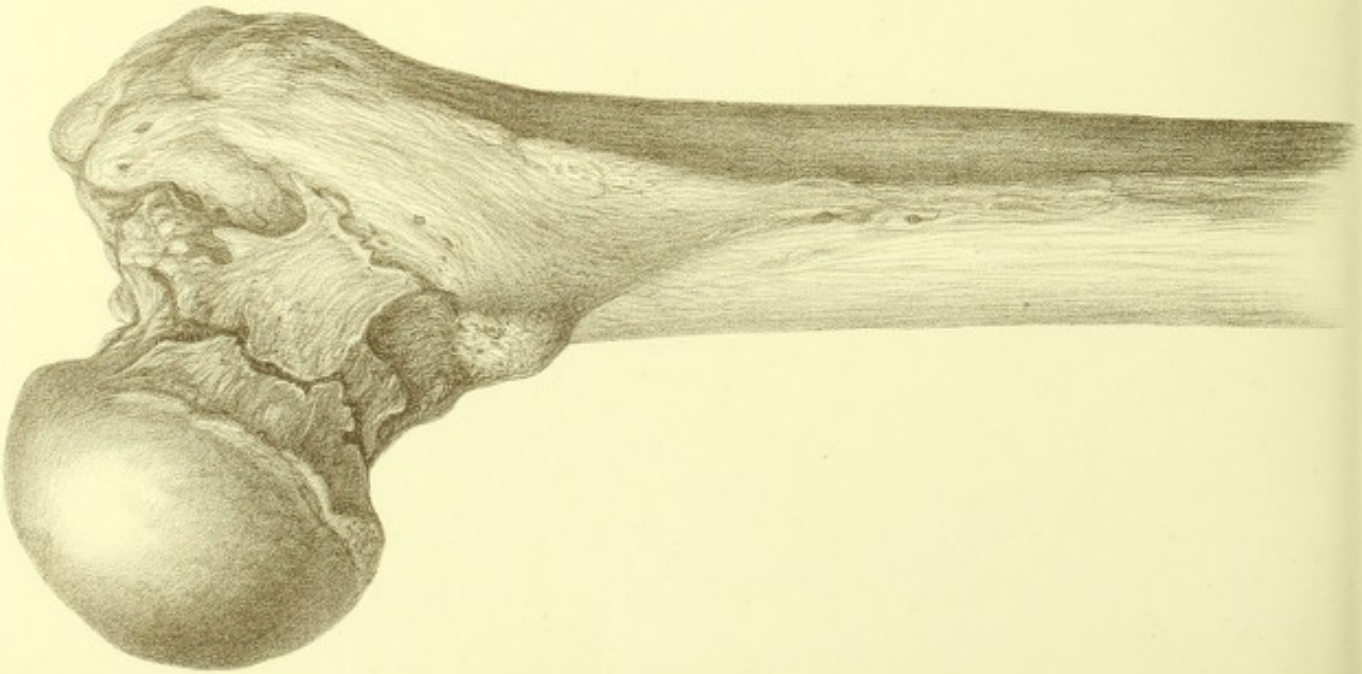

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PLATE XLI.

BONY UNION OF AN INTRA-CAPSULAR FRACTURE OF THE NECK OF THE FEMUR.

Fifty years ago there was much dispute as to whether after intra-capsular fracture of the neck of the femur bony union ever results. The discussion has now almost died out, though it can scarcely be said that unanimity of opinion has been attained, for some of our best authorities, Malgaigne, Hamilton, &c., still express a degree of scepticism much exceeding, probably, that of the majority of surgeons. Sir Astley Cooper, who for long stood in the front rank of the incredulous, never denied the possibility of union. He, however, disputed the fact in almost every specimen that was submitted to him, including, it is said, the very remarkable one which is the subject of this plate. Following his authority, for long it amounted almost to an article of creed with English surgeons, that although fractures of the cervix femoris within the capsule might unite by bone, yet practically they never did so. The facts which made this scepticism possible, in the face of numerous specimens which appeared to prove the point, were chiefly the following :—1st, that the conditions produced by rheumatic arthritis are often very deceptively like those of united fractures; 2ndly, that a peculiar interstitial absorption of the neck of the bone may follow contusions, which will simulate closely a repaired fracture; and 3rdly, that in cases where the fact of fracture and that of union are both proved it is almost always open to the objector to suggest that the line of fracture was not at all parts within the capsule. It may be doubted whether on any other question of fact in practical surgery such vigorous pertinacity of doubt has been displayed. The reader who is interested in examining the evidence respecting individual cases of supposed union will find it given in much detail and with great fairness in the work of Hamilton, to which I have referred. I shall not here attempt any *résumé* of them, but shall content myself with a brief statement of creed. My opinions, I may be permitted to state, are based upon a large experience of these

injuries in the living, and upon a careful examination of the specimens in most of our European museums.

In the first place I may avow my belief that bony union after fracture within the capsule is not nearly so infrequent as it is generally thought. The recognition of the precise position of the fracture in the living, or even of the fact of fracture, is by no means an easy matter. It may often happen that a fracture diagnosed as intra-capsular is really, in part or wholly, outside the joint. This, to a certain extent, invalidates any conclusions which we may form from the experience of cases in which no opportunity for dissection has occurred. It may be admitted also that it is often very difficult to decide whether or not union has occurred. For long it has been my invariable custom to treat all suspicious injuries at the hip-joint with the long splint, using it not so much for extension as for fixation. The result has been that of the cases in which we diagnosed intra-capsular fracture a majority have, so far as I could tell, ended in good union. Of the cases which came under care late, and in which no treatment had been adopted in the early stages, most have ended in non-union, but with careful abstinence from undue movements for purposes of diagnosis, and prompt fixation by splints, I believe non-union to be the exception.

My impression is that an amount of incredulity almost beyond what is reasonable has been displayed as regards the reception of specimens supposed to illustrate the occurrence of union. I believe that a good many preparations quite worthy of confidence exist in different museums.* I cannot admit that the dictum by which it has been sought to exclude as evidence all specimens in which the neck of the bone has been shortened is a sound one. Surely if an unbroken cervix may, as the result of contusion only, undergo interstitial absorption and shorten, there is no reason why one which has been fractured and united may not show a similar change. Nor is it improbable that comminution or something approaching to impaction may in certain cases account for considerable shortening. Yet by this supposed law some of the best specimens of union have been put aside as being probably the results of disease rather than of injury.†

Nor does it appear to me much more to the point, for the purposes of practical surgery, to attempt extreme precision as to whether at all parts the fracture is strictly within the capsule. It

* In my "Museum Notes" of January 23rd, 1870, I mention having seen in the Museum of Trinity College, Dublin, no fewer than three specimens of well united intra-capsular fractures of the neck of the femur. One of these was shown me privately by the curator, and had not at that time been added to the collection.

† See Hamilton's work.

is sufficient, so far as rules of practice are concerned, that the line of fracture is transverse, that the great trochanter is not involved, and that at any rate the greater part of the fracture is within the capsule. In dried specimens it is often quite impossible, especially if any shortening have occurred, to tell exactly where the fracture passed. It may be freely admitted that the closer the fracture is to the head of the bone the less the chance of union, and that if at some part the line of breakage passes beneath the fibres of attachment of the capsule that chance is much increased. The impediments to union are, no doubt, several—the senile atrophy of the bone involved, the defective blood-supply to the head, the difficulty of maintaining the fragments in apposition. The detrimental influence of each one of these will, as just remarked, be increased in proportion to the nearness of the fracture to the head. The division of all fractures of the cervix into "intra-capsular" and "extra-capsular" is to a large extent arbitrary, and ill-suited for clinical needs. The fact is that many transverse fractures within the capsule are attended by other lines of breakage external to that structure. In a future plate I shall illustrate this point, and shall have to insist that there are, indeed, but very few uncomplicated transverse fractures which are not wholly or chiefly within the capsule.

The bone which supplied the illustration which I now publish is one of the many treasures of the Pathological Museum of the Leeds Hospital. The drawings were (by permission) made for me by Mr. Tuffen West some years ago at the time of the visit of the British Medical Association to Leeds. The specimen is the best example of union of an intra-capsular fracture with which I am acquainted, and as it appears to be beyond all cavil I have great pleasure in endeavouring to secure for it a wider recognition.

The drawings show so exactly the condition of the bone that it is scarcely necessary to describe them. It will be seen that whilst the transverse fracture is wholly within the capsule, and nowhere more than half an inch from the articular head, yet that on the back of the cervix some fragments have been detached which pass much further out. It is worth notice also that in the section of the bone the edge of the lower outer layer is seen to catch in the cancellous tissue of the articular fragment, thus constituting a degree of impaction which no doubt much favoured fixation and union. The specimen was obtained by the late Mr. Chorley, formerly Surgeon to the Leeds Infirmary, from the body of a gentleman, aged seventy, whom he had attended several years before his death, with the diagnosis of fracture of the neck of the thigh-bone. The treatment had been by very careful immobilisation and long-

continued confinement to bed. The recovery had been such that the patient had been able to walk well with a stick.

In 1870, when editor of the 'British Medical Journal,' I published in the "Museum Notes" a woodcut of this bone, with full particulars of the case, which had been supplied to me by Mr. Wheelhouse, of Leeds, by whom the specimen was mounted.

This specimen is alluded to by Malgaigne and Hamilton, as if it were of doubtful validity, but neither of them had probably seen it.

I cannot but hope that the publication of these life-size drawings of the bone will set at rest all scepticism as to the possible union of intra-capsular fractures. I trust also that it may lead to greater hopefulness in the treatment of these accidents, and thus to more systematic care in securing coaptation.

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Fig. I.

Fig. II.

Fig. III.

Fig. V.

Fig. IV.

Fig. VI.

Fig. VII.

Fig. VIII.

Fig. IX.

MALFORMED TEETH IN HEREDITARY SYPHILIS.

Jurgens ch. lith.

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PLATE XLII.

MALFORMED TEETH IN HEREDITARY SYPHILIS.

About the year 1857, having for some years previously been engaged in the endeavour to discriminate between the conditions due to inherited syphilis and those which result from scrofula, I stumbled upon the observation that many of those in whom there seemed reason to suspect syphilis had very peculiar teeth. With the assistance of my friend Mr. Alfred Coleman I soon collected a large number of models, drawings, and photographs, by the comparison of which we were able to describe definitely the peculiarities in question, and also to assert that they did not occur in other cases, and had nothing to do with struma. In 1858 I made a communication to the Pathological Society on the subject, and in 1863 published my work on 'Syphilitic Affections of the Eye and Ear,' in which, by the aid in large measure of the teeth symptoms, I was able to show that what had previously been called "strumous corneitis" was really peculiar to the subjects of inherited syphilis, and that choroiditis disseminata and some other affections usually stood in the same relation. Subsequent experience, my own and that of others, has more than confirmed the estimate I had been led to form as to the value and trustworthiness of this symptom. That it requires great care in its application to purposes of diagnosis I freely admit, and also that there are many cases in which the malformations are so slight as to cause suspicion only. If, however, care be given, and if the conditions are present in a well-marked degree, then I believe they may be trusted implicitly. During the last twenty years it is scarcely too much to say that I have been using this symptom almost every day, and although it has often failed me in the sense of not being present in a degree sufficiently well marked I do not think that it has ever misled.

In the present plate I have copied a selection from my drawings showing the best-marked conditions of syphilitic teeth, and a little comparative study of these figures will, I trust, easily enable any one, even previously inexperienced, to readily appreciate what these

conditions are. I will first briefly describe the figures, and then append a few rules for the diagnosis of hereditary syphilis by means of the teeth.

Fig. 1 (Plate XLII) shows a very characteristic pair. (Fig. 9.) The upper central incisors of the permanent set are seen to be short and narrow. They slant towards each other, are discoloured from defect of enamel, and each shows in its edge a broad vertical notch. In this notch the enamel is wanting, the dentine is exposed and discoloured. This description will apply equally well to Fig. 4.

Fig. 9.

Syphilitic teeth.

Fig. 2 shows the two central incisors notched and malformed, but not symmetrically. (Fig. 10.) The right tooth is very much dwarfed, being much less than the lateral incisor. Its corners also are shaved off, and its vertical notch is deep. In its fellow-tooth the conditions are different, and this tooth, although short and dwarfed, is wide at its edge, and shows a broad and very shallow notch. This is a very exceptional set. It will be seen that neither the lateral incisors nor the canines are quite symmetrical in size or shape. They do not, however, display any important peculiarities. This occasional want of symmetry is again well illustrated in the appended woodcut (Fig. 11), in which the left incisor alone is notched.

Fig. 10.

Syphilitic teeth, unsymmetrical.

Fig. 11.

Syphilitic teeth, unsymmetrical.

Fig. 3 shows a central incisor in a syphilitic subject which has just been cut. It is of large size and fair colour, but its corners are sloped off, and in the middle a broad notch is marked out, which for the present is occupied by three small sharp spines. The spines described would be present only a short time, and when worn away by use would leave the tooth with a very characteristic notch.

Fig. 4 I have already described under Fig. 1.

Fig. 5 shows not only the teeth but the mouth, and at the angles of the latter are radiating fissures, such as are often very useful in helping the diagnosis. They are the consequence of troublesome and long-continued ulceration of the skin in early infancy. The teeth show the characteristic notches, and are short and dwarfed, but their enamel, and especially that of the right tooth, is much more deficient than is usual in syphilis. In all probability this was due to the use of mercury in infancy. We have the peculiarities of "mercurial teeth" associated with those of

"syphilitic teeth," a conjunction by no means uncommon, and of which I have given two illustrations in the plate showing "stomatitis teeth" (see Plate XI).

Fig. 6 has most unfortunately been depicted wrong way up. It represents the permanent incisors of the lower set from a syphilitic mouth. They are short, round, and stumpy—"peg-like teeth." This dwarfed condition of the lower incisors is common in inherited syphilis, but I attach no importance to it as compared with the notches, &c., in the upper central incisors. This figure may be profitably compared with Fig. 9, in which the lower incisors show foliated excrescences, after the wearing away of which the teeth will be left dwarfed and stumpy, much like those in Fig. 6.

Fig. 7 shows a pair of teeth well notched, but not so much dwarfed as usual, and not quite of symmetrical size. The teeth are long, but deficient in breadth, and do not touch each other.

Fig. 12.

Syphilitic teeth.

Fig. 8 shows an exceedingly characteristic pair of central incisors. It also shows that the lateral incisors have escaped, whilst the right canine has a notch, and the left a constricted extremity or gemmule. The appended woodcut shows a very similar set of teeth.

Fig. 9 shows the upper central incisors, short, narrow, an divergent, leaving a wide space between them. Broad, well-marked notches exist, but are as yet occupied by a thin growth of dentine, destined to wear away before long. (These teeth had not long been cut.) The lower set are peculiar in showing a horizontal line of depression, above which are foliated or wart-like projections. These conditions are rare, and although very suspicious, I should by no means feel justified in considering them characteristic.

It is to be understood, respecting all these drawings, that they were taken from cases in which the diagnosis was beyond doubt. I shall not encumber my description with any history of the patients, as it would be foreign to my present purpose.

It is a point of some little importance, as illustrating the ease with which these teeth may be recognised, that I have now, after twenty years' additional observation, little or nothing to add to my descriptions of 1858. On again reading my paper in the 'Pathological Society's Transactions' of that date I find that I have little to alter in what is there stated. The chief advance has been in the clearer recognition of the peculiarities which result from stomatitis (mercurial or otherwise) apart from syphilis. We are now able

easily to allot to the two influences each its due share, and even when, as is very frequently the case, the two exist together, to say which features belong to syphilis and which to the mercury which was given to cure it. I now hold it as established that defects in formation of the enamel, as distinct from arrested development of the tooth as a whole, result from stomatitis, and that great clinical use may be made of the fact that these defects are observed chiefly in certain teeth. Just as the upper central incisors are the teeth to be looked at in reference to the diagnosis of syphilis, so are the first permanent molars in respect to stomatitis. In Plates XI and XLIII I have fully illustrated and described the peculiarities of stomatitis teeth. It is a very remarkable and interesting pathological fact that these two influences should produce conditions so different and so easily distinguishable, and an important corollary follows on it, to the effect that the malformations due to syphilis do not depend upon stomatitis in its general sense. At any rate, the stomatitis or alveolar congestion which causes the malformations of syphilis must differ definitely from that caused by mercury, since its peculiarities are so marked in their permanent results.

At this point I may note an interesting additional observation on the subject which has been made by Mr. Moon, one of the Dental Surgeons to Guy's Hospital. It is to the effect that, next to the upper central incisors, the first permanent molars are prone to exhibit change of form in syphilitic subjects. The changes consist in a want of expansion of the crown, the sides of which fall together and thus produce a sort of dome rather than a flattened surface. It is the counterpart of what happens in the central incisors when arrest of development of the middle denticle leads to a falling together of the sides of the tooth, which becomes narrow where it should expand. I can confirm the accuracy of Mr. Moon's statement, but as the peculiarities are far less easy of recognition and less definite than the notching and dwarfing of the incisors, the latter must still remain "the test teeth for hereditary syphilis." In cases in which the latter do not permit of the formation of a positive opinion, valuable aid may be obtained by observing whether or not the patient possesses dome-topped first molars.

I would suggest the following memoranda as rules for the avoidance of error in the diagnosis of heredito-syphilis by the teeth:

I. That no special peculiarities are to be looked for in the first set. It is the permanent sets which alone show features which are reliable.

II. That it is not in the cases in which very conspicuous defects

are present that syphilis is most to be suspected. What are known as craggy teeth, and also many forms of stomatitis teeth, are far more conspicuously malformed than are those of syphilis, and there can be no more serious blunder than to imagine that bad teeth in proportion to their badness of form are to be suspected of syphilis.

III. The upper central incisors of the permanent set are the teeth which are to be chiefly looked at, and are the only ones which afford evidence which is beyond question. The other teeth—those of the lower set, the lateral incisors, the canines, and even, as Mr. Moon has shown, the first molars—may often afford corroborative testimony, being often peculiar in form; but, I must repeat, they are never to be trusted alone.

IV. The chief peculiarity is a general dwarfing of the tooth, which is both too short and too narrow, and, from its sides slanting together, presents a tendency to become pointed. This tendency to pointing is always defeated by the cutting off of the end, the truncation being usually effected in a line curved upwards so as to produce a single shallow notch. At the bottom of this notch the enamel is deficient and the dentine exposed, but there is no irregular pitting, as in stomatitis teeth.

V. It is to be kept in mind that the malformations are usually symmetrical, that is, they affect pairs of teeth. The two central incisors resemble each other, and the two laterals are also alike. If any defect passes horizontally across all the incisors at the same level and affects them all alike, it is probably not due to syphilis.

VI. In syphilis the lateral incisors usually show little or no malformation.

VII. The occurrence of the peculiarities due to syphilis, and of those due to mercury in the same mouth, is exceedingly common.

In conclusion I may, perhaps, be permitted to beg of those who purpose to employ the teeth as a means of diagnosis of inherited syphilis that they will first carefully study the details of the subject. By the aid of plates, or still better by the inspection of the mouths of patients, these are not difficult to master; but reliance on verbal descriptions is almost certain to lead into error. I am well aware that it is a matter of very frequent occurrence to mistake mercurial teeth for those due to syphilis, but for such blunders I cannot accept any responsibility. The plates which I now publish are in many respects reproductions of what I gave twenty years ago, and at that time the distinctions were clearly laid down. All that is needed is a little care in preliminary study of details.

Although the teeth are, if taken alone, by far the most valuable

of the signs by which we recognise, in adolescents, the fact of inherited syphilis, yet there are other very important ones which will corroborate or which may, even in the absence of the teeth peculiarities, supply the means of diagnosis. I will enumerate these briefly in their order of relative importance.

1. A group of physiognomical peculiarities :—(*a*) sunken bridge of nose ; (*b*) prominent frontal eminences ; (*c*) scars at corners of mouth ; (*d*) silky softness of skin with absence of colour.

2. The history of a past attack (or the evidences of a present one) of interstitial keratitis. This disease usually affects both eyes, and causes very great defect of sight lasting over several months ; then it clears away, leaving the cornea a little cloudy, or it may be perfectly bright. Often there remains a peculiar steel-grey lustre on the iris.

3. The presence in the choroid of scattered patches of absorption, especially in the peripheral regions. These will often afford conclusive evidence when other symptoms fail us.

4. The presence of periosteal nodes on one or on many of the long bones. (See Plate IX.)

5. The occurrence, present or past, of a peculiar form of phagedænic ulceration, sometimes erroneously called lupus. This may affect any part, but is often seen in the face or in the throat.

Fig. I.

Fig. II.

Fig. III.

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Fig. IV.

Fig. V.

Fig. VI.

Fig. VII.

Fig. VIII.

Fig. IX.

PECULIARITIES IN THE DEVELOPMENT OF THE TEETH FROM VARIOUS CAUSES.

PLATE XLIII.

PECULIARITIES IN THE DEVELOPMENT OF THE TEETH FROM VARIOUS CAUSES.

Some of the illustrations given in this plate have been introduced in order to show the state of the first set of teeth in certain cases of inherited syphilis, and others to exhibit varieties of malformation in the permanent set, which it is essential to distinguish carefully from those which are due to syphilis. It will be convenient to describe them not in numerical order, but in row down the plate, as in this way they will fall into more natural groups.

Fig. 1 shows the milk teeth of a child, aged three, who was the subject of inherited syphilis. The necks of the four incisors have been attacked by eroding caries, which has extended round them, entirely destroying the enamel and eating into the dentine. The crowns of the two lateral incisors have broken off, and those of the central ones were, no doubt, destined soon to follow.

Fig. 4 shows a similar state of the teeth but in a more advanced stage, the central incisors having been wholly destroyed, and the laterals remaining only as stumps. From a child of five, the subject of inherited syphilis.

Fig. 7 shows a stage of the same condition but still further advanced, all the upper incisors being lost. In this case, also syphilitic, the boy was aged nine, and the cutting of the upper permanent set had been much delayed. This figure is given not so much to show the deficiency of the incisors as the very peculiar manner in which the canines have been worn. On all the canines the enamel is deficient, and a circular ridge is left in the crown of the tooth not far from the gum. Thus the end of the tooth projects as a short blunt spine. I do not know how to interpret this peculiar condition, but I have seen it several times in the milk set of syphilitic subjects. I am by no means sure that it does not occur also in those who are not syphilitic.

Fig. 2 shows a permanent canine from a syphilitic subject, but the peculiarity illustrated is probably by no means restricted to

syphilis. The tooth is large and well formed, with the exception that its terminal part is denuded of enamel, and thus exhibits a short, sharp-pointed spine (or gemmule) surrounded at its base by a circular furrow. Canine teeth, more or less like this, are very common in syphilitic mouths, but they occur also after stomatitis from mercury.

Fig. 5 is introduced in order to illustrate what, perhaps, needs no proof, that syphilitic patients do not always show syphilitic teeth. The boy from whom this drawing was made was one of a family which suffered most severely from syphilis. He himself was covered with nodes, for which he was repeatedly under my care in the London Hospital. He had also disease of the liver and albuminuria, and of the latter he finally died. His physiognomy showed but little peculiarity, and his upper incisor teeth, as shown in this portrait, were well formed and without a trace of notch. I have many times seen the teeth of those who undoubtedly inherited syphilis in a severe form quite free from peculiarities. This absence of tooth malformation is, I think, especially frequent in those who suffer from phagedenic forms of syphilis. I have some years ago published the opinion that when syphilitic ulceration of the throat occurs in connection with inherited taint, it is rare to find the teeth malformed.

Fig. 8 shows the upper permanent incisors from a boy who suffered severely from scrofula. It will be seen that the teeth are large, well formed, and white. They had only recently been cut, and their edges are sharp and slightly serrated, a condition which usually disappears with wear.

Fig. 3 is introduced in order to show the serrations which are common in normal teeth. It is extremely important that these serrations should be distinguished from the syphilitic notch, with which they have nothing in common. These serrations may vary in number and very much in their degree of distinctness. Usually an upper central incisor shows three little teeth and two notches, but, as is shown in the left tooth in this sketch, there may be four teeth and three notches. In the lateral incisors there is usually a single central notch, one which if it occurred in the central incisors might easily lead to the suspicion of syphilis. The lower teeth present similar serrations. It will be seen that all these teeth are of good size and colour, not in the least resembling the dwarfed and discoloured teeth of syphilis. It may be convenient to point out in connection with this figure that the malformation peculiar to syphilis is caused by the non-development of the central denticle in the three-toothed upper central incisor. This leaves a gap in the

middle, and allows the lateral denticles to fall together, thus producing the peculiar shape so well illustrated in several of the figures in Plate XLII.

Fig. 6 shows what may be denominated "craggy teeth." The enamel on the lower halves of the crowns of the upper incisors is absent, and its deficiency is bounded by an abrupt transverse line which deeply grooves the tooth. The lower and denuded part of tooth shows strong ridges, and is by no means in the soft, pitted, and crumbly condition often seen in the teeth of stomatitis. I believe that a tendency to these craggy teeth is sometimes a matter of family inheritance, and they may sometimes probably be produced by mercury. They are to be most carefully distinguished from those of syphilis.

Fig. 9 exhibits mercurial- or "stomatitis-teeth" from a boy, aged 15, who was known to have taken much mercury. The enamel is defective, pitted and discoloured, the edges of the teeth are too sharp, and along the lower set several transverse lines are seen to cross. There is not a single feature in these teeth which should lead to any mistake as to syphilis, and if conditions resembling these were met with in syphilitic mouths they would probably be due to the mercurial treatment which had been adopted for the disease. Plate XI contains several sets which may be suitably compared with this figure, as they illustrate the same conditions. In Plate IX of the 'Path. Soc. Transactions,' vol. x, I have given several others still more closely similar.

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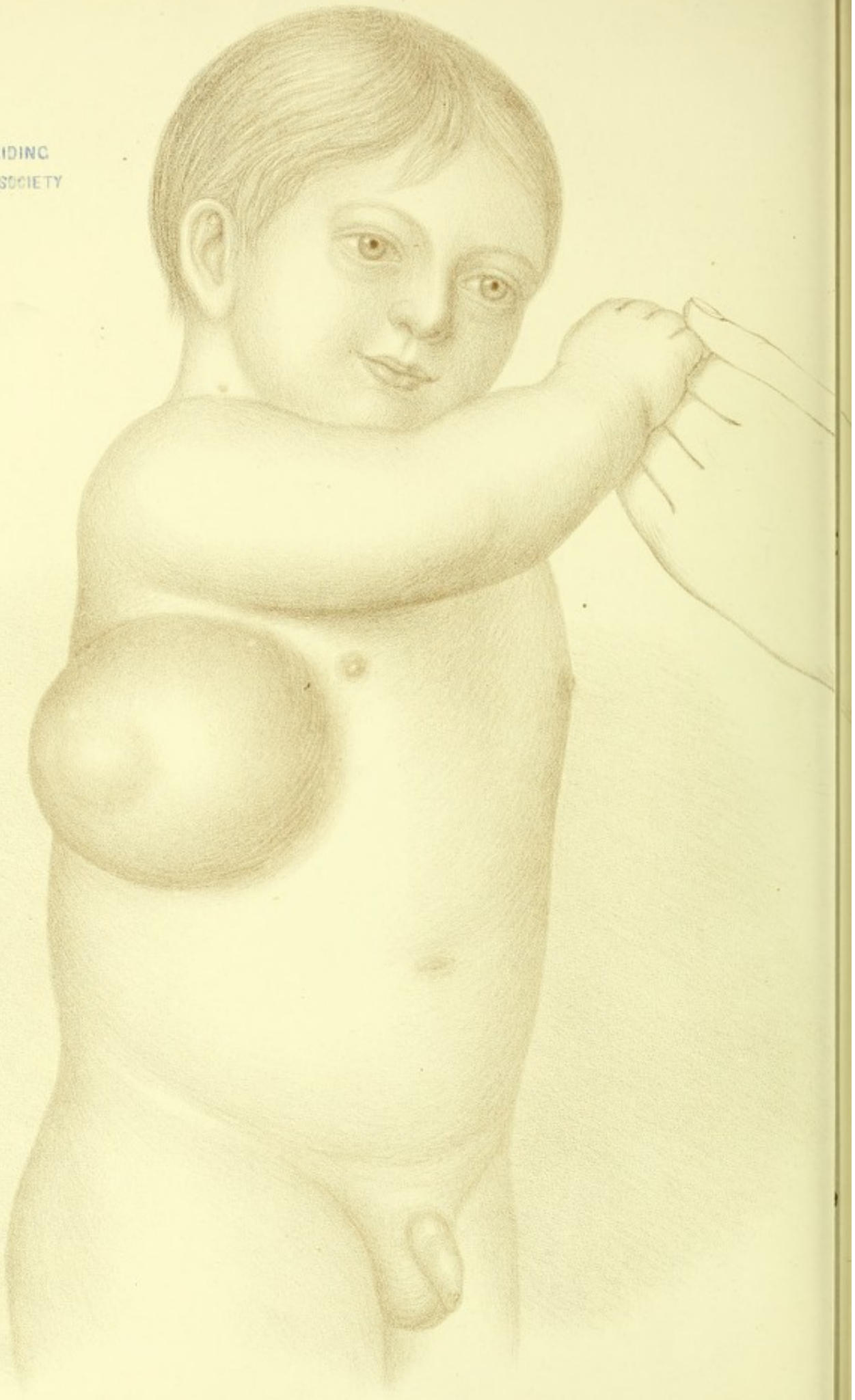

CONGENITAL FIBRO-CYSTIC TUMOUR.

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PLATE XLIV.

CONGENITAL FIBRO-CYSTIC TUMOUR.

The patient whose portrait is here given was an infant of a few months old, who was sent to me by the late Dr. Cooke, of Trinity Square, in 1860. The tumour had been present from birth, and was as large as a fist. It adhered to the skin, and in its middle was a small lobular projection, where the skin was thinner. There was not the least inflammation, and it caused the child no inconvenience. It was thought that it had not materially increased since birth. In the first instance it had been suspected to be a hernia of the lung, but as during crying, it did not alter, nor receive any impulse, this suggestion had been abandoned. It was a firm solid-feeling tumour, with soft places where fluctuation was evident. My diagnosis was that it was fibro-cystic growth, resulting possibly from intra-uterine transformation of a subcutaneous nævus, and I ventured to predict that it would undergo spontaneous shrivelling. Nothing was done in the way of treatment. A few months later it inflamed and swelled very much. During this condition the child was feverish, and became very thin. Cold lotions were applied, and although suppuration had appeared imminent it did not take place. After about a fortnight's inflammation the swelling began to subside, and the whole of the tumour rapidly disappeared. The child regained its health, and when seen some months afterwards nothing but a fold of flabby skin marked the original position of the tumour.

The course taken in the above case is, I believe, the usual one in the kind of tumour under consideration, nor is the tumour one of any very great rarity. I have seen many such, and in most spontaneous shrivelling after an attack of inflammation occurred. They are always congenital, and usually remain without change and without any great degree of growth, during the first six months of

life. Then, without any obvious exciting cause, the tumour inflames, swells very much, becomes red, and looks as if it would burst, but it never does so, and after the inflammation has reached its height spontaneous disappearance ensues. I have seen several cases in which the infant was alarmingly ill during the stage of inflammation, but I never knew one die. In several I have been consulted for the first time during the stage of inflammatory swelling. In one such, a child was sent to me by my friend, Dr. Hooper May, of Tottenham, with an enormous swelling implicating the whole of the right upper arm. The child was very ill, and immediate amputation at the shoulder had been advised at an hospital. We covered the limb with strips of lint wet in spirit and lead lotion, and three months afterwards I demonstrated to my class at the London Hospital that nothing remained excepting pendulous folds of skin. An almost precisely similar case was shown me by my former colleague Mr. Louis Little (now of Shanghai). In this the thigh was implicated, and here again the condition was so alarming, and removal of the limb had been advised as the only means of saving life. Under the same treatment as in Dr. May's case a precisely similar result was obtained. Such cases show in the clearest possible manner the importance of a correct diagnosis of these cases and of a knowledge of their tendencies. In the early part of my surgical career I several times excised tumours of this class, but I have now for many years uniformly declined to meddle with them in infancy. Spontaneous cure is the rule, and persistence the exception, and if at any subsequent period of life, in childhood or later, such a tumour should by its size or position be a source of inconvenience it will be time enough then to attempt its removal. As another reason for delay it may properly be urged that the operation is at a later period much less formidable and attended with far less risk. I believe that nothing of the nature of true growth usually occurs to such tumours after the first few months of life are over. They may inflame, as already stated, but the surgeon must be on his guard, and not mistake an attack of inflammation, which will end in cure, for one of rapid growth. During the first few months of life these tumours, like nævi, often grow, but like nævi their progress is always arrested at a certain stage, and after that they either retrograde or remain stationary.

A hint has been dropped that these growths may be formed in nævoid structures which have undergone changes during intra-uterine life and ceased to be vascular. The irregularity of the cyst cavities and their occasional tubular form, and the mixture of small cysts or cavities with solid fibrous structure, favours this view. It

is also supported by the fact that very often some small portions of still vascular nævus structure may be observed in the skin near to the tumour. On the other hand, it is to be admitted that the cysts rarely contain a coloured fluid, and that they rarely much implicate the skin. They are developed in the subcutaneous tissue, and adhere closely to the skin, so that it may be quite impossible to dissect it off, but they do not involve it in structural changes.

I believe that this group of congenital tumours ought to be carefully separated from another group with which they are often associated by authors. I allude to the cystic formations which occur in the root of the neck and sometimes in other positions, and which are, as Mr. Thomas Smith has remarked, always developed beneath the deep fascia. These latter are illustrated in Portrait VII, and in the Appendix to Vol. I (see p. 236), I have been able to give a detailed dissection, which proved that these cystic formations are symmetrical, and pass from the neck into the thorax. It is very possible that they are formed in connection with the branchial clefts. In them the fluid contained is often not to be distinguished from blood, and the cysts are large and have thin walls, and there is not, as a rule, much inter-cystic solid tissue.

It is yet open to doubt whether some of the congenital coccygeal tumours may not be of the same nature as those of which we are now treating. It may also be suggested that it is quite possible for these tumours to undergo spontaneous shrivelling *before birth*. I have several times seen puckered bags of flabby skin in growing infants just such as might be likely to result from such atrophy.

These tumours may occur on any part of the body or limbs, but are especially frequent on the sides of the trunk, or in the cheeks or upper part of neck. I do not think that I have ever myself seen one below the knee or below the elbow, but in the London Hospital Museum we possess an excellent specimen of a very large one in the calf of the leg. In the Museum of the Richmond Street Hospital in Dublin there is a coloured drawing representing one in a similar position.

The reader who is interested in the subject will find an excellent paper by Mr. Thomas Smith in one of the early volumes of the 'St. Bartholomew's Hospital Reports.' The chapter in Holmes' work on Surgical Diseases of Childhood is also full of important material.

The following cases I append by way of illustration:

The patient whose portrait is given in the appended woodcut (Fig. 13) was

Fig. 13.

under my care at the Metropolitan Free Hospital many years ago. The tumour was a large ill-defined lobulated mass in the left cheek and side of neck. Some small portions of nævus structure were present in the skin at its base. I excised the tumour, but it was a tedious business, owing to the difficulty of detecting the margins of the diseased structure and the free bleeding. The child recovered well.

In reference to operations I may here remark that no further harm comes of leaving portions of the tumour than that the result as regards removing deformity is imperfect. There is no danger of "growth" of the portions left behind.

On September 22nd, 1862, a child, aged nineteen months, was sent to me by Dr. Mackenzie, at the London Hospital. He was well grown, and in good health. The tumour was on his left side, extending from the nipple downwards and backwards to below the lowest rib. The skin adhered to it in most parts, but was quite healthy: here and there a bluish tinge was to be noticed, as of a distended vein seen through the skin. The tumour was loose and flabby, and indistinctly lobulated. In most parts the presence of fluid in small separate collections was perceptible. In one part where the largest collection existed I could, by alternately squeezing the upper and lower half, produce a very evident sensation of the passing of a stream through a small orifice. No doubt there were two cysts which communicated at this point. Pressure on it gave him no pain. There had never been any inflammation about it, but occasionally it became much fuller for a few days, and then subsided.

His mother thought that it had increased in size proportionately to the child's growth, but not more. It was noticed at the time of birth, and was then about the size of two eggs side by side and flattened. There were no nævi or "mother's marks" on any other parts.

A day or two after I had seen the subject of the preceding case my friend Mr. Taylor requested my opinion of another very similar one. In this instance the child was only seven weeks old. The tumour was just below and to the outer side of the left nipple. It was tense, unevenly rounded, and about the size of a small orange. It fluctuated in most parts, but was evidently divided by dissepiments of fibrous structure. The mammary gland itself was enlarged, and was lifted up on the upper margin of the tumour, from which, however, it was quite distinct. By pressure, a drop of milky fluid was squeezed out of the nipple. (The infant was a boy.)

The tumour in this case was very tense, and it was not easy to be certain that it did not become more so when the child cried. By firm pressure, however, under its edges, I satisfied myself that the ribs were perfect. Mr. Taylor had punctured the tumour a fortnight before I saw it, but obtained only a little serous fluid. The wound, after slight inflammation, healed, and no permanent diminution of size followed. The skin adjacent to the scar was adherent, but at other parts it could be lifted from the tumour. The child was in good health. The tumour had increased considerably since its birth. No nævi, or "mother's marks," existed on other parts.

In April, 1863, the child was again brought to me on account of the tumour having inflamed. It was much increased in size (see stereoscopic portrait), and the skin over it was tense, and in parts red. Fluctuation was very distinct, but there was clear evidences of its being divided into separate cysts by tense and firm bands which crossed it. I suspected suppuration and used a small trocar at the point which

Fig. 14.

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threatened to point. Only yellow serum was obtained. It flowed freely to two ounces, when I withdrew the canula. The fluid set rapidly into a solid fibrinous mass.

The ultimate result was, I believe, an entire disappearance of the tumour.

In May, 1867, Mr. Appleton, of Hackney, sent to me an infant in whose right cheek was a very considerable ill-defined tumour. It caused great deformity, but had given no pain, and the child, now three months old, was thriving well. The tumour was observed at birth, and had increased but little since; neither on the cheek nor in the mouth could I find any traces of vascular nævus. The swelling was closely adherent both to skin and mucous membrane. In the centre doubtful fluctuation might be detected. The child had no "mother's-marks" elsewhere.

I advised that nothing should be done to it beyond the application of lead lotion, and expressed my belief that in the course of a few years the swelling would in all probability have disappeared. This result was, however, not attained, and when the child was three years old it presented the condition shown in the appended wood-cut (Fig. 15). It had not grown excepting in proportion to the child's growth, and it was neither vascular nor painful. No attack of inflammation had ever occurred. It was united with both skin and mucous membrane. As the deformity was great and there now appeared but little hope of spontaneous improvement, we decided to excise it.

Fig. 15.

In the operation I was assisted by Dr. Appleton, and his partner, Dr. Slimon.

It was necessary to cut away a considerable portion of the cheek, and the skin was inseparably involved. The operation was rendered troublesome from the fact that the growth had no definite boundaries. It consisted of thick fibrous tissue with numerous small cysts of irregular form. The bleeding was not excessive. I have seen the patient several times during an interval of several years from the operation, and the result is as good as could be expected, seeing that it was necessary to excise the angle of the mouth.

The following case is of interest as proving, like the preceding one, that these tumours do not always shrivel, and next, as giving evidence in support of the belief that they originate in nævi:

In April, 1875, an adult man was under my care in the London Hospital for injuries. He had in the outer part of his right thigh a large, very irregular tumour, which he said had been there since he was a boy. He thought it had begun at about ten years; at any rate, it was first painful then. It consisted of two chief masses, each as large as a fist, one of them immediately beneath and adherent to the skin, the other more deeply placed. There were hard knotty lumps in both. The tumour gave him no trouble, and he was not desirous of treatment.

As a clue to the nature of the tumour there was present in its upper part a patch of nævus stain about as large as a penny.

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OCCIPITAL MENINGOCELE.

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PLATE XLV.

OCCIPITAL MENINGOCELE.

Although in this case the tumour was successfully removed, and was proved to have no communication with the cranial cavity, yet I have no hesitation in assigning it to the class of meningoceles. In all probability it had resulted from an intra-uterine extrusion of cerebral membranes with subsequent obliteration of the channel of communication. The subject of the case was a child under the care of Dr. Joseph Todd, of Selby, Yorkshire, by whom I was asked to see it. The tumour was congenital, and had not materially increased in size since birth. It did distend when the child was made to cry. The child's limbs were well developed, and its health good. Excepting on account of the bulk of the tumour, and the inconvenience involved, there was no reason for interference. The neck of the tumour ran up into the occipital region, and, although we hoped that it had no communication with the skull, it was impossible to feel sure. Knowing that in some cases in which, after careful investigation, the diagnosis of no communication had been formed and excision performed, death had yet resulted from arachnitis, I at first refused to remove the tumour. On a second occasion, however, Dr. Todd told me that the child's parents were quite resolved to take the risk of an operation, and thought that the child had better die than live with such an encumbrance. Under these circumstances I consented to do the operation. In the middle of the neck of the tumour we found a dense fibrous cord, which ran up to the base of the skull, and in this were several blood-vessels, which bled freely. There was no serous canal, but no doubt the cord mentioned was the remains of the original channel. The size of the tumour after removal, and the peculiarities in its pedicle just referred to, are well seen in fig. 2 of Plate XLVI. The cyst was lined by a smooth membrane, and contained clear serum. The child made a good recovery, but I cannot forget that we ran a very great risk of opening a meningeal sac, and am unwilling to admit that success in a single instance like this should be allowed to much interfere with the general rule which enjoins surgeons not to interfere with

congenital tumours in the occipital region. In the fortieth volume of the 'Medico-Chirurigal Society's Transactions,' the late Mr. Solly has recorded a case very similar to mine, and which he appears to have considered unique. In his case the tumour was not removed till the age of 27, and its walls had in the meantime contracted, indurated, and calcified. At the time of the operation there was no longer any doubt that it did not communicate with the head or spine. In infancy the patient had been seen in succession by Mr. Vincent, Sir Astley Cooper, Mr. Abernethy, and Mr. Key, most of whom, regarding it as a spina bifida, had declined to operate. A sketch of the child in infancy had been preserved, and a copy of this appended to Mr. Solly's paper forms a most interesting contrast with one showing the state of things in adult life. The tumour had considerably diminished in size, and become more pendulous. Mr. Solly found in the middle of the pedicle a cord exactly like that which I have described and figured, and which, no doubt, represented the obliterated canal of communication. Mr. Solly and those who had seen the child previously thought the tumour a spina bifida, but Mr. Solly states that Mr. Prescott Hewett had suggested to him that it was more probably in connection with the skull itself. In this latter opinion I should incline to agree. It is impossible in these cases in which the canal has become obliterated, to decide whether it runs up to the occiput or to the spine, and our diagnosis must be guided in large part by the very great rarity of spina bifida in this region and the frequency of tumours connected with the skull. I do not think that I have seen more than two cases in which I thought a cervical tumour to be connected with the spinal canal, and have seen a great many in which at first the position of the tumour suggested that diagnosis, but subsequent examination made me feel certain that it was really a pendulous cranial one. The occipital meningocele usually communicates with the cranium close behind, or even through the foramen magnum.

I do not know of any other cases excepting Mr. Solly's and my own in which tumours of this kind have been successfully removed, but probably others have occurred. M. Lallemand, in 1813, attempted the excision of a tumour from the back of the head of a woman, aged 23, but desisted on finding that it had a cranial communication. His patient died of meningitis, and the tumour proved to be an encephalocele. It is probable, however, that the case did not very closely resemble, either in size or situation of the tumour, the cases now under notice. Mr. Prescott Hewett, in quoting this case, remarks, "and this is not the only case in which an error of this kind has occurred in reference to congenital ence-

phalocele. I could refer you to several such."* Mr. Hewett, in the lecture from which I quote this passage, mentions a case in which Prof. Seerig excised with success a large occipital tumour from a child two and a half years old, but states that it was clearly not an encephalocele. It had increased from the size of a pea at birth.

* 'Medical Times and Gazette,' March, 1862, p 316.

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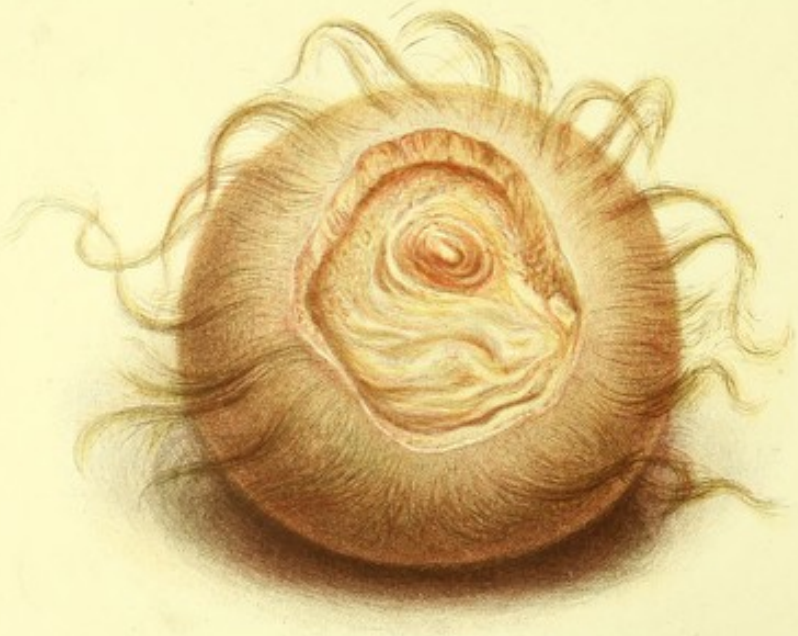

E. Burgess del. ad nat. et chr. lith.

MENINGOCELE.

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PLATE XLVI.

MENINGOCELE OVER THE ANTERIOR FONTANELLE.

The subject of this portrait (fig. 1) is now a fine young man of eighteen. His tumour is scarcely larger than as shown in the portrait, and it is well concealed under a thick mass of hair, and gives not the slightest inconvenience. The portrait shows the state of things when he was a baby of nine months old. He was then sent to me by Dr. ——, with a suggestion that the cyst might be excised. As I found that it distinctly filled when the child cried, and was placed exactly over the anterior fontanelle, I declined to meddle with it. It had been present from birth, and it never showed any tendency to increase. It is the only example of a meningocele or encephalocele in this position that I have ever seen.

Fig. 2 belongs to the preceding Plate and has already been described. It shows the appearance of the occipital tumour after excision.

Fig I.

Fig II.

Fig I

Fig IV.

OCCIPITAL ENCEPHALOCELE.

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PLATE XLVII.

OCCIPITAL ENCEPHALOCELE.

In this plate we have figures taken from photographs of five different infants, showing the commonest form of encephalocele,—that which occurs in the occipital region. The four lower were from subjects seen by myself; the upper one was given me by a friend. These portraits afford a good idea of the differences as regards size and contour which we encounter in these cases, and, at the same time, of their general sameness of aspect. In all instances the tumour consists chiefly of a cyst containing fluid, and projects from the occipital region. The differences concern chiefly the size of the tumour, the width of the pedicle, and the degree in which the occipital region of the skull itself is deficient in bulk. The tumour is usually placed in the middle line, but in fig. 2 is decidedly to the left. It is exceedingly difficult, indeed impossible, to make a diagnosis between a meningocele and an encephalocele in this region, or rather, perhaps, I should say between a meningocele pure and a tumour which contains in addition to the arachnoid sac some portion of the cerebellum or brain. In all cases the cyst-formation constitutes the main bulk, but in a large majority some part of the cerebellum is extruded as well. If the pedicle be long and narrow, the tumour well rounded, and the child's lower extremities well formed, there is reason for hoping that the membranes alone are involved. Sometimes, as shown in Plate XLV, the canal of the pedicle in pure meningocele is obliterated, and we have a serous bag devoid of communication with the interior of the skull. This, however, is very rare, and but too frequently the tumour is large, somewhat lobulated, its pedicle very large, and the state of the child's extremities such as to make it almost certain that the brain itself is involved.

The key to the pathology of encephalocele (and also of spina bifida) is in the fact the extrusion is due, not to want of development of the bones concerned, but to intra-uterine hydrocephalus. Effusion of fluid takes place into the subarachnoid spaces at a period when

ossification of the skull is in but an early stage, and the presence of these bulging cysts prevents the process from being ever completed. We must remember that hydrocephalus or hydrorachitis, as the case may be, is almost invariably internal—that is, it concerns the ventricles or subarachnoid spaces, and not the cavity of the arachnoid itself.* In cases of encephalocele, at whatever part of the skull situated, there is usually a communication with the lateral ventricles, one or both, and in its commonest form (the occipital) the third and fourth ventricles usually form the channel of communication. From the fourth ventricle fluid escapes under the membranes, and, displacing the cerebellum, usually causes it to be included in the external tumour. When this is the case the cerebellum is so much altered in form, through hindrance of development, that its parts can scarcely be recognised. I have dissected several specimens in which this was the state of parts, and there is a good account, with illustrations, of a similar dissection in Mr. Holmes's work on 'Children's Diseases.' Mr. Henry Power, in the sixteenth volume of the Path. Soc. 'Transactions,' has recorded a case in which the development of the cerebellum appeared to have been almost entirely prevented, and parts of cerebral hemispheres occupied the tumour.

We must, of course, expect to meet with great differences in the degree of malformation, and in some the correct identification of parts is very difficult. Amongst the facts which confirm the theory of intra-uterine hydrocephalus we have the not infrequent coexistence of spina bifida, and the frequent complication of this latter, in its turn, with hydrocephalus; also the persistence occasionally after birth of a tendency to further effusion with enlargement of the tumour or of the skull. The precise condition of things at birth will vary with the period of intra-uterine existence at which the tendency to effusion began, and that at which it was arrested. If a considerable interval has taken place between the arrest and the birth, time will have been allowed for contraction of the orifice and for the formation of healthy skin, &c., over the tumour. In these the cyst may be protected by healthy skin and a good thickness of subcutaneous fat, and the tumour may be pendulous and its peduncle small. In others the skin may be very thin or on the point of giving way. By attention to these points some conjecture may be made as to the contents of the tumour and as to the prospects of the continuance of the child's life.

The distinction between meningocele and encephalocele is not, as

* I believe that it is doubted by some good authorities whether there is such a thing as external hydrocephalus or dropsical dilatation of the arachnoid sac.

a rule, convenient in practice or correct in pathology. According to the views just expressed all cases of encephalocele are meningoceles also, for there is always some dropsical effusion into the bag of membranes which surrounds the portion of protruded brain. In rare instances, however, we may have a meningeal cyst without any visceral contents. To these the term simple meningocele might be applicable, but it must be remembered that they are very exceptional, and that the diagnosis of absence of cerebral extrusion is made with extreme difficulty. No mistake could be more fatal than to assume that because any given tumour is proved to be a large bag of fluid that therefore it is not an encephalocele also. If the tumour receives no impulse during cries, and if it cannot be in the least altered by pressure, and the child experiences no brain symptoms from firm and continued pressure, we may hope that the canal in the pedicle is obliterated, and if this is the case then the tumour must be a simple meningocele. In all other conditions, however, the diagnosis on this point must remain in doubt, though we may hope that the cyst is simple with increasing confidence in proportion as it is pendulous, as its outline is smooth and rounded, and its neck narrow. Mr. Prescott Hewitt has stated as the result of his investigations of specimens that in spina bifida nineteen cases out of twenty contain some part of the cauda equina or cord. Probably in the case of the parallel tumours in connection with the cranium a still smaller percentage are simply meningeal.

The chance of the patient's survival will vary with the position of the tumour. The occipital region is the most dangerous, the nasal much less so, and the fontanelles and lateral regions probably the least of all. In the latter regions the protrusions are usually small and remain quite quiet, and it is there especially that the surgeon is likely to be entrapped into the performance of a fatal excision. The best statistical account of the subject with which I am acquainted is contained in a short paper by Mr. Zachariah Lawrence in vol. xxxix of the 'Medico-Chirurgical Transactions.' Of 75 cases collated by Mr. Lawrence, and to which references are given, 53 were in the occipital region, 17 in the frontal, and 5 in the parietal or temporal. In 16 out of the 75 spina bifida was present also. Mr. Christopher Heath produced before the Pathological Society in December, 1864, two living patients the subjects of the fronto-

* An interesting account of the dissection of an occipital meningocele, which was simple, is given by Mr. Bale Hicks, in vol. xv of the Pathological Society's 'Transactions.' The child died on the fourth day. The sac contained fifteen ounces of serous fluid and communicated through an aperture, eight lines in diameter, situated between the foramen magnum and the occipital protuberance, with the left lateral ventricle. The canal of communication was narrow; no portion of brain was extruded, and it may be supposed to have been easily possible that occlusion might have occurred.

nasal form of encephalocele. They were aged respectively three and eleven years, and appeared likely to live, and thus afford support to the statement that this form has only a minor degree of risk to life. On the same occasion Mr. Heath showed a dissected specimen from an infant which had lived only ten hours, its birth having been impeded by a very large frontal encephalocele.*

Concerning the treatment of encephalocele, I have little to add to what I said when treating of its frontal form in Fasciculus I. For the most part the surgeon should certainly hold his hand and abstain alike from injections and from attempts at excision. In the rare cases in which, as in the subject of Portrait, removal without risk is practicable, there is no haste, and it is far better to allow the patient to advance in years, and thus permit of a more certain diagnosis, than to interfere in early infancy. Antiseptic measures may, perhaps, do something to diminish our estimate of the danger of opening a communication with the arachnoid sac; but the uncertainties of diagnosis, and the risk that portions of the brain itself may be found in the tumour, will still remain to enforce the lesson of extreme caution.

* I regret that when I published my first Fasciculus, illustrating Frontal Encephalocele, I overlooked this valuable contribution to our clinical knowledge of the subject.