NOTES

ON

A CASE OF CEREBRAL SUPPURATION DUE TO OTITIS MEDIA
DIAGNOSED AND SUCCESSFULLY
TREATED BY TREPHINING
AND DRAINAGE.

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If any example were required to illustrate the perils of inflammation of the middle ear, and the need of the most careful study of them by physicians and surgeons, the following case would furnish it. It supplies, on the other hand, fresh evidence of the advance of operative surgery to the rescue of cases hitherto considered altogether hopeless, and suggests the possibility of still further progress. Apart from its intrinsic interest, this case is of importance from the contrast it offers as to pathology and symptoms with a case of abscess in the temporo-sphenoidal lobe published by myself in conjunction with Dr. Gowers in the JOURNAL of December 11th, 1886, in which trephining and drainage were also followed by complete recovery. If the present case was, as I believe, primarily one of fairly localised meningitis, the difference of its symptoms from those of the first case are easily explained.

A. G., aged 33, an engineer, was admitted into University College Hospital on January 21st, 1888, under the care of Mr. Heath, who, knowing my interest in such cases, kindly transferred him to my care.

The patient's family history was excellent. When 7 years old he had scarlatinal otitis media, which soon healed, but the right ear has discharged more than once since, and before the last attack. Up to the age of 21 he enjoyed good health. At that time he suffered from some epileptiform seizures, and was treated for them for a few days in University College Hospital. At 24 he states that he was under treatment for gastric ulcer in an infirmary. At 29 he had a bad fall, and injured his spine, after which his right arm and leg were more or less paralysed for eighteen months, with partial anaesthesia. For this he was treated by Dr. Beavor at the Queen Square Hospital, and recovered completely. In May, 1886, he contracted gonorrhoea, and was an in-patient at University College Hospital for prostatic abscess. At this time he began to complain of weakness, and a sensation of coldness in the right leg, which he dragged in walking. The left leg was strong; ankle-clonus was well marked on the right and absent on the left. Knee-jerk was exaggerated on the right and well marked on the left. There was some localised anaesthesia on the dorsum of the right foot; *tâche cérébrale* was well marked.

On August 25th, 1886, the patient came under the care of Dr. Gowers, whose notes record exaggerated knee-jerk on both sides, with ankle-clonus on the right but not on the left; also tremors in the right upper limb on movement, but only slight in the left. Slight nystagmus on movement was doubtful. The pupils were dilated, and reacted sluggishly to light, but well to accommodation. There was tenderness from the fifth to the eighth dorsal spines, but no prominence. Dr. Gowers's diagnosis was lateral sclerosis, and under his treatment for this the various nervous symptoms mentioned disappeared one by one; but, on December 4th, 1886, neuralgic attacks in the right side of the face were noted.

After March, 1887, he ceased attendance, and appeared, from his own account, to have been quite well until the present illness. The latter began on December 5th, 1887, with a purulent discharge from the right ear, for which he became an out-patient under Mr. Bilton Pollard. The right membrana tympani showed a large perforation an eighth of an inch across in the anterior segment, and from this the discharge escaped freely. The treatment consisted in thoroughly mopping out the latter, and dressing the inflamed surfaces lightly with iodoform powder.

On December 28th great pain set in over the whole of the right side of the head. At this time I was asked to see the case, and found the ear as just described, and that there was no evidence of caries of any kind, or of pent-up matter in the middle ear. With Mr. Pollard's concurrence I passed a stream of quinine solution through the middle ear and down the Eustachian tube into the throat, showing that there was a free passage for discharge in two directions, inwards or outwards. There was no trace of redness or swelling over the mastoid, or other evidence of mischief in this process at this date or up to the present moment. The pain was neuralgic in character, and felt most severely over the branches of the trifacial nerve. The optic discs were quite normal, and the pupils equal and normal in reaction to light and accommodation. The temperature was 101°.

Viewing the case as a whole, we both agreed that it was more like one of neuralgia, such as is not infrequent in the course of acute inflammatory ear disease than anything else. From this time the pain continued to increase, and was worse at night, reaching its maximum towards the morning, and preventing sleep.

On January 18th a carious tooth was extracted, but without relief. On the night of the 20th the patient vomited twice, and on the 21st he was admitted into hospital. The condition of the right ear was as before; the left membrana tympani was also perforated, but the middle ear was not inflamed. In addition to the symptoms already enumerated, there was great superficial tenderness on tapping over the right side of the skull; this was most severe just behind the mastoid process and over the right lobe of the cerebellum. There was no trace of redness or swelling anywhere in these regions, or over any part of the scalp. The patient wore a dazed look at this time, apparently from intense pain, and was difficult to deal with in the matter of obtaining accurate information from him, though, as since proved, a very intelligent man. He says now that his sight was at no time in any way affected; but I am sorry to say he was not specially examined for hemianopia at the time.

His temperature on admission was 100°. Until the evening of the 23rd the most marked symptom was intense pain in the head, the temperature varying between 99° and 100°. At 6 P.M. on this day the patient had two epileptiform fits within an hour, preceded by vomiting, during which he ground his teeth, and the right side of his body was very much convulsed. The last fit began as described by the sister of the ward, by his fidgetting about with his right hand, and breaking therewith two ward basins, then extending to the whole side. The latter part of this fit was seen by Mr. Herring, the house-surgeon, who also noticed that the right side was chiefly affected. At the same time the breathing was stertorous and the pupils widely dilated. The eyes were turned first to the right, and then upwards and backwards to the left. After this he slept fairly well, the temperature rising to 100.2° at 7 A.M. next morning.

When I saw him at 2 P.M. on the 25th, the symptoms were as before. His pulse was increased in frequency, and he was groaning with pain in the head. On rising to walk into the next ward, for ophthalmoscopic examination, he was rather unsteady in his gait, inclining to stagger to the left. The optic discs were normal. The pupil on the right was now smaller than on the left. The patient's general aspect and demeanour at this time gave the impression that he was highly neurotic and inclined to magnify his troubles, a fact suspicious in itself, as I have known this condition present in similar cases of grave intracranial mischief, ultimately running a fatal course. On this day, in order to make sure that there was no pus confined in the middle ear, and to cleanse the latter thoroughly I trephined the mastoid in the usual way. Little or nothing was found, but the tympanum was thoroughly washed out through the opening. The wound was dressed with boracic acid fomentations. The next day, the 26th, the condition was unchanged, except that the temperature had fallen to 99° in the morning; it was 100.4° in the evening, and his breath was noticed as very foul. On the 27th there was a rise from 100.2° in the morning to 101.2° in the evening. On the 28th he was sick all night, and more drowsy, and much less observant; temperature 100.2° in the morning, to 100.6° in the evening. For the next few days I did not see the patient, being myself confined to the house. During this time his condition was practically unchanged, except that the temperature was generally a little lower, from 100° to 98.8°. But on seeing him again on February 1st, I noticed great wasting of the whole body, and that the skin was of a dirty yellowish, earthy colour. Mr.

¹ Read at a meeting of the West Surrey Branch on March 29th, 1888.

Herring also recorded a slight loss of power in the left facial muscles. The patient had also begun to pass his motions and urine involuntarily in the bed. Still he could be roused to speak rationally, but quickly lapsed into a stupid heavy state, and was constantly groaning and complaining of intense pain over the right side of the scalp, which was also acutely tender. On the 2nd he was noted as very dull and sleepy, not taking notice of anything around him, but he could still answer questions when roused. His eyes were kept constantly closed tightly, the pupils dilating widely when the lids were raised. The right pupil was now larger than the left. There was greatly increased knee-jerk and ankle-clonus on both sides, and very little plantar reflex on the left. During the preceding night he was first noticed to have lost power in the left arm, and later it was found that the latter was almost powerless, and rather rigid. There were also occasional twitchings about the wrist and fingers. The paresis was most marked in the extensors, the "drop wrist" being very plain. The facial palsy was also more marked than before; temperature 98.8° ; pulse 64. In the evening I endeavoured to examine the optic discs, but found it impossible to get the patient to fix the eyes for more than an instant. He would do so when shouted at, but almost immediately the eyes would roll upwards, and remain so till shouted at again, in a way that looked like perversity. When held open with the finger they still turned upwards, but whether unconsciously, or wilfully to avoid the light I cannot say. When remonstrated with, he replied in a dreamy way that he could not help it, that he would do anything to obtain relief from his torturing pain. His breath had at this time the most intensely sickening odour, and his body was extremely emaciated. The paresis of the left arm and face was more marked; micturition and defecation were quite involuntary.

It now appeared to me that a point had been reached in the case at which there were definite symptoms of local cerebral inflammatory effusion for which I had been on the look out, and that its locality was fairly indicated. I also thought that the six other serious conditions which I always teach may likewise arise from otitis media (vide *Lancet*, 1887) might now be excluded as complications in this case, though this could not be done earlier. Putting the matter shortly: (1) Mastoid cell abscess had already been excluded by the operation of January 25th, and the subsequent persistence and aggravation of the symptoms; (2) phlegmon of the lateral sinus, with thrombosis, appeared also to be negated by the course of the temperature, the absence of rigor, and of any swelling in the course of the deep jugular vein and side of the face. The temperature, raised before the opening of the cells, and thorough cleansing of the tympanic ramifications, had shown a general inclination to fall slightly but steadily; (3) pyemia was negated much in the same way, also by the absence of secondary deposits, as well as by the general aspect of the patient; (4) subdural abscess, besides being less likely to form in an adult, and especially in one who had no evidence of definite caries in the ear, would probably have led by this time to oedema of the overlying skin, which was conspicuously absent, and would probably have been ushered in by a rigor, and have kept the temperature steadily higher than was the case; (5) cerebellar abscess, besides its relative rarity, seemed improbable from the history of the case, that is, the character of the ear mischief and the absence of caries of the tym-

panum; and although it was suggested that the right-sided fits at the commencement of the intracranial complications might be explained by cerebellar disease, the gradual onset of facial and arm paralysis, with twitchings of the wrist, appeared to me to give a clear indication of the situation and nature of the lesion as near the motor areas of the cerebrum; (6) abscess in the temporo-sphenoidal lobe again seemed alone to be insufficient to account for all the symptoms present now. In another case, alluded to above, in which I operated for the latter lesion with the best results, the most noticeable feature was an almost complete absence of special nerve symptoms, although they were carefully watched for, and in the present case these were abundantly present. In the former case, too, the temperature had been usually subnormal after the first onset of the acute attack in the middle ear, though there had been a second sudden elevation, with rigor just before the operation on the brain. The pulse, too, had been constantly slow (*circa* 52), unlike the present case in its earlier stages, although here, also, it gradually slowed down at the last to 64, with the onset of pressure symptoms. With the purely temporo-sphenoidal abscess there was for a time a dull aching in the temporal region, which ultimately passed off. In this present case there was from the first violent, deep-seated

headache in the temporal region, with extreme hyperaesthesia all over the right side of the head. This was followed by vomiting, then convulsions with transient coma, followed by intensification of the pain. Later on there was partial left hemiplegia, with twitching of the left wrist, and some rigidity of the arm, together with exaggerated tendon reflexes, and ankle-clonus symptoms entirely absent in the first case, except one attack of vomiting just before the operation.

A consideration of all these facts seemed to me to point to the presence more or less of localised meningitis rather than any of the other six conditions mentioned. Further, it seemed that the locality of the inflammatory effusion was sufficiently clearly indicated for a working hypothesis. The paresis had started in the left side of the face, and had spread to the left arm, and there were twitchings in the left wrist; the leg was unaffected, except

Fig. 1.—From a photograph by Mr. Marriott of a skull, with the markings on it given in the text, and the trephine openings made exactly as in the operation. Exactly one-half the natural size. *a a* Reid's "base line;" *b b* vertical line from latter in front of the tragus, or from tubercle of superior maxilla; *c c* second vertical line from posterior border of mastoid process to sagittal suture; *d d* line marking Sylvian fissure; *e e* line indicating Rolando's fissure; 1 and 2 first trephine opening over motor centres for head and face (the figures indicate the points of puncture in their order); 3 second trephine opening over first temporal convolution, $1\frac{1}{2}$ inch above "base line," $1\frac{1}{2}$ inch behind centre of long meatus of ear. The figure 3 indicates the point of the third puncture and drainage opening.

as regards the reflexes. This ought to indicate a lesion in and about the junction of the middle and lower third of the right ascending frontal and parietal convolutions, a lesion which apparently commenced with inflammatory irritation, and had gone on to inhibition, probably from pressure. In one or two cases dying of meningitis due to ear disease I have observed *post mortem* that the inflammation has appeared to concentrate itself about the bifurcation of the Sylvian fissure, and to have spread by preference from this up along the fissure of Rolando. On these grounds, therefore, I decided to trephine over the arm and face centres on the right, and hoped thus to evacuate the materials of a localised meningitis pressing upon them. This operation was accordingly done the next morning, Friday, February 3rd, at 10.30, after I had briefly, in a few remarks to the class present, given some of my reasons for arriving at the conclusions just indicated. Immediately before operation defecation had taken place involuntarily.

Operation.—After the usual shaving and cleansing of the head, the main fissures were marked out on the scalp with an aniline pencil, Reid's method of measurement being adopted. A semilunar flap, including scalp and periosteum, the base about $3\frac{1}{2}$ inches long and parallel with the "base line," was then raised from over

the middle of the motor area, its upper tangent being 2 inches from the middle line of the vertex or sagittal suture. The pin of an inch trephine was then placed over Rolando's fissure (Fig. 1) $1\frac{1}{2}$ inch above the Sylvian fissure, and a disc of bone was removed. The dura mater was at once noticed to bulge markedly outwards. A second disc was then removed above and just touching the first on the same line. Here, too, the dura mater bulged, but not so much. The angles of bone between the two rings were then cut away, and the dura mater was slit up in the middle line of the resulting oval opening of the bone. The surface of the exposed convolutions was now seen to be apparently healthy, but there was considerable bulging and a distinct sense of deep fluctuation under them. I therefore punctured the brain with a large hollow needle in the middle of the oval opening (Figs. 1, II, and IV, 1), and at right angles to the surface, but though the needle entered an inch deep no fluid escaped. The needle was then again entered at the lower border of the opening (Figs. I, II, and IV, 2), and thrust downwards and inwards into the exposed convolution. When it had penetrated to the extent of $1\frac{1}{4}$ inch, thick, turbid, yellow serum began to flow out, and was received into a test tube to the amount of nearly two drachms.

A third trephine opening was now made, the centre of which was $1\frac{1}{2}$ inch above the base line and $1\frac{1}{4}$ inch behind the centre of the bony meatus of the ear. Through the middle of this third opening (Figs. I, II, and III, 3) the needle was pushed inwards and forwards for $1\frac{1}{2}$ inch from the surface of the bone towards the point at which fluid was struck in the last puncture. On reaching this spot a quantity of thin, white, odourless pus flowed away and was received in a glass to the extent of nearly half an ounce. The dura mater at either side of the puncture was now split up, and a sinus forceps was thrust into the latter as the needle was withdrawn. When the blades of this instrument were slightly separated more pus came away; then a rubber drain-tube was thrust into the open track for an inch and a half from the surface of the bone, through which more pus flowed off freely, especially when the patient struggled, which he did once or twice at this moment, being but lightly anaesthetised. The flow

was also observed to increase when Mr. Herring pressed with a sponge on the convolutions under the upper opening. Altogether half an ounce of pus was actually collected in a glass, and quite as much escaped through the drain-tube, so that not less than one ounce was evacuated. On its escape the convolutions under the upper opening were observed to sink down considerably over the area which had before bulged.

The bleeding from the scalp was now finally arrested, and a small vein in the diaplœ was closed with a Pacquelin's cautey; then the edges of the incision in the dura mater were united with five fine silk sutures after the opening had been lightly dusted with iodoform in fine powder. The flap was finally dried, similarly dusted, laid down, and stitched all round with eight silk sutures without drainage. Before this was done, however, a small portion of the whole thickness of the scalp was cut away over the lower and posterior trephine opening to admit of free drainage through the rubber tube lying in the brain, which was brought out of this opening. A sal-nlembroth gauze dressing laid over the whole scalp after dusting with iodoform completed the operation, which had lasted an hour and a quarter. The carbolic spray and all other conceivable precautions were taken to ensure asepsis.

Throughout the whole procedure the respiration, face, and pupils were specially watched by our Resident Medical Officer, Dr. Arkle, and the pulse and left arm by Mr. Jecks, to whom I am indebted for the following notes:—

"Chloroform was administered at first on the corner of a towel, later by means of a Junker's inhaler through the nostril. The condition of the patient was most critical. At the moment of administering the anæsthetic the pulse was only 36 per minute, of only moderate strength, and compressible. It was irregular in force and rhythm, with pauses of three and even four seconds between successive beats. In about ten minutes the pulse rose to 44 and 48 per minute, improving a little in character, and remained like this during the first part of the operation. The respirations were slow and shallow, about 18 per minute. The patient took the chloroform well, and only struggled a little, both sides of the body moving, but the right more freely than the left. While struggling he could not raise the left arm higher than the manubrium sterni. On exposure of the dura mater by the removal of the first disc with the trephine the respiration altered, becoming deeper and more frequent. There was no sudden appreciable alteration at this time in the pulse; but, on the opening up of the dura mater, it was noted as 60 per minute.

"Shortly after the punctures through the motor areas there was some clonic spasm in the left arm and hand, none in the face, leg, or foot. This was repeated several times when the sponge was pressed on the convolutions, but not constantly. Immediately after the pus was struck the pulse became very weak, rapidly reaching 100, and, a little later, 120. It was small, regular, and very compressible. An enema of brandy was given but was not retained long. Before the operation was over the condition of the patient appeared to be most alarming. The breathing again became very shallow, and the pulse was 160 and running; the face was pale and sweating, and the lips a little blue. Fifteen minims of ether were injected under the skin of the præcordium with manifest advantage. The patient was only kept lightly under the anæsthetic during the whole operation, and very little chloroform was used."

When I next saw the patient, three hours later, he was already better,

and stretched out his right hand and shook mine warmly, speaking quite rationally. His pulse was still very rapid, and he had just been sick, but at 9 p.m. I thought him in a very critical condition. His pulse was very weak and variable—140 to 160, temperature 100° ; he had been constantly sick. The dressings, which were slightly soaked with blood and serum, were now changed, but the drainage-tube was not disturbed.

The next morning, February 4th, he was decidedly better. The sickness had ceased, the pulse was 120, the temperature 97.8° . The facial paresis had improved, but there was still great weakness in the left arm. Fæces and urine were still passed involuntarily.

February 5th.—Better in every way. Pulse 112, temperature 97.8° . Takes food fairly well. Second dressing as before, at which a silver drainage-tube, made from a No. 12 English catheter, was substituted for the rubber one. It was pushed in along the track of the latter for one inch and three quarters from the surface of the skin, and in a direction inwards and forwards from the opening. It had a slight curve upwards and forwards. The urine and motions were passed voluntarily from this day onwards. The facial palsy was nearly gone, and the arm much improved. There was no optic neuritis. The pains in the head, though better, were

Fig. II.—From a photograph by Mr. Marriott of the same skull with the brain exposed, showing the position of the punctures, which had been previously made with small wooden rods without opening up the dura mater. One-half natural size. *a a* base line; *R* fissure of Rolando; *S* Sylvian fissure; 1 indicates the spot at which the first puncture was made for an inch, from which nothing came; 2 first wooden peg, lying exactly in the fissure of Rolando, passes downwards and inwards, and indicates where the second puncture reached turbid fluid; 3 second peg passes through the first temporal convolution inwards and forwards to meet the first, and indicates the spot at which the drain-tube was inserted.

still severe, but the patient's general aspect had much improved. Pulse 82, temperature 98.6°.

February 6th.—Has slept fairly well. Pain in the head much better. Pulse 82, temperature 98.6°. Three grains of calomel were ordered. The track of the tube was washed out with a warm saturated solution of boric acid; this did not produce any nerve symptoms. The silver tube, dusted with iodoform, was replaced, and the wound was dressed as before.

From this time there is little to note except uninterrupted recovery. The facial and arm paresis disappeared in a few days completely. The breath became less offensive, and the appetite normal. The bowels required to be opened occasionally with a few grains of calomel; there was still an occasional slight tremor or twitch in the left wrist for some days, but this, too, disappeared soon.

On February 9th, he drew attention to a feeling of "pins and needles" in the fingers of the left hand, and slightly in the left leg, and a sensation as though a string were tied tightly round his tongue. On the 10th, the pain in the head was gone. On the 11th, the "pins and needles" were gone, but he noticed that his tongue was still sore.

On the 12th, a shorter and smaller drainage-tube was used, as there was very little discharge from the brain. Two days later a still shorter one was inserted. Humming tinnitus was noticed. Pupils equal. Great tenderness all over the left side of the body was complained of on this day, but especially over the thorax. The dynamometer registers 45 with the right hand, 40 with the left.

Fig. III.—From one of Dalton's photographs of an imbedded brain, reduced to exactly half size. The section is vertical and longitudinal to expose the space in which the island of Reil lies. 1 2 3 4 5 the convolutions of the island of Reil; the position of the figures 4 and 5 would indicate as nearly as possible the spots reached by my two punctures in the operation; t. lobe temporo-sphenoidal lobe; only the inner part remains.

On February 15th the patient was practically convalescent. His bowels were regular, appetite good, and he was cheerful and intelligent. There was not much pain in the head, and the colour of the skin was much better; the drain-tube was finally dispensed with. The scalp wound healed everywhere by first intention, except at one angle, where slight moisture escaped up to February 20th. On the 21st all the stitches were removed. The patient was out of bed on and after the sixteenth day after the operation, and was very cheerful and bright in spite of occasional neuralgic pains over the branches of the trifacial nerve, probably aggravated by the very severe weather. The knee-jerk on both sides remained, though less than before, and ankle-clonus was still present, though diminished. G. left the hospital on March 8th for the Convalescent Home, where he still is.

It would be interesting did space permit to discuss the pathology of this affection, and to analyse the symptoms present at greater length, as well as to deal more fully with the purely surgical features of the case. But the mere record of the essential and salient facts of the case has carried me already too far, and these questions must be left for future consideration. This record, however, would not be complete if I did not state my belief as to the exact nature of the inflammatory collection, and the position it occupied in the brain.

Reasons alluded to above were briefly given before the opera-

tion for my belief that this was a case of more or less localised meningitis in and about the middle of the Sylvian fissure, and extending up over the motor centres of the face and arm on the right side. But on trephining over the latter, the arachnoid was seen to be healthy, though the cortex fluctuated. The introduction of the hollow needle, however, downwards and inwards (Fig. IV, 2), evacuated thick, turbid, odourless serum. This experience shook my faith for the moment in the correctness of my diagnosis; but the result of the next puncture (Fig. IV, 3) through the posterior and lower trephine opening, in which the needle should have nearly met its fellow at about 1½ inch from the surface of the skin, brought me back to my original conviction, that this was a case of localised meningitis, which I now hold with a very slight modification. It is quite clear that the collection of inflammatory fluid tapped did actually lie in the Sylvian fissure, and was not a temporo-sphenoidal abscess. But instead of extending up over the external surface of the brain, as I at first thought, it accumulated, I believe, among the convolutions in the deeper part of the fissure between the island of Reil (Fig. III, 1, 2, 3, 4, 5) and the overhanging motor convolutions, and pressed the latter outwards against the skull (Fig. IV). This explains the fluctuations of the motor gyri under the first trephine holes, and also their collapsing on the evacuation of the fluid through the third trephine opening below. If the abscess had been seated actually in the white substance under the motor centres, the arm and face would hardly have recovered so rapidly as was the case here; whereas if a collection of

Fig. IV.—From one of Dalton's photographs of an imbedded brain, reduced exactly to half size. The section is vertical and transverse, in the region of the punctures made in the operation. The right half of the brain is apparently a little shrunken. S Sylvian fissure; a b c first, second, and third temporal convolutions; p Pons varolii; i cap internal capsule; o t optic tract; l n lenticular nucleus; i R island of Reil; 1 first puncture, directly vertical to surface of brain, which gave no result; 2 second puncture, downwards and inwards, which reached turbid fluid; 3 third puncture, inwards and forwards, through the first temporal convolution, into which a drain-tube was inserted; drained the same space as that reached by No. 2 puncture.

fluid lay in the deeper parts of the fissure of Sylvius around the island of Reil, it could act doubly upon the motor centres, on the one hand by forcing the overhanging convolutions outwards against the skull, and on the other by pressing directly through the island upon the motor fibres of the internal capsule (Fig. IV, i. cap.) lying underneath, and after its evacuation the functions of the parts around would quickly be resumed. But the matter is put beyond question by the performance on the dead body of exactly the same operation, taking every possible precaution as to accuracy of measurement.

In doing this, I selected an adult skull of the same dimensions, within a small fraction, as the patient's. In this skull the dura mater was exposed with the trephine, exactly at the same point (Fig. I, 2) as in G.'s case. I then took a slender lucifer match, pointed it and cut it to the length of 1½ inch. This was then thrust through a puncture in the dura mater, and into the brain, at exactly the same spot, and in precisely the same direction downwards and inwards, as was the needle which struck the first turbid fluid. A second similar match, 1½ inch long, was then pushed through a puncture in the dura mater under the lower trephine hole (Fig. I, 3), in a direction inwards and forwards, as in the case of the needle at the operation. The outer ends of both these rods were now flush with the cortex and concealed by the

dura mater. The skull was then photographed by my friend Mr. Marriott (Fig. 1), after which the right side of the calvarium was removed. On cutting open the dura mater, the outer end of the first rod was seen, exactly in the fissure of Rolando (Fig. 11, 2), that of the second rod in the superior temporo-sphenoidal convolution (Fig. 11, 3), as seen in a second photograph. A vertical section of the hemisphere exposing the whole length of the first match was now made, and then a horizontal, exposing the track of the second. When the posterior half of the hemisphere was now lifted off, the points of the two rods of wood were seen to be almost in contact in the space overlying the island of Reil, and touching the latter (Fig. 1V, 2 and 3). The first had passed between the ascending frontal and ascending parietal convolutions (2), the second through the superior temporal convolution (3). Had the collection of fluid been a temporo-sphenoidal abscess, it is quite obvious that it would not have been reached by the first puncture, which evacuated fluid $\frac{1}{4}$ inch from the surface of the cortex, at the junction of the middle and lower third of the fissure of Rolando. Nor would it probably, unless very large and high, have been reached by the second puncture, which met the first and travelled quite above the body of the lobe. It must be remembered, further, that one ounce of fluid among the convolutions over the island of Reil would press the former asunder more or less, and would produce a larger space than that represented in the drawing, so that without actually touching each other, the two needles might easily empty it. I am careful to clear up this point, less as a mere operative question (because of course one would evacuate the pus wherever the needle reached it), but rather as bearing upon the wider question of treatment of septic meningitis by operation, which for some time past I have looked forward to as possible. It would of course be unwise to dogmatise as to the exact limits occupied by the pus in this case, and as to whether it was produced primarily by a leptomeningitis or encephalitis, or, possibly, by the giving way of an abscess. The patient is now alive, and we cannot settle the matter by dissecting his brain; and although I have approached as nearly as possible to proving, by operation on the dead body, what actually was the locality involved, still I wish to put forward the above view only as the most reasonable hypothesis deducible from a careful and anxious clinical study of this and several allied cases for which I have had exceptional opportunities now for many years, and also from numerous pathological data accumulated in the *post-mortem* room.

All those who have given close attention to this whole subject will feel that, in the matter of operative treatment of non-traumatic intracranial suppurations, we are but on the threshold of a new region common to medicine and surgery, and most will be unable to divest themselves of a feeling of dismay at its complexity. It is comforting to us all, however, physicians and surgeons alike, to reflect that already this region has shown itself fruitful, and that one more group of fatal diseases has been brought within the reach of surgical operation.

Note.—I have thought it better to give reduced copies of Dalton's beautiful photographs of sections through an imbedded brain in Figs. III and IV, rather than drawings of my own dissections. Without a large material and special apparatus for embedding and section, it is difficult to make an accurate representation of the relation of parts of the brain, which soon sinks down when the skull is opened and it is cut. I have therefore transferred to Dalton's sections the lines of puncture observed in my own dissections; this leaves as little room for error as possible.

March 30th. The patient returned from the country on the 28th. He still complains of pain in the head, but looks well and eats, I am told, remarkably well. I shall continue to observe him, and report later if anything further of interest should be noted.

THE 105th annual report of the Hull Royal Infirmary shows the number of in-patients for the year to have been 1873, the number of out-patients 10,772—the largest number that has ever passed through the hospital in any one year. The average cost of each in-patient for treatment, nursing, and maintenance was £2 19s. 10d. The estimated cost of each out-patient was nearly 1s. 8½d. The alterations and improvements in the main building have been satisfactorily completed, and it was hoped the south-east block would shortly be available for patients. With a view of providing better accommodation for the nursing staff, it was decided to proceed at once with the conversion of the Watts Wards into a home, and by this means provide the nurses the comfort due to their position and the exhausting nature of their duties.

ON SOME HITHERTO UNDESCRIBED SYMPTOMS IN THE EARLY HISTORY OF OSTEO- ARTHRITIS.

(THE SO-CALLED RHEUMATOID ARTHRITIS).¹

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Few things are so apt to cause a feeling of drowsy despair at a medical meeting as the prospect of an academic discussion on the etiology of osteo-arthritis. The fields seem barren; the harvest is small, even after every scrap has been gleaned; one master says one thing, and another master says another; so that the self-styled practical man cries out in his confusion, How have all these speculations helped me? Two wants, he exclaims, I ask to have supplied; such sure notes of a disease that I may, if possible, know it at once when I see it, and trustworthy landmarks to its treatment at a time when treatment is available. The practical man has some ground for his dolorous plaint. It is certain that if scientific questionings about the nature of a disease do not help us to do people good somewhere or somewhere, those questionings will soon lack interest and be forgotten. Three common—but wholly distinct maladies affect the same structures; the patient cannot distinguish his malady, and naturally requests his medical adviser to do so; but he is prone to lose himself in vague generalities, and probably falls back on that old-fashioned, ghostly thing called "suppressed gout." Now, is it not an enormous gain if we can at the earliest moment give a verifiable diagnosis—not merely a fancy or an opinion? When so much depends upon the issue, time is everything. Such is the plea for my paper to-night. It is my aim to strengthen those landmarks which tell of early danger, because they proclaim with unerring precision what the disease is. To be able to identify osteo-arthritis in its very cradle, and to sharpen the lines of boundary between it and all other things which resemble it, is surely worth a little time and trouble.

Bath has been called a museum of living osteo-arthritis; but this conveys no adequate idea of the wealth of our clinical material, which I believe to be without a parallel in its kind. In our Mineral Water Hospital, nearly half the cases belong to the osteo-arthritic group; and a crowd of so-called rheumatoid people flock to our spa from all parts of the country. Among our residential population there is no osteo-arthritis worth speaking of, nor are any of the influences present which would favour its development. But this procession of suffering pilgrims—what a challenge to our therapeutic skill! In the presence of an overwhelming quantity of the same sort of trouble, the tendency of the mind is towards apathy and almost weariness. A ceaseless iteration of the same phenomena dulls the faculties and dims the senses. We see, and yet we do not see; curiosity is dead, for there is nothing to be curious about; what happened yesterday happens again to-day, and (for aught we know) will happen again to-morrow. All interest perishes in the everlasting sameness. In this shroud of mental torpor no man ever discovers anything, because there is no enthusiasm and no inward light.

It has been said by a writer of distinction that there is nothing which may not be found if we start on an inquiry with the intention of finding it. It is sound advice to inquire without expecting, and without even the desire of finding; and it is plain truth when I say that some "hitherto undescribed symptoms" of early osteo-arthritis were so little expected that even when found, after a careful induction of nearly a thousand cases, the feeling of wholesome scepticism was long in clearing away. "Was it not a mere coincidence?" asked the casuist; and his logical appetite suggested that there were a hundred little pitfalls scattered here and there. So it required some hardihood of mind to think at last that certain signs, when present, connote osteo-arthritis in its earliest phase, and demonstrate beyond doubt that the disease cannot be anything else.

I. Dividing roughly all cases of osteo-arthritis into slow and quick forms—the first sometimes occupying decades of years in its chronic ruin, the other maiming and crippling in forced marches—we find that a great number of the latter class are characterised almost from the beginning by an increased velocity and tension of the heart's action. Quoting from cases the history of which was traced from an early date, the pulse may go up at once to between 80 and 90, and remain so for years. But we