Localization and William Macewen's Early Brain Surgery Part II: The Cases

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This paper contains Part II of an evaluation of the claims made for the priority of Macewen's pre-1884 brain surgery over that of Bennett and Godlee. Although the primary sources—Macewen's Private Journals and the Ward Records of the Glasgow Royal Infirmary—confirm that the operations were carried out when Macewen said they were, problems with the sources make it difficult to evaluate the extent to which he actually used knowledge of localization in all seven operations. What remains of the case material on the operations is examined, the accounts in unpublished sources and published versions compared, and Macewen's use of knowledge of localization bearing on the claim for his priority evaluated. Part II concludes with citations from archival correspondence and the contemporary and near contemporary medical press confirming Macewen's priority.

Keywords William Macewen, Hughes Bennett, history of brain surgery, cerebral localization, cerebral abscess

The most important of William Macewen's claims to have drawn on localization theory in planning his brain surgery is that in his invited address to the 1888 Annual Meeting of the British Medical Association in Glasgow. There, he presented, en bloc, summaries with diagrams of the sites of the lesions he had removed or tried to remove in seven of the most significant of his pre-1884 cases. He also summarized his operations on the spine conducted between 1882 and 1885. Most were for the removal of fibrous tissue exerting pressure on the cord because of excessive curvature of the spine, but some were for the removal of tumors, one of which was of traumatic origin (Macewen, 1888a; 1888b).

Investigating the claim for Macewen's priority over Bennett and Godlee might seem easy because it should require only that Macewen's published accounts be compared with the original records. A quick comparison soon reveals discrepancies of varying magnitude among Macewen's various publications and the primary source material held at the Royal College of Physicians and Surgeons of Glasgow, the Glasgow Royal Infirmary (held at the


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There are slight stylistic differences between the otherwise identical British Medical Journal and Lancet accounts of Macewen's Glasgow Address (Macewen, 1888a and 1888b). For various reasons I have used only the former. Macewen's 1888 remarks about his spinal cases constitute an explicit claim for his priority over the operation of Gowers and Horsley (1888). Like his brain surgery cases, many of his typical spinal cases were also described and demonstrated at the various medical society meetings well before 1888, for example, at the February meeting of the Glasgow Medico-Chirurgical Society (Macewen, 1884a) and the March meetings of the Glasgow Southern Medical Society (Macewen, 1884b).
Glasgow Health Board), and the University of Glasgow Archives. Reconciling the accounts is not as easy as it seems.

The contemporaneous records consist of Macewen’s Private Journals, in which the background facts about the patients, their operations, and their subsequent fates are recorded (Macewen, 1876–1886), and the Ward Records of the Glasgow Royal Infirmary. The published accounts are either short presentations at meetings of local medical societies or reports from the Infirmary (Macewen, 1879b; 1880; 1884a; 1884b; 1884c), or longer accounts by Macewen himself (1881; 1885). The main problem in evaluating this material is deciding which of these static sets of words is the most reliable witness to Macewen’s active thinking.

Although they appear to be the oldest of the sources, the records in the Private Journals have to be treated circumspectly. First, they are clearly not complete. This lack is almost generic; it can be seen in some of the non-brain surgery cases as well as those of primary interest here. Thus, the Private Journal record of the reconstruction of William Connell’s humerus gives no detail of the operative procedure or that the wedges were obtained from osteotomies that must have been conducted almost simultaneously, and transplanted almost immediately, whereas the published one does. Similarly, the Journal record of William McClean’s skull reconstruction contains no reference to three of Macewen’s examinations of the repair, those at 21 days, three years, and ten years after the operation. Among the pre-1884 cases mentioned in 1888 it is also evident that there are or were other records made at the same time as those in the Private Journals. Thus, in 1893 Macewen published an account of one such case that gave a much fuller description than had appeared in the Journal of the symptoms that he had used in making the diagnosis, and included drawings of the abscess and a report on its histological details. Again, some of the accounts of Macewen’s brain surgery cases not included in his 1888 Address but published elsewhere contain more detail in some accounts than others. For example, Macewen (1893, pp. i71–l74, 197–203) reports Cases 28 (W.H.) and 36 (T.K.) very fully, with detail not found elsewhere (the latter even with a temperature chart). For these kinds of cases, we must ask, “Where is the original information?”

Second, most of the Private Journal records seem not to have been written by Macewen but to have been dictated to his House Surgeon. Macewen’s hand is sometimes seen (literally) in the crossings out of obvious errors and expansions of what seem to be telegraphed remarks. Some of the records may also have been generated under pressure and may not have covered the complexities of Macewen’s reasoning. His arguments for basing his interventions on localization may therefore be truncated or omitted. Apart from these considerations, one Journal record is missing altogether, one has always been incomplete, many pages but not the index of Volume 2 of the Journal have been crudely and almost completely mutilated, and some critically important pages have been skillfully removed from another. Few of the Ward Records have survived, and where they have, they contain little information about treatment. What they do confirm is the patient’s name and date of admission, and sometimes the diagnosis.

Much the same circumspection is required in evaluating Macewen’s published accounts, some of which were simple communications of observations likely to be of interest to the small audiences at the regular meetings of the various professional societies to which he belonged in Glasgow. A number of these, especially the shorter accounts, often reproduce almost word-for-word what is in the corresponding Private Journal record, and are probably affected by the same factors as the originals. On the other hand, some published accounts include or lead to significant points not in the originals. Thus, although his first short report of his sixth case resembles the Journal record in saying nothing about localization, that topic practically dominates the subsequent discussion (Macewen, 1884a). Of Macewen’s longer published accounts, we note that that of 1881
was as much directed to winning over the readership of a medical journal to antiseptic/aseptic practice as it was to winning support for the doctrine of localization. Conversely, the extreme condensation of the case descriptions in his 1888 Address were because they were mere illustrations of the basis in localization theory of his early operations.

Finally, and probably most importantly, what we now think of as the theory of localization was not fixed, but changed almost month-to-month, and certainly year-to-year. Whether brain lesions produced symptoms on the opposite side of the body was still being debated, for example, as late as the 1880s, and what counted as the aphasic symptoms implicating Broca's area was still a matter of argument in 1900. Consequently, at different times, even when writing about the same case, it would be surprising had Macewen not drawn on changing understandings of the same concepts when setting out his reasoning.

In what follows, I attempt to take these various complexities into consideration.

**Macewen and localization theory**

About a year before his death, William Macewen recalled that when he had been a medical student at the Glasgow Royal Infirmary he had seen cases of lesions in the base of the third left frontal convolution, caused mainly by blows that had fractured the skull, producing motor aphasia (Macewen, 1922, note to p. 157). If that memory suggests that in that early period he accepted the theory of localization, it contrasts markedly with his 1875 comments on the seven cases of skull fracture and intracranial lesion that he collected during his early surgical work, cases that he and the editors of the *Edinburgh Medical Journal* thought worth publishing. At that time he said nothing about the new ideas on localization, mentioning only the differences in pupillary condition, and that in only one of his cases as it related to left-sided damage (Macewen, 1875). Such a memory also contrasts with the then skepticism of his friend and colleague, Dr. Alexander Robertson, about localization, especially about Broca's inferences but also about the motor areas (Robertson, 1866; 1871; 1879a; 1879b; 1880).

Even had Macewen not seen a link in 1875 between the theory of localization and his use of the trephine, it is evident that he had seen one by 1876, for that was the year he planned his first operation based on it. Prior to that time, in treating skull fractures antiseptically and without having to draw on knowledge of localization, Macewen recalled that “he used to be very conservative in the matter of interference . . . leaving them almost entirely alone.” Only after seeing that there were often long-term defects of memory, slight mental defect, or actual insanity had he become “inclined to trephine in a good many more cases than formerly” (Macewen, 1879a). From 1876 his confidence in the theoretical and practical basis of his work grew sufficiently for him to demonstrate the results of the first 14 of his operations in March 1884, eight years later (Macewen, 1884b; *British Medical Journal*, 1884).

**Macewen's 1888 claim**

Macewen opened his 1888 Glasgow address by briefly mentioning some aspects of past cerebral surgery before discussing how modern brain surgery was made possible through the combination of antisepsis and asepsis with clinically and experimentally based knowledge of localization. He introduced the next section, in which he summarized his cases with the sentence “This extended physiological knowledge enabled cerebral lesions to be more accurately localised, while my experience showed that, by preserving aseptic the parts operated on, surgical interference with the brain could be robbed of its chief danger” (Macewen, 1888a).

Each of the first seven of Macewen's case summaries was dated and the concluding paragraph of the section read:
With the relation of these seven cases, all of which occurred prior to the end of 1883, the initial history of the initial movement ceases to be solely personal as regards myself. In December, 1884, Dr. Bennett and Mr. Godlee, assisted by Dr. Ferrier, had the first case operated on in London in which a tumour was removed by Mr. Godlee from the brain (Macewen, 1888a).

It is this explicit claim of priority in relation to the work of Bennett and Godlee (1882–1885; 1884; 1885a; 1885b) that I now examine.

For each case I outline Macewen’s 1888 claim to have used localizing signs in planning the operation and then set out what is found in the Private Journal record. Where the original record is missing or incomplete I sometimes draw on later material to fill the gaps. I then set out the problems posed by any discrepancies between the 1888 and Journal accounts and use other published material, usually the shorter society reports, in an attempt to reconcile them.

**Macewen’s seven operations**

**Operation 1: John McKinley**

Macewen’s 1888 summary of the first case, that of John McKinley, began with the subheading “Case in which symptoms of focal cerebral disease led to diagnosis of lesion in Broca’s lobe: 1876” (Macewen, 1888a, emphasis altered). In the summary Macewen stressed that a cicatrix on John’s forehead, marking where he had been injured, was no guide to his lesion. What was significant were his aphasia and his absolute right-sided hemiplegia, both of which lasted for two hours following a convulsion that had begun on his right side and gradually involved his whole body:

From these symptoms the abscess was diagnosed to be situated in the immediate vicinity of Broca’s lobe. It was evident that the whole of the base of the left third frontal was not involved in a destructive lesion, otherwise the aphasia would have persisted for a much longer period, and it was probable that

![Fig. 1.—Abscess in vicinity of Broca’s lobe diagnosed from symptoms exhibited.](image-url)

Figure 1a. Macewen’s 1888 location of the abscess in John McKinley’s brain (From Macewen, 1888a, Figure 1).
Broca’s area had become involved in the inflammatory zone surrounding the abscess. Trusting to these localising symptoms, it was proposed to open the abscess aseptically by exposing Broca’s lobe. (Macewen, 1888a, Case 1)

Macewen’s trust in what the symptoms would reveal was as definite as his reasoning was specific.

However, “the parents refused consent” to the operation and the convulsions returned soon after and John died. John’s “friends” then agreed to allow the operation to be performed as it would have been in life. The skull was trephined, the brain exposed and a bistoury introduced through the third left frontal convolution, for half an inch, when pus flowed through the incision, proving the accuracy of the diagnosis and giving poignancy to the regret that the operation had not been permitted during life. The abscess, about the size of a pigeon’s egg, was situated in the white matter of the basis of the second and third frontal convolutions (Macewen, 1888a, Case 1).

The blade of the bistoury, left in situ, had penetrated the outer wall of the abscess. Macewen therefore concluded his summary by stressing that “the precise spot” occupied by the abscess had been determined “from the localising symptoms,” reiterating that it was different from that indicated by the scar.

The record of 1876 in Macewen’s Private Journal contains nothing direct about John McKinley’s symptoms being used to localize the abscess. We learn that the eleven-year-old John was admitted to the Glasgow Royal Infirmary on July 20, 1876 with “a cut head” occasioned by a fall from an undetermined height two weeks previously. The cut was about two inches long over the left eyebrow, it was suppurating and the bone was exposed, and it contained stitches from a previous attempt at repair. On July 23rd a drainage tube was inserted into the wound, which was then dressed antiseptically. Five days later John had “a pretty severe rigor lasting 5 mins. after which he vomited.” Macewen was uncertain whether this signified an extension of the inflammation inwards to affect the brain membranes or whether John had been surreptitiously eating. At 11:00 a.m. on August 2nd, John had “a shock of convulsions which lasted for half an hour” that Macewen’s assistant observed to be “confined entirely to the right side and implicated the face and limbs – they were violent.” John then lay apathetically in bed “though he attempts to answer ‘no’ to any questions even when he does not indicate anything.”

Although John’s temperature rose to 102.6 and his pulse to 108 later that day, the convulsions did not return and he regained his power of speech. He then complained of pain “over the left side of the frontal extending into the lateral2 frontal half of the left parietal,” pain that was aggravated on pressure. The wound over the forehead had healed, but at 8:30 the next morning, when his temperature was 102.8 and pulse 112, there was a slight tremulousness. At 9:15 a.m. the pulse was 104 and the pupils “quite equal and sensible to light.” Macewen saw him at 10:00 a.m. and:

having noted the increase in temperature and the fact that he is now vomiting and also considering the fact of his shivering which Mr. Huxtable [a medical orderly?] saw previously he thought that the symptoms pointed to inflammation of the brain membranes and most probably to the formation of pus on the left hemisphere at the frontal portion at least (Macewen, 1876–1886, Vol. 1, p. 20, emphasis added).

2Here and at other places where I quote from Macewen’s Private Journals, my transcriptions retain his crossings out, his other corrections and expansions, as well as his contractions and punctuation.
Macewen wanted to trephine but Drs. Clark and Lothian, the House Surgeons with whom he consulted, “advised against any operative interference” and none took place.

However, Mr. Huxtable was left with instructions that “should any increase of the symptoms come on & decidedly if any convulsion reappear that Dr Macewen should immediately be sent for and that the operation should be performed.” At 2:45 p.m., Huxtable found John lying unconscious on his right side with his limbs flexed. There was then internal strabismus of the left eye, its pupil was contracted and insensible to light, the right pupil was widely dilated, and “there was complete muscular relaxation.” Macewen was “at once sent for.” John’s pulse was now 120 and very weak, his temperature 104.8, his breathing slow and labored, his left eye was half closed, and his right eye was drooping and twitching slightly. John died at 3:20 p.m., before Macewen arrived.

Macewen then performed postmortem the operation planned earlier. He began by trephining the skull “on the left side of frontal above the eye,” where he found the surface of the skull to be “slightly diseased almost like caries in an incipient stage,” and the inner table “in great measure to be absorbed for the size of a large bean.” When the trephine had completed its incision into the bone, “greenish pus oozed out” and a further accumulation of pus about the size of half a crown [32 mm in diameter] was found between the dura mater and the skull. Macewen next incised the dura mater, thickened by lymph and pus, and passed “a bistoury into the brain substance in the direction of the 3rd frontal convolution” (emphasis added).

On opening the skull and reflecting the membranes, Macewen found the dura to be turgid over the surface of the brain & there were two points about the size of a pea of matter like the polo[?] of an abscess on the ant surface of the 1st convolution. One of these corresponded to the space in the D.M covered by pus.

It was found that the incision made after trephining had passed directly into an abscess about the size of a pigeon’s egg which was situated in the 2nd and 3d frontal convolons involving the white matter but avoiding the cortical substance except at the point spoken of in the 2nd frontal convolution. This abscess penetrated backward & [inward?] toward the middle line and its wall ended by encroaching on the anterior cornu of the left lateral ventricle at its upper part (Macewen, 1876–1886, Vol. 1, pp. 32–33).

Further examination showed the vessels on the surface of the left ventricle to be enlarged, but there was no accumulation of pus or serum in it or the ventricles. The margin of the abscess was “a greenish color fringed by red p[arenchyma].” Most importantly, there was “no fracture of the skull” and, apart from “a scarcely appreciable enlargement of the B.V. over the brain generally, there was nothing else abnormal to be found in the skull” (Macewen, 1876–1886, Vol. 1, p. 33).

As the diagrams pasted into Macewen’s Private Journal (Fig. 1b and 1c) show, the abscess was (apart from the strange mirror reversal) where John’s symptoms suggested it would be, and that was at a very different place from that to which they would have been led by the cut over his brow (Macewen, 1876–1886, Vol. 1, pp. 18–21, 32–33).³

³The sites of most of the lesions have been drawn by hand on to schematic diagrams of the brain that seem to have been produced by a simple engraved stamp, perhaps of rubber, usually of an external lateral view of the relevant hemisphere. All but McKinley Figures 1b and Figures 1c diagram are in Macewen’s published works. Figures 1b and Figures 1c appear only in the Journal itself, where they have been pasted in. Both are obviously mirror-reversed.
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Figures 1b, 1c, and 1d. Macewen’s 1876 (?) and 1893 location of the abscess in John McKinley’s brain. (Figures 1b and 1c from Macewen’s Private Journal, Vol. 1 1876, p. 33. Courtesy of the Royal College and Physicians and Surgeons of Glasgow, and Figure 1c from Macewen, 1893, p. 191).

Problems in relation to John McKinley

There is a discrepancy between Macewen’s very definite inference in the 1888 account of an abscess “situated in the immediate vicinity of Broca’s lobe” and the House Surgeon’s
1876 record of Macewen’s much less specific implication of inflammation of the meninges and the formation of pus on the frontal portion of the left hemisphere.

Macewen also published a longer report on the McKinley case in 1881, the side heading of which began, “Head injury; symptoms of cerebral affection; rigor, convulsions; probable localisation of cerebral abscess...” and finished with “opening of cerebral abscess confirmatory of diagnosis.” John himself was described as complaining of “pain, on pressure, over the left frontal” which, combined with his high temperature and a rigor, “was considered to indicate the formation of pus.” After the convulsion “he was decidedly aphasic, answering ‘No’ to everything, and making efforts at communicating which ended in a series of ‘No, noes.’” Macewen’s 1881 account of his inference was:

As it then stood, the case was clearly one of cerebral abscess, the probable locus being the third frontal convolution. Trephining and evacuating the abscess was the clear surgery. It was proposed to lay the skull bare, and to remove a disc of bone as near to the third frontal convolution as practicable. If an accumulation of pus sufficient to account for the symptoms were found between the skull and the dura mater, no further steps would be taken; but if not, the dura mater would be opened, and a bistoury would be inserted into the third frontal convolution (Macewen, 1881, emphasis added).

Macewen again recorded the negative result of his consulting with his colleagues, now saying only that John’s “friends” were also against operating but that they gave permission for it postmortem.

Macewen’s 1881 account actually contains little further detail of John McKinley’s symptoms. Possibly this is because the Lancet paper in which it was embedded was as much about the value of early aseptic and antiseptic trephining in preventing late complications of trauma as it was about the usefulness of localizing symptoms. The more practically oriented reader might therefore have found the remarks about aseptic and antiseptic measures more relevant. Nevertheless both the 1881 and 1888 accounts are more specific than that of the Journal in 1876. This feature may also reflect the difference between what was known about Broca’s aphasia at the time of the operation as compared with 1881 and 1888. Broca described his first patient — M. Leborgne (“Tan”) — in 1861, but it was two years after that before he placed any significance on the lesion being left-sided, and another two before he concluded that the function of articulate language was localized in the third, left, frontal convolution. Up until 1865 and for some years after the debate was especially bitter. There was counterevidence from cases in which the lesions were right-sided, or more posterior, from those in which there were lesions without effects on language, and from those in which lesions were completely absent. There was also much confusion about whether aphasia was the ability to understand language but not respond verbally, or a loss of the expressive and receptive functions of language, or just an inability to speak (Macmillan, 2000, pp. 188–194). One notes also that Ferrier’s papers confirming much of the motor aspects of Broca’s thesis did not appear until 1873 and his first major publication until 1876. His findings were themselves the center of well-known and bitter controversy (Ferrier, 1873; 1876).

We do not know what Macewen’s view of the aphasia debate was by 1876, but Dr. Alexander Robertson, a notable Glasgow medical authority, remained doubtful for some years about the uniqueness of the left-sided location of the lesion and about the symptoms it produced (Robertson, 1879b. See also Robertson 1866; 1879a). Had Macewen
himself had doubts in 1876, it would not have made much sense for him to publish in 1881 and 1888 in other than the terms and understanding of those later periods. This consideration may explain what Macewen wrote in an even later account of John McKinley’s case in his 1893 book on pyogenic infections. In it he said he had deduced the abscess to be “in the immediate vicinity of Broca’s lobe, situated between the speech centre and the internal capsule,” which he illustrated with a new diagram (Fig. 1d), and gave reasons for preferring this very specific causal site to a destructive lesion in the lobe itself or extradural pressure on it. Trephining was to be carried out “over the base of the third frontal convolution (Macewen, 1893, Case 34, pp. 189–193).

In my view, the most telling piece of evidence— one that appears in all the accounts—is that the only direction in which Macewen passed the bistoury was towards Broca’s area . . . which he would hardly have done had he not thought the abscess was there. The discrepancies practically disappear in the light of this fact alone. I therefore conclude that it was Macewen’s use of localizing signs in 1876 that led him to plan to operate on Broca’s lobe (Compare Macewen, 1876–1886, Vol. 1, pp. 32–33; 1881, Case 4; 1888a, Case 1; 1893, Case 34, pp. 189–193).

**Operation 2: John Daley**

Macewen introduced his 1888 account of John Daley, his second case, with the side-heading “Case in which motor symptoms were the sole guides to the cerebral lesion: 1879” (emphasis altered), and immediately went on to say that it was “a case with definitely localising motor symptoms” (Macewen, 1888a). John’s face and head had been slightly bruised in a fall six days earlier and there was “a shade of mental obscuration.” On the sixth day he had, a series of convulsions, the twitching beginning in the left side of the face, gradually involving the left arm and subsequently the left leg, during which consciousness was preserved. Paresis of these parts remained, though sensation was unimpaired. On the following day there was a renewal of the convulsions, the parts being affected in the same order, but the convulsions persisted and finally became general, with loss of consciousness. Those motor phenomena indicated a lesion on the right side of the brain, pronounced at the middle and lower portion of the ascending convolutions, as the face and arm centres were the first to show evidence of stimulation (Macewen, 1888a, Case 2, emphasis added).

Macewen said that his colleague, Dr. Alexander Robertson, “agreed with me that the motor symptoms presented a sufficiently clear guide to the localization of the lesion in the lower part of the fissure of Rolando” and he resolved “to expose that portion of the brain” (emphasis added). After the incision had been made, Macewen discovered a fissured fracture running across the coronal suture and he trephined at a point slightly behind the auricula-bregmatic, and midway between the external auditory meatus and the vertex. This point happened to correspond to the posterior extremity of the fissured fracture (Macewen, 1888a. Macewen’s emphasis).

Some nine and a half years after the operation John was alive “and in perfect health.”
The Private Journal of 1879 record is definite in localizing John Daley's lesion to the right side but is not specific about its particular locale or how the site of the operation was selected. Daley was admitted to the Glasgow Royal Infirmary on March 13, 1879, at the age of eight and a half years, with a right-sided swelling of his face and right brow extending into the hairy scalp, following a fall from a first floor window (Macewen, 1876–1886, Vol. 1, pp. 212–216). His pupils were normal, and although “in a slightly confused state [he] could answer questions intelligently.” John complained of pain over the right side of the head and over the back of the neck at the spine. The “slight haze” over his intelligence made Macewen suspect “a slight amount of concussion” and he ordered John to be put to bed and watched. [In his 1879 short report Macewen (1880) described these features as “a vacancy of expression . . . so slight as to be scarcely recognisable by his mother.”]

On the second or third day there was an infiltration of blood into John’s right eyelids that extended above the brow, and “a slight swelling over the right side of the head about the junction of the frontoparietal (coronal) suture” was noted. At about 6:30 p.m. on the 19th of March (about six days after admission) there was a half hour-long episode during which John was affected by “convulsive movements affecting the left angle of the mouth and the left upper eyelid, the eyes during the convulsion were turned slightly to the left side, he was unconscious,” and during the attack he vomited freely. At 11 o’clock the next morning when the attack returned, “the twitching of the levator palpebrae muscle on the left side was most marked.” Twitching continued until the muscles of John’s left forearm became affected – the left thumb being twitched “markedly” into the palm – and for a short time “the same portion” of the right arm became involved. Afterwards there was some twitching of the left trapezius. The eyes, previously turned left, were turned to the right for a short time, the pupils were dilated “but acted slightly,” and by about 4:00 p.m. John was “perfectly unconscious.” Later he became restless and incoherent, frequently repeating the same phrase for a few minutes before changing to a new one – that is, displaying “that restless anxiety” which with the other symptoms “are so characteristic of brain irritation” (Macewen, 1876–1886, Vol. 1, p. 214).

John’s temperature gradually increased over the next 12 hours, reaching 101.6 at 9:10 that night. His symptoms not being alleviated by his head being shaved, Macewen decided to operate even though, as the House Surgeon recorded, the symptoms,
did not point to any particular localization but the seat of injury being over the right side of the coronal suture where there was a slight fluctuant swelling and the bulk of the symptoms affecting the left side of the body caused [Macewen] to propose to cut down over the right side of the coronal suture in hope of getting at the cause of the irritation which had spread over the surface of the brain right hemisphere of the brain generally. (Macewen, 1876–1886, Vol. 1, p. 214, emphases added)

The record adds that “in this view Dr. Macewen was supported by Dr. Robertson (Lecturer in Mental Diseases at the Royal Infirmary School of Medicine)” who thought the operation “imperative,” and also that there was “congestion of the surface of the brain and perhaps a little pus, but of this latter he could not be sure” (emphasis added).

At 10:00 p.m. Macewen made an incision down to the bone “over the right side of the coronal suture” that released “a small quantity of fluid blood.” When the incision was extended it exposed a fracture, about four inches long and approximately along the line of the suture, with, at some places, a gap of about a quarter of an inch between the two bones. “At one portion” of the fracture Macewen found “a slight depression” and elevated a disc of bone with the trephine there. When he punctured the dura mater, already lacerated along the line of the fracture, “a large quantity of pent up fluid blood escaped,” after which “the pulsations of the brain slowly returned to the dura mater.” The wound was then “left freely over,” a protective plaster and gauze dressing applied, and after a somewhat restless night, and although having a temperature of 101.2 when Macewen visited the next morning, nine hours after the operation, John was “perfectly conscious, intelligent, and quiet (clothed in his right mind).”

By evening Daley’s temperature was 99.2, the infiltration over his brow beginning to lighten and disappear. He then recovered without incident and by April 2nd the wound looked well and was “filling up all covered with granulations.” An undated note added that John had been seen several times since his dismissal (apparently on April 2nd) and was “well.”

Problems in relation to John Daley

There are three interrelated discrepancies between Macewen’s 1888 and original accounts of John Daley: the first over the significance Macewen and Robertson attributed to the symptoms, the second over the specificity of Macewen’s own localization, and the third over the selection of the site for trephining. In attempting to resolve these discrepancies, the two other accounts that Macewen published about John Daley need to be examined: one appeared about eight months after the operation, in a short paper to the Glasgow Pathological and Clinical Society on November 11th, 1879 on the value of trephining (Macewen, 1880; British Medical Journal, 1879), and another, somewhat longer one, in September of 1881 (Macewen, 1881).

The 1888 account has it that Robertson agreed with Macewen that the symptoms provided “a clear guide” to a localized lesion. But, neither in the discussion of Macewen’s presentation to the Glasgow Pathological and Clinical Society in 1879 nor in Macewen’s 1881 account is Robertson described as agreeing with more than Macewen’s decision to operate. In those accounts, Robertson gives no opinion about localization at all. More, the Private Journal account of 1879 seems to reveal a difference of opinion between them, with Robertson thinking only there was “congestion of the surface of the brain” and Macewen believing that an irritation had spread over “the right hemisphere of the brain generally.”
If there really was a disagreement, perhaps it can be resolved by assuming that, in 1879, it was about how much of the localization of motor function established in experiments on monkeys and dogs applied to humans. We know that Robertson then believed that it could not “be held that the theory of motor centres in the convolutions is fully established.” Even though Robertson was more convinced about the applicability to humans of the animal work on motor localization than other findings, it was only “highly probable that there are such centres in what is known as the motor region.” He added his impression “that most of the advocates of localisation, inclusive of Ferrier, by their writings convey an idea of its nature that the facts do not warrant” (Robertson, 1879b, p. 413. See also Robertson, 1879a; 1880).

Second, on the specificity of Macewen’s own localization, the House Surgeon’s 1879 Private Journal record states clearly that Macewen thought John Daley’s symptoms pointed only to a very general site — the surface of the right hemisphere — whereas in the 1888 report he implicated a very specific one: the lower part of the fissure of Rolando. Both of Macewen’s later accounts are also very general. To the Glasgow Pathological and Clinical Society he said that the “disturbance” was on “the right side of the brain” although the infiltration into the orbit pointed to a subdural effusion of blood (Macewen, 1880). In the 1881 account it was simply “the right hemisphere” (Macewen, 1881). Against the vagueness of these localizations, one must place Macewen’s extremely detailed description of John’s left-sided motor symptoms involving the mouth, the muscles of the eye and eyelid, and the forearm. They make sense only when considered with Ferrier’s (1876, Figs. 29 and 63) extrapolation of his monkey work to humans in which the “centres” for movements of the mouth, eye, eye muscles, and upper limb are spread along the lateral surface of the fissure of Rolando, ventrally to dorsally.

Lastly, on the selection of the site for trephining, Macewen said in 1888 that the symptoms themselves were the sole guide, with the swelling just happening to coincide with it. In the 1879 Private Journal, he said the site of the initial incision was determined by the swelling over the right side of the coronal suture and the next part of that account reads as if the trephining was also carried out there. In speaking to the Glasgow Pathological and Clinical Society eight months after the operation Macewen also made an important distinction between the site of the incision and the site of the trephining. Although the incision over the right-sided discoloration and accompanying slight osseous irregularity exposed the fracture, there was “nothing” in it “to account for the symptoms.” He implied that he had trephined at another, more relevant, place but did not describe it (Macewen, 1880). Then, in the slightly longer account of 1881, he gave as his reason for dismissing the fracture as a possible site of the lesion that it was not depressed (Macewen, 1881). On my view, so distinguishing between sites of incision and trephining removes the discrepancy.

Of the three discrepancies, those about specificity seem to me to be the most crucial logically. But if the detail in Macewen’s description of the symptoms points specifically to the lower part of the fissure of Rolando, he was probably right to emphasize in 1888 that the point for trephining “happened” to correspond with the posterior extremity of the fracture. Consequently, it seems to me reasonable to suppose that Macewen trephined at a site to which the motor symptoms led and that the other discrepancies are, like those in John McKinley’s case, not of significance. I conclude therefore that Macewen definitely used localizing signs in planning John Daley’s operation (Compare Macewen, 1876–1886, Vol. 1, pp. 212–216; 1880; 1881, Case 2; and 1888a, Case 2).
Operation 3: Barbara Watson

Macewen’s 1888a account of the operation on Barbara Watson, the third of his cases, was introduced as “Case in which the symptoms exhibited pointed to lesion in frontal lobe: 1879” (emphasis altered). Barbara was suffering from the recurrence of a tumor above the left eyeball, in the orbital cavity, and now the left pupil was in a state of stable miosis; there was obscuration of intelligence, slowness of mental comprehension, want of mental vigour, and pain in the head. These pointed to the probability of a lesion in the left frontal lobe but were not sufficient to enable a diagnosis to be made (Macewen, 1888a, Case 3, emphasis added).

Macewen therefore “placed her under the observation of an educated skilled nurse” who some weeks later made a careful record of the initial stages of a series of convulsions without which, Macewen said, “the key to the brain lesion as indicated by the convulsions would have been lost, as, when seen by me, they had become general and threatened speedy dissolution.”

The nurse observed that the convulsions were initially,

strictly limited to the right side, commencing in the face and arm, and confined to these two parts during the initial attacks. The leg on the same side was affected during the third seizure, and ultimately the convulsions became general, with complete loss of consciousness.

Macewen said he had construed these phenomena as:

indicating extension of the irritation to the lower and middle portions of the ascending convolutions; and, when this was considered along with the former evidence, it was concluded that an irritative lesion existed in the left frontal lobe (Macewen, 1888a, Case 3, emphasis added).

Macewen therefore decided to trephine “midway between the centre of the ascending convolutions and the anterior aspect of the cranium. At this point a minute nodule, the size of a barley grain was detected on the outside of the skull” [emphasis added]. A disc of bone was removed with a large trephine and tumor of the dura mater exercising pressure on the anterior surface of two-thirds of the left frontal lobe and varying in thickness was exposed. It was “carefully dissected out along with the brain membranes” involved with it. Barbara rapidly recovered and there was no recurrence of the tumor. When she died eight years later from Bright’s disease, Macewen was able to establish that there “was no trace of further growth” (Macewen, 1888a. See also Macewen, 1896).

Macewen’s 1879 record in his Private Journal is less definite about Barbara Watson’s tumor being located left frontally. The fourteen year-old Barbara was admitted on July 21st, 1879, complaining of pain over the left brow and a recurrence of a left-sided supraorbital periosteal tumor that had been removed about a year earlier. Macewen now found her left pupil to be contracted and showing only a slight response to light. He also found a tumor “over the inner side of the upper left orbital cavity . . . about the size of a kidney bean, firmly attached apparently to the periosteum.” Over the brow, “about 2½ inches above the supra-orbital ridge” he also found “a prominence about the size of a pea
large barley grain” firmly attached to the periosteum (Macewen, 1876-1886, Vol. 1, pp. 246–252).

Macewen concluded that it was probable that pressure from the supraorbital tumor on “the nervous apparatus [was] causing the contraction of the pupil” but, if that were not the case, he raised the possibility of a similar growth “on the inside of the skull” (emphasis added). Although the barley-like node and the pain “gave ground for suspecting that there might have been other tumours on the inside of the cranial cavity,” Macewen decided to remove the tumour over the eyeball, but before he could do this, Barbara had a series of convulsions that “entirely altered the aspect of the case.”

The first convulsion, on July 27th at 5:30 p.m., was slight and lasted two to three minutes. It amounted to twitchings of the eyelids and muscles of the right side of the face, and a flexing and violent twitching of the right arm. Miss McKie, experienced in nursing epileptics, did not recognize Barbara’s moan, just as she began to convulse, “as being like the cry of an epileptic.” A second convulsion followed ten minutes later, accompanied by a twitching of the left leg. More convulsions occurred at decreasing intervals and by 6:00 p.m. they were continuous and general. Barbara’s breathing also slowed, her temperature soon increased to 103.4, and Macewen, concluding that “a fatal issue was imminent,” decided to operate.

Macewen selected “the barley-like node over the frontal bone as the seat of the operation.” On incising the node, he found it “of a similar consistency to the supraorbital tumour” he had removed the year before. It extended over the frontal bone “in a flattened form apparently connected with the periosteum” and the bone under it was slightly rough and soft to the touch. A one-inch disc of the bone removed by the trephine was thickened with a three-sixteenths of an inch thick piece of tumor on its underside similar to that found externally. A considerable portion of the tumor was also adherent to the inside of the skull and spread over much of the dura mater. After removing the tumor from the dura “as far as practicable,” the supraorbital tumour itself was examined and found to be continuous with the node. It and the approximately two and a half square inch tumor over
the external surface of the frontal bone were then removed. The operation had been con-ducted antiseptically, and the flaps brought together and left drained. The next morning Barbara’s temperature “was 99.6, she was perfectly conscious, answered several questions intelligently, lifted her head to get dressed, and stated that she felt well.”

Four days after the operation, Barbara’s temperature increased, “she then became aphasic,” and had convulsions that began on the right side before becoming general and leaving her unconscious. After the pressure from the dressing over the site of the operation was relieved (on August 1st), her consciousness began to return and she started to lose her aphasia, but her right arm and leg were still paralyzed. From then she “gradually improved, the paralytic affection of the right arm & leg gradually disappearing. Her consciousness became perfect, & her intelligence rapidly improved” (Macewen, 1876-1886, Vol. 1, p. 251). However, Barbara was not discharged until the 1st of October.

Four additions regarding this case were later made to the Journal (Macewen, 1876-1886, Vol. 1, pp. 251, 252):

1. a photograph labelled “taken in 1882”;
2. a note dated June 29th, 1883: “the patient has regularly visited the ward and has continued in excellent health. Underneath is the photograph taken a few days ago. A scar is slightly visible to the left of the forehead”; and
3. a photograph labelled “Photo 1883”;
4. a note of March 1884: “Above present at the Southern Medical Society demonstration in GRI cerebro-spinal lesions. Well and working regularly.”

Barbara remained well until her death.

Problems in relation to Barbara Watson

The two problems with Macewen’s accounts of Barbara Watson are the discrepancies over his selection of the site for operating and the importance he gave the symptoms, including the psychological, in localizing the lesion. Four of Macewen’s publications bear on the discrepancies, of which the first three are the most relevant (Macewen, 1879b, 1880, 1881, and 1884b).

None of the 1879 Private Journal record and the shorter 1879 and 1880 accounts place much stress on the use of the symptoms to localize the lesion. The 1884 account makes up part of the report on Macewen’s (1884b) demonstration at the March Glasgow Southern Medical Society. The discussion of her case was, like that of John Daley’s, clearly in the context of the usefulness of localizing signs, and the 1881 account of Miss McKie’s description of the convulsions that had so altered Macewen’s assessment of the case seems also to be in a localization context. These convulsions commenced when “the muscles of the right side of the face began to twitch, the right arm was firmly flexed, and violently twitched.” They increased in intensity, became more general, and eventually were of more serious import. In his 1881 conclusion Macewen explicitly included the convulsions as the fourth point in his summary of:

the indications which led . . . to a probable locus of brain pressure were: (1) The contraction and fixity of the left pupil. (2) The presence of a supraorbital tumour of a gummatous character and of a small nodule of probably similar consistence on the left side of the frontal. (3) A fixed dull pain on the left side of the brow, between these two tumours. (4) Convulsions commencing on the right side of the face and afterwards involving the right side of the body (though ultimately becoming general). (Macewen, 1881, p. 582)
Nevertheless, in this as in the other accounts, it seems to have been the frontal, barley-sized node that led Macewen to trephine where he did (Compare Macewen, 1879b, 1880; *British Medical Journal*, 1879).

Cushing and Eisenhardt (1938, p. 720) also drew this conclusion, presumably without the *Journal* evidence. They believed that the diagnosis “was based more on the extracranial evidences of lesion than on the neurological symptoms it produced.” However, we see from the *Journal* that Macewen considered the possibility of an internal locus even before the first convulsion. He clearly believed the node to be connected with the supraorbital tumour, and probably believed that in attacking it first he would find a path, so to speak, from it to the site of the internal frontal dural tumor.

Barbara’s psychological symptoms were given some prominence in the 1888 summary, where Macewen described her “obscuration of intelligence, slowness of mental comprehension, and want of mental vigour,” but were not mentioned explicitly in either the *Private Journal* or the short accounts. However, among the signs of her recovery, the *Private Journal* of 1879 does record that after the operation “Her consciousness became perfect and her intelligence rapidly improved” – words that imply less than adequate functioning before it.

I think it fair to conclude that Macewen used Barbara’s symptoms, including the psychological changes, to localize the lesion in the frontal lobe, and that when he selected the frontal nodule as the starting point for the operation he anticipated it might lead to an internal dural tumor (Compare Macewen, 1876-1886, Vol. 1, pp. 246-252; 1879b; 1880; 1881, Case 3; and 1888a, Case 3). 

**Operation 4: Christina Thomson**

Macewen introduced his 1888 account of Christina Thomson, his fourth case, with the side-heading “Cerebral abscess in temporo-sphenoidal lobe: Involvement of motor area: 1881” (emphasis altered), and then described how:

> aphasia could be discerned through the clouded state of the patient’s intelligence; there was paralysis of the left third nerve, and of the brachial and facial muscles on the right side. From these the extent and localisation of the disease was determined. (Macewen, 1888a, Case 4, emphasis added)

He concluded that there was “a very large abscess located in the temporo-sphenoidal lobe, but involving the basis of the third frontal and ascending convolutions.”

The suspected abscess came under notice “at such a late period of the disease, that before arrangements could be made for the operation, the patient suddenly exhibited all the phenomena of the abscess having burst into the lateral ventricles.” On operation, the cerebral surface was penetrated and after several ounces of pus were evacuated an old, encysted abscess “something like a tennis ball was seen floating in a sea of pus that still remained in the interior of the brain” with an acute abscess in its periphery. Unfortunately it was too late; Christina died “from exhaustion.” At postmortem, it was found that “the

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4In evaluating the contribution of the Phineas Gage case to brain surgery, I had read Maclean's published listing of the psychological symptoms as his using Ferrier's analysis of the effects of frontal damage in relation to Gage to make his diagnosis. That may be so – the anonymous review of Ferrier's Gulstonian Lectures in the *Glasgow Medical Journal* (1879, 12: 286-291) that Maclean almost certainly read emphasizes them in relation to Gage – but there is no hint of that connection in Maclean's reasoning, and that use now seems to me to be very unlikely (Macmillan, 2000, p. 213).
whole temporo-sphenoidal lobe had disappeared, and the basis of the second and third frontal, as well as the basis of the two ascending convolutions, were the seat of acute encephalitis" (Macewen, 1888a, Case 4).

The 1881 record in the *Private Journal* is incomplete and what there is contains few specifics about localizing symptoms. Christina Thomson was admitted at fourteen years of age to Macewen's ward on the October 26th, "suffering from a discharge of pus . . . from two incisions, one above and in front of the left ear, the other behind and below" made a few days before. Dr. Potts of the Infirmary had tried to drain a large abscess, most of which was situated in front of the ear on the left side of the head (Macewen, 1876–1886, Vol. 3, pp. 25–31).

Macewen found the squamous and mastoid portions of the temporal bone to be "bare, destitute of periosteum." Although Christina's face was flushed, her breathing and temperature were normal, "intelligence clear though she was not in any way inclined to be communicative." Macewen ordered Christina to be watched very closely. On October 31st her pulse dropped to 50 and her "intelligence seemed more obscure, though she still answered questions correctly, there seemed to be a cloud over her mental actions." At 1:00 p.m. she began "to suffer from slight feelings of cold" which, although they did not amount to a "shiver," caused her to pull up her shoulders and complain of cold.

Christina then slept a good deal but was restless and the next day her feelings of cold "almost amounted to a shiver." Macewen then decided to trephine, "as it was clear that there was cerebral mischief somewhere about the temporal lobe" (emphasis added). Before he could act, her temperature rose, her breathing became labored, she lost consciousness, became insensible, and her pulse reached 140. A successful outcome "was thought almost beyond hope" but the very evident symptoms made Macewen proceed. Christina was insensible enough for the operation to be performed without chloroform. An opening was made "through the squamous portion of the temporal bone," the "much congested" dura mater opened, and a bistoury inserted into "a white thickish material" found there. Some three to four ounces of pus "having a foetid odour" then spurted out and the remaining white material, resembling a cyst-wall, was loose enough to be removed with forceps. Immediately after opening the abscess, Christina's breathing became quiet and free, her pulse stronger, the circulation restored to her face, and brain pulsations returned. She remained insensible although she appeared "to experience pain."

After recording that a second opening was made behind the ear "in order to make drainage complete," the House Surgeon's account suddenly ends (Macewen, 1876–1886, Vol. 3, p. 31).
Problems in relation to Christina Thomson

Although the 1888 summary has it that it was the combination of paralyses of the left third nerve, and of the brachial and facial muscles on the right, together with the aphasia from which Macewen determined “the extent and localisation of the disease,” the Private Journal record includes only Macewen’s conviction that the temporal lobe was involved and records this as the basis of his decision to trephine over it. But, apart from the “shiver,” no motor symptoms are recorded, and it is not clear what he took the aphasia to be.

The Private Journal for Christina is of course incomplete, but that aspect of the problem can be overcome by adding Macewen’s 1893 account to it (Macewen, 1893, Case 30, pp. 177–181). Hers is the case noted in the introduction to this paper where the very detail of the 1893 account, including the histology and drawing of the abscess, means that the information on which it was based must have been kept somewhere other than in the Journal. This 1893 “supplement” was published under the initials “C.S.” in Macewen’s book on pyogenic infections and contains his description of her motor symptoms: “right facial and brachial paralysis, and paralysis of the left oculo-motor.” Macewen here described her thinking as “sluggish” and her replies to questions as monosyllabic and sometimes not always intelligible, but he did not use the term “aphasia.” From all the symptoms, he diagnosed a “cerebral abscess, located in the left temporo-sphenoidal lobe.” Shortly after he arrived at this conclusion, Christina’s right facial muscles and, later, her right arm were spasmodically contracted. From these, Macewen went on to infer that the inflammatory zone around the abscess had “invaded the lower portions of the motor area on the left side of the brain.” We also learn that on admission Christina’s left pupil was larger and fixed and that she lay on her left side with knees flexed with marked cutis anserina [goose flesh] on her legs and arms. Although we learn nothing more about the second trephining, we do learn that Christina improved for a couple of hours before dying some four hours later, and that there was a postmortem and a histological examination of the abscess (Macewen, 1893, Case 30, pp. 177–181).

At postmortem, Macewen found the dura mater over the left side to be “much congested and thickened,” the portion corresponding “to the temporo-sphenoidal lobe was covered with a layer of lymph,” and that the abscess cavity, ringed with reddish-yellow, softened, pulpy cerebral tissue, occupied the whole of the lobe. The base of the parietal lobe was affected and there was a “distinct breach” of the wall of the left lateral ventricle as well as some accumulation of serum and a little pus in the right. The bones were also diseased, the left petrous bone eroded such that it communicated with a circular opening in the middle ear. Filling the gap was a mass of connective tissue that linked the middle ear with the abscess cavity and which Macewen concluded had connected a primary middle-ear disease with the cyst-like abscess. He supplied figures of the abscess, described its contents and histology, and gave its dimensions as 62 mm by 37.5 mm (Macewen, 1893, Figs. 45 and 46 between pp. 106 and 107 and text pp. 105, 108–109, 112, 144, 179–181).

As compared with Christina Thompson’s monosyllabic and not very intelligible replies, which Macewen may have taken as aphasia, the relatively greater specificity of his characterization of William McClean’s post-operative loss of words as “almost” amounting to an aphasic condition may reflect an increase in his knowledge of aphasia over the interval between their cases. On the other hand, Macewen does say, and just before setting out the later version of Christina’s case, that he not seen distinct motor aphasia in any of his other left temporo-sphenoidal abscess cases (Macewen, 1893, pp. 153–154). The localizing signs Macewen described in Christina’s case are also those that Barr set out for localizing a left-temporal abscess after he had begun his collaboration with Macewen (Compare Barr, 1884, pp. 416–421; 1896, pp. 293–296).
Consequently, even though the symptoms are described in the 1893 "supplement" in more detail than in the 1888 summary, they are, with the exception of the condition of the pupils, the same, and their localizing significance is the same in both. Hence, although we have no contemporaneous record of how (or if) Macewen reasoned about Christina’s motor involvement and aphasia in 1881, what he reported in 1893 resolves that uncertainty by showing it to be a simple function of the lack of evidence rather than anything that contradicts it (Compare Macewen, 1876–1886, Vol. 3, pp. 25–31; 1888a, Case 4; 1893, Case 30, pp. 177–181).
Operation 5: William McGill

In 1888, Macewen introduced his three-sentence description of his fifth case, that of William McGill, with the side-heading "Intracranial effusion of blood diagnosed from motor symptoms alone: 1883" (emphasis altered) before going on:

In May of that year, a traumatic intracranial effusion of blood was correctly diagnosed from the motor symptoms exhibited, as being located over the base of the ascending convolutions. There were no external marks of injury, and the motor symptoms alone were the guides to the position of the lesion. The patient is now alive, in robust health, and regularly at work (Macewen, 1888a, Case 5).

Macewen describes William as one of three cases seen in 1883, two of which had been published, and it is evident that the other two are Cases 6 (Mrs. McKirdy) and 7 (Francis Newlands). There appears to be no other published account or mention of William’s case.

The Ward Record for 1883 contains a detailed description of William McGill’s symptoms but little explicit information about localization. William was a 26 year-old chimney sweep residing at 60 East John Street who was unconscious with head injuries sustained after falling from the roof of a house (Glasgow Health Board Archive, HH67/29/3, p. 6). Macewen’s Private Journal tells us he was admitted on May 21st, 1883 with a “head injury (evidently involving the cerebrum), wh. he had received shortly before admission” (Macewen, 1876–1886, Vol. 4, pp. 37–39). He was unconscious and the only external mark of injury was “a bruise of the scalp at the junction of the occiput with the right parietal ['across toward left of midline' added and corrected by Macewen].” He could not be roused, but from time to time “gave vent to a semi-articulate, incoherent cry, consisting chiefly of oaths.” William’s pulse was slow and full, his temperature normal, his right eyelids were infiltrated with blood, but his pupils active and equal. He remained in that condition for seven days and, although there were no convulsions during it, at the end of the period William “had a series of convulsions twitchings of the ['left' added by Macewen] facial muscles,” which were “violent,” and his head turned to the right.

Fig. 5.—Lesion in Ascending Convolutions diagnosed from Motor Symptoms alone.

Figure 5. Macewen’s 1888 location of William McGill’s haematoma (From Macewen 1888a, Figure 5)
William's convulsions (not this time corrected to 'twitchings') apparently caused Macewen to trephine a disc from his right parietal bone "in a line with the ear a little in front of behind the auriculo-bregmatic line and above a line drawn from ext. ang [illegible] occipital protuberance," but no reasons for selecting that site are recorded (and the date of May 27th for the operation is given only in the Ward Records). The dura mater bulged into the aperture and was detached from the skull at its anterior margin. A broad blunt probe "passed downward & forward to the frontal bone" located a "considerable quantity of clotted blood" there. After its removal, a fissured fracture was found "commencing in the anterior aspect of the parietal & running downward and forward thro the frontal, into the base of the skull, & into the anterior fossa." There a larger clot "between the dura mater & skull extending toward the base" was evident and a second disc was therefore raised "over the fracture as it ran thro the frontal bone," about two and a half inches in front of and below the first. Macewen's attempt to remove this clot caused "a quantity of pent up fluid blood" to gush out and after it had done so about two ounces of clot were removed.

The discs were divided into small pieces and replaced under the tissues. Over a period of about 24 hours after the operation William "had a series of convulsions ['which though general' added by Macewen] principally affected (the right side?)" [this phrase, the question mark, and the brackets around it added by Macewen]. These, lasting about a minute each, were followed a slight twitching and continued for about 24 hours. By June 19th his consciousness had returned and although he could answer questions of a simple kind, he suffered from a loss of words "which almost amounted to an aphasic condition." By 27th June it was noted that "intelligence greatly improved" and by August 9th it was "perfect" (Macewen, 1876-1886, Vol. 4, p. 39), and the Ward Record shows that he was "Dismissed" on August 22nd with "Result; well" (Glasgow Health Board Archive, HH67/29/3, Index and p. 6).

Problems in relation to William McGill

The Private Journal account contains a good description of the symptoms but tells us nothing of Macewen's deductions about localizing the hemorrhage. It may be that, as with John McKinley, his reasoning was implicit in the place he selected for trephining. It did not depend on the fracture, because Macewen found where that was only after the first disc was removed. On the other hand, his localization might not have been as precise as he represented it. The second disc was situated more frontally, nearer to the base of the skull than the first, and it was there that even more fluid and more of the old hemorrhage was found. This second site seems to match more closely what he said in 1888 about the hemorrhage being "over the base of the ascending convolutions" and located by "the motor symptoms alone" than does the first.

In my view, it seems certain that Macewen used the left sided twitchings/convulsions and the head turning alone to plan where the first disc was to be removed. If so, it may be irrelevant that he then found other damage (Compare Macewen, 1876-1886, Vol. 4, pp. 37-39, 1888a, Case 5).

Operation 6: Mrs. McKirdy

Macewen's 1888 summary of Mrs. McKirdy, his sixth case, is under the side-heading "Syphilitic tumour in paracentral lobule diagnosed from motor symptoms alone: 1883" (emphasis altered). The description is sparse: "a case of brachio-crusral monoplegia, without loss of sensation, was relieved by the removal of a syphilitic tumour from the paracentral lobule and a plastic effusion from the centre of the ascending convolution." Macewen
William Macewen and Localization

Fig. 6.—Syphilitic Tumour in Paracentral Lobule. Lighter shading indicates effusion on surface of upper part of central convolution.

Figure 6. Macewen’s 1888 location of Mrs. McKirdy’s syphilitic tumour (From Macewen 1888a, Figure 6)

gives no reason for claiming in the side-heading that his localization was “diagnosed from motor symptoms alone” (Macewen, 1888a, emphasis added).

Macewen’s 1883 Private Journal record of Mrs. McKirdy is incomplete. Although relatively detailed about her symptoms, it is less so about localization and also seems to suggest that there was an external guide. The 25-year-old Mrs. McKirdy was admitted on the June 7th, 1883 with a history of syphilitic sores on her head that had dried up on treatment. Some time later, over about 24 hours, she became unable to use her right arm [presumably an error for “left”] and she may also have had some numbness in her left limbs even earlier. She was also “troubled with a defective memory, causing her [illegible word] contradictory statements, &, at times, to be subject to delusions, mostly optical.” A note on page 40 “(see p. 82)” suggests that the delusions were to be described there. Mrs. McKirdy attributed some of these symptoms to being struck by a falling window sash, which had caused a small piece of bone to be “shed” from the back of her head (Macewen, 1876–1886, Vol. 4, pp. 40–41).

On examination Macewen found that Mrs. McKirdy had complete paralysis of the left arm with an almost spastic-like condition of the lower limb but with unimpaired sensation in both. He also found “a small sinus” at the junction of the two parietal bones with the occipital “inclining principally to the left side.” When he tapped her head “smartly with the finger,” he found a distinctly tender point over the right parietal bone and “extending toward the vertex.”

Other than Macewen’s saying (and this part of the record is in his hand) that it was “at the spot corresponding with the ascending frontal and parietal convolutions on the rt. side. Where there was previously pain on pressure” (emphasis added), nothing in the Journal sets out Macewen’s reasons for trephining where he did. Nor does he give any reasons for removing a second disc, as he did, from the occiput. A probe from the first opening did find a space between the dura mater and the skull about an inch wide leading to the occiput where the undersurface of the skull was found to be roughened. Exactly after the next sentence, “A disc of bone was, therefore, removed” Macewen’s record ends. There is a note “continued on p. 81” but pages 81 and 82 have been very neatly excised from the Journal (Macewen, 1876–1886, Vol. 4, p. 41).

The hiatus can be partly bridged by adding some points from the January 1884 meeting of the Glasgow Pathological and Clinical Society at which Mrs. McKirdy was demonstrated...
Malcolm Macmillan

(Macewen, 1884a). The description of her operation there provides a quite legitimate supplement to the Journal account because it is virtually word-for-word as in the Private Journal up to the removal of the second disc. Although we find that “pain on pressure” is not mentioned in relation to the first trephining, we do learn that opposite the first opening the dura was paler, somewhat thickened, and covered with a yellow-colored false membrane about one-sixteenth of an inch thick. This was removed and an incision made into the brain in the direction of the paracentral lobule which resulted in “a gush” of probably two drachms (about 0.23 fluid ounces) of “grunous red coloured fluid.” If the cerebral pulsations, previously absent, did return they were very indistinct. Macewen described a second trephining “over the occipital region” where “a similar thickening of the internal table was found,” but did not mention the dura being pierced or any fluid being released. Both discs of bone were divided and replanted and were “quite firm” by January 1884 when the wounds had healed without pus being produced. Mrs. McKirdy was soon able to walk, to raise her arm to shoulder level, and her “mind changed greatly for the better, her memory improving and her intelligence becoming much brighter,” points that those attending the demonstration could confirm for themselves. Her “optical delusions” were not mentioned at all (Macewen, 1884a).

Problems in relation to Mrs. McKirdy

Because of the excision of pages 81 and 82 from the Private Journal record, it is almost impossible to establish fully what differences there were between it and the 1888 account of Mrs. McKirdy’s case. One real difference is apparent however: localizing the lesion(s) in the 1888 summary and what we find reported at the 1884 demonstration. The problems are resolved in Macewen’s 1885 account, which is the only other place where Macewen gives an account of Mrs. McKirdy.

Macewen’s 1885 account is introduced with a paragraph-length summary beginning “Left-sided monoplegia of arm and leg, preceded by muscular twitchings and tingling sensations, without loss of sensation, due to syphilitic lesion; cortical lesion in right motor area, superior half of ascending frontal and parietal convolutions, with probable involvement of paracentral lobule....” (Macewen, 1885, Case 2). Macewen confirmed the pre-admission history recorded in the Journal. Mrs. McKirdy had a history of syphilitic infection of more than four years standing that had eventually resulted in sores on her head and the formation of a small ulcer over the upper part of the occipital bone, principally on the left side, that she attributed to a blow. About eight months after the ulcer healed “she began to experience a tingling sensation in the muscles of the left arm, and subsequently in those of the left leg, which was occasionally accompanied by slight muscular twitches.” These sensations gradually increased over about six weeks until “numbness” supervened, but she did not lose her sense of touch. Toward the end of this period her left arm then lost its power, and she was also soon unable to stand. Eight weeks from the commencement of these symptoms she lost all power in the arm and leg and it seems to have been at about this time she was admitted to the medical wards of the Glasgow Royal Infirmary. Ten weeks later again, because her hemiplegia had not responded to treatment she was transferred to Macewen’s surgical ward.

On examining Mrs. McKirdy, Macewen found a complete motor paralysis of her left arm and leg, “accompanied by sufficient rigidity to indicate a slight degree of spastic condition of the muscles,” and he confirmed that sensation over the affected limbs was unimpaired. She also complained of
languor and a general sense of oppression. Her intelligence was dull and her memory defective. Tapping the head gave rise to disagreeable feelings, but there was no specially localised sensations with the exception of a tenderness over the occipital region at the site of the scar left by the tertiary ulcer. It was apparent that there was a lesion or lesions in and confined to cortical areas controlling the movements of the leg and arm. (Macewen, 1885, Case 2, emphasis added)

Once again the “optical delusions” were not mentioned.

After noting that the absence of anaesthesia pointed to a cortical rather than a central lesion, Macewen drew on Charcot’s and Pitres’ view that “cortical cerebral monoplegias affecting the arm and leg coincide with lesions in the superior half of the ascending frontal and parietal convolutions” (Macewen, 1885).

Macewen therefore concluded it was possible that, two separate lesions were present acting coincidentally, the one on the arm, the other on the leg... In that case the lesion affecting the power of the arm would involve chiefly the middle ascending frontal and to a less extent the corresponding part of the ascending parietal; while the paracentral lobule would be looked to as the seat of the lesion affecting the lower limb (Macewen, 1885, Case 2, emphasis added).

Macewen reasoned that exposure of “the greater part” of the ascending convolutions would allow both for the removal of the lesions affecting the arm and leg, and, should the paracentral lobule be involved, for a transverse incision to reach it.

A disc of bone “over an inch in diameter was elevated from the right side of the skull, its anterior border touching a point about half an inch behind the auriculo-bregmatic line, while its upper margin reached a point about an inch from the centre of the longitudinal sinus.” The internal surface of the disc was rough with osteoplastic projections about a sixteenth of an inch long. The dura, otherwise adherent to the skull, was separated from the posterior part of the aperture and a probe passed for two inches toward the occiput met there with “a similarly roughened portion” at the posterior border of the parietal, near the lambdoidal suture, that is, under the right extremity of the scar left by the ulcer. The dura mater under the opening “was more opaque than usual” and its surface roughened by yellowish indentations corresponding to the bony projections. The dura was then incised and a yellowish, opaque effusion that seemed to dip “slightly into the fissure of Rolando” was found and removed.

With his fingers, Macewen felt a dense portion of tissue “about the size of a large filbert [i.e., a hazelnut]” between the upper portion of the trephine opening and the paracentral lobule. It was when this dense tissue was excised that the two drachms of fluid escaped. He then removed a second disc from “the posterior portion of the parietal near its junction with the occipital” at the spot where the bony irregularities had been sensed. The osteophytic deposits were chiselled off “in order to prevent the possibility of future irritation,” both discs were divided and reimplanted, decalcified chicken bones were inserted for drainage, and the wounds were sutured with chromic gut and allowed to drain (Macewen, 1885, Case 2).

Mrs. McKirdy recovered quickly but it took her about six weeks to regain all her powers. Thus, 48 hours after the operation she felt “much relieved,” although she had some slight numbness in her left arm; four days later the numbness had disappeared and
she could move her toes; at the end of the week she could move her toes freely and foot partially, and could move her finger and raise her whole arm. Six weeks after the operation she could walk unaided, but with a hemiplegic gait, and still had some difficulty in releasing her left hand after grasping objects. Nevertheless, Mrs. McKirdy could do ordinary housework and walked easily, although still dragging her left lower limb. Macewen said that, up to April 1885, she “reported herself on many occasions at the hospital,” and despite living “under the most adverse circumstances,” was quite able to carry out her household duties. Her “previously affected side was performing its functions as well as formerly,” and on the last occasion Macewen saw her, Mrs. McKirdy had walked a mile to the hospital and intended to walk the same distance home (Macewen, 1885, Case 2).

The complexities of Macewen’s 1885 argument over what the symptoms pointed to might account for its omission from the Journal record and the January 1884 case demonstration. However, although Macewen said nothing at the latter about localization, that he definitely planned his operation on Mrs. McKirdy in terms of her symptoms is consistent with the remarks of Finlayson, Robertson, and Clark at the demonstration. Dr. Finlayson said that the operation “was quite a new one and depended greatly on the advances that had been made in recent years in cerebral localisation;” Dr. Robertson, noting how the pressure of the fluid and the false membrane could explain the hemiplegia, “had no difficulty in understanding how their removal or relief should benefit it;” and Mr. Clark, citing a case of his which ended fatally, believed his own trephining would have been better guided “by the distribution of the paralysis” than the external manifestation of injury. And, in his reply to one of the questions, and just as clearly, Macewen’s related her symptoms to the localization of the lesion (Macewen, 1884a).

Leaving aside for the moment the question of whether the extra detail Macewen provided in 1885 might be part of a plea for priority of his over Bennett’s and Godlee’s operation—it was not published until after theirs—and despite the problems posed by the incompleteness of the original record, I have little doubt that Macewen used his knowledge of localization in planning the operation on Mrs. McKirdy and that his 1888 summary gives an accurate account of what he did in 1883 (Compare Macewen, 1876–1886, Vol. 4, pp. 40–41, 1884a; 1885, Case 2).6

Operation 7: Francis Newlands

Macewen introduced Francis Newlands, the seventh case in his 1888 address, with the side-heading “Focal lesion in ascending convolution recognised by motor symptoms alone: 1883” (emphasis altered) and placed his being seen “a few months later” than Mrs. McKirdy. He described Francis as a case of brachial monoplegia in whom “a focal lesion [was] found in the white substance of the motor cortex in the middle portion of the ascending convolution. The lesion was an extravasation of blood into the brain around which encephalitis had occurred, inducing irritation and compression of this area.” The operation produced “immediate and complete” relief and Francis had since been “in perfect health and regularly at work” (Macewen, 1888a, Case 7).

6Another curious feature of Mrs. McKirdy’s case is that she was readmitted to Macewen’s Ward 22 of the Glasgow Royal Infirmary on December 17th, 1883, and discharged on March 10th, 1884, after a stay of 84 days. The words “hemiplegia, trephining, cured” appear after her name in the admissions register but nothing is recorded about this second operation, although it may be that whatever was recorded about it was on the pages excised from Macewen’s Private Journal. The second admission is not mentioned in either of the published accounts and there seems to be no other reference to her having a second operation.
We have a particular difficulty over Francis Newlands in that there is no *Private Journal* record of his admission and treatment. The name “Newlands” does appear on the otherwise unnumbered page 28 of Volume 4 of Macewen’s *Journal*, in the Index headed “Trephining” under the subheading, “Head symptoms following injury.” That index entry should lead to a description of an operation on page 112, a place consistent with a November 1883 date, but there is no page 112. The records of Ward 21 of the Infirmary show the admission on November 27th, 1883 of a Francis Newlands, a 36-year-old miner of Low Waters Hamilton [southeast of Glasgow] and his discharge “Well” on March 14th, 1884. No diagnosis is recorded (Glasgow Health Board Archives. HB 14/5/8, p. 241). Even though the patient of Macewen’s 1888 address is given no initials, that he is Francis Newlands is certain from the 1885 account, where the initials “F. N” are provided, and the date of November 27th, 1883 given for his admission to the Glasgow Royal Infirmary.

All that we have on Francis Newlands, then, is Macewen’s 1885 published account. We learn that Francis was a 36-year-old coal miner admitted on November 27th, 1883, complaining of weakness, inability to work, and symptoms “referable to the motor centres.” Three months earlier he had become unconscious for 12 hours after falling downstairs. There had been some blood about one ear but its source was unknown. On recovering consciousness Francis was well except for a feeling of giddiness when he attempted to walk, but soon he became too weak to work. He was first admitted to the medical wards of the Glasgow Royal Infirmary on the September 18th, when he was found to have a partial right-sided facial paralysis, although it was unclear whether it was of central or peripheral origin. He was discharged basically unchanged although the paralysis had improved after “a series of blisters over the temporal region and rest.” On returning home, Francis could not work because of general weakness, feebleness of the left arm, vertigo on moving suddenly or rising from stooping, and a sensation of oppression in the head. His physician therefore referred him to the Infirmary’s surgical wards (Macewen, 1885, Case 1).

Macewen’s own examination found a trace of the right-sided paralysis, “evinced by a slight passivity of expression,” confirmed when Francis attempted to elevate his eyebrows. The muscles on the right side of his face occasionally twitched and the right pupil’s response to light was sluggish. Occasionally he had spasmodic jerking of the muscles of
the left arm, sometimes pricking sensations from the shoulder to the fingers, and the grasp of the left hand “was very feeble.” Francis preferred not to hold anything breakable in his left hand because “he could not trust it” and was liable to drop things. Macewen noticed that the other symptoms present on his previous admission were still in evidence. There were no external marks of injury on the skull, even after it had been shaved. To Macewen “it was obvious that there was a lesion of the motor cortex in the upper half of the right ascending convolution,” probably “set up round an extravasation of blood” that had taken place there during the contusion. Secondary changes had occurred around the point of irritation which, from the changes in the left arm, were of an inflammatory nature, “a localised encephalitis, and probably a leptomeningitis” (Macewen, 1885, Case 1).

Francis Newlands was operated on on December 8th, 1883. A one-inch disc of the right parietal bone was removed “about one inch behind the auriculo-bregmatic line, and one inch above a line drawn from the external angular process of the frontal to the to the upper angle of the lambdoidal suture.” The disc was somewhat thinner than usual and its internal table slightly eroded. “The dura mater . . . had an irregular roughened surface, and was of a yellowish-grey colour, with here and there a dark patch indicating blood-clots in the subdural space.” When an incision was made into the dura mater, which was adherent to the skull around the margins of the aperture, “a considerable quantity of clear fluid escaped along with some clots of blood about the size of a large bean.” After removing more clots, the surface was found to be a somewhat yellowish, opaque, dense membrane-like patch adherent to the tissues underneath covering the ascending frontal convolution and dipping down into the fissure of Rolando. When the membrane was pierced it was found to be one-eighth of an inch thick and the brain tissue under it “infiltrated with minute blood-clots, some of them about the size of a pea, others that of a barley grain.” Many of these were extruded by the brain pulsations when they were re-established and Macewen gently loosened others. Externally they were yellow-brown in colour but internally still black. Bleeding from a minute vessel on the surface of the brain was then staunched with pressure, the dura replaced, and the divided portions of the disc of bone, stripped of its periosteum, reimplanted in the trephine aperture. Francis recovered in eight weeks, basically without complications, and eight months later told Macewen that he was “regularly at work, and in excellent health, the power of his left arm having been quite restored” (Macewen, 1885, Case 1).

Problems in relation to Francis Newlands

Discrepancies do not really arise in the case of Francis Newlands but we may ask if Macewen’s 1885 account presents a true picture of his 1883 inferences from the symptoms. In 1885 he reported a relatively large amount of detail about them and it is clear that the operation he then described was based on what they revealed. Possibly this is another plea for priority over Bennett and Godlee, especially as there is no explicit record of Macewen reporting on Newlands before 1885 to any meeting of the local Glasgow medical societies to which he belonged. There is some indirect evidence in that Macewen’s March 6th, 1884 demonstration included twelve cerebral and two spinal lesion cases, all but one of which were traumatic and all of which were put by Dr. Park, the President, and Macewen in the context of localization. All had been treated by “trephining, elevation where necessary, incision of the dura mater or brain, and evacuation of pus or blood” (Macewen, 1884b). The British Medical Journal report emphasized that “cerebral localisation of function guided the operator to particular lesions” (British Medical Journal,
1884). Possibly Francis Newlands was among those shown because his was a traumatic case, Macewen’s summary of the operative procedures covers what he did with him, and Francis was by then “eager and anxious to be permitted to get out to work” (Macewen, 1885, Case 1).

The absence of an original report itself makes evaluating Macewen’s case of Francis Newlands difficult. Again leaving aside the issue of any special plea, I think it reasonable to conclude that Macewen did use localizing signs in planning his 1883 surgery and that his summary of 1888 gives an accurate account of what he did (Compare Macewen, 1885, Case 1; 1888a, Case 7).

**Did Macewen use localising signs?**

Because the data on Macewen’s seven pre-1884 brain surgery cases is imperfect in so many respects, it is difficult to be certain of the number in which his claim to have used localizing signs is justified. For none of the cases do we have really complete original records of the symptoms, or of Macewen’s analysis of them to compare with his published claims. Nevertheless, what evidence is provided by his *Private Journals* and the other sources considered here appears to me to justify quite clearly Macewen’s claims in the cases of John McKinley, Barbara Watson, William McGill, and Mrs. McKirdy.

Only in the cases of John Daley, Christina Thomson, and Francis Newlands is there doubt. In Daley’s case that doubt is more over Macewen’s use of the swelling to select the site than over his analysis of John’s symptoms, and in Christina Thomson’s it is because of the incompleteness of the *Journal* record. The doubt may seem rather stronger over Francis Newlands who, with Mrs. McKirdy, may be seen as an element of a special plea. However, when Mrs. McKirdy was demonstrated to Macewen’s colleagues about ten months before the Bennett and Godlee operation, they used the language of localization to discuss his operation. It is also possible that Francis Newlands was demonstrated three months later, at the March 1884 meeting. By then he was almost ready to be discharged and was rather more completely recovered than Mrs. McKirdy. Hence, I believe Macewen was not making a special plea for Francis Newlands any more than for Mrs. McKirdy, and that he planned both operations on the basis that he gave (Macewen, 1885. See also 1884a).

Consequently, of Macewen’s seven pre-1884 operations, I conclude that he used localizing signs to plan all of them. In the two instances where there is doubt, in one (John Daley) it is about the basis for Macewen’s selecting the site of operation, not about his inferences from the symptoms, and in the other (Christina Thomson) the doubt arises because of having to complete the incomplete original record by interpolating an 1893 analysis of the symptoms into it.

**Priority: Macewen and Ferrier**

Before considering the reception given Macewen’s 1888 address, which should remove any doubt that remains about his priority, I should like to return to an earlier aspect of the chronology set out in Part I. After Whitson’s first letter outlining Macewen’s work and questioning F.R.S.’s claim (cited in Part I from the *Herald* Glasgow, December 22nd, 1884; *Times* London, December 26th, 1884), Ferrier wrote to him thanking him for it because
“Macewen’s work should be more widely known and appreciated” (Glasgow University Archives, DC79/2. Ferrier to Whitson, December 23rd, 1884). A month later, on the 22nd of January 1885, Ferrier wrote to Macewen himself arguing that because “squabbles” had arisen over his operations,

I think it very desirable both in the interests of cerebral surgery and in your own alike, that you should publish an account of them. Many have asked me about you and I am only able to say that you have operated successfully on the brain several times, but I cannot give them any particulars or give them any references (Letter from Ferrier to Macewen, January 22nd, 1885, Royal College of Physicians and Surgeons of Glasgow Archives, 10/1A/43).

He also asked Macewen for a paper on the subject for Brain, which he had helped to found seven years earlier, in 1878.

Macewen did not hurry over his reply, apologizing on 31st January to Ferrier for delaying, “I have taken no part in it [the squabble] and will have nothing to do with it” and, as we saw in Part I, saying that he had tried to discourage Whitson from responding. To Ferrier’s plea to publish, Macewen said that the only effect of the correspondence “will be to retard the publication of anything on the subject by me.” He had determined to make no public reference to his papers “for some years, until in fact time had softened the irritation which this affair had given rise to.” On the other hand, although he had no fear for the future of cerebral surgery, if Ferrier thought “it would be of service to you and to the cause I shall reconsider the matter soon” (Draft[?] letter from Macewen to Ferrier, January 31st [?], 1885. Royal College of Physicians and Surgeons of Glasgow Archives, 10/1A/44. See Note 9).

When Macewen published the last two of the seven cases in some detail in 1885 – Mrs. McKirdy and Francis Newlands – it seems likely that he was responding to Ferrier’s request. In it he also answered the question Ferrier had put to him in his January 22nd, 1885 letter about the frequency of hernia cerebri as a complication of his operations (Macewen, 1885).

Priority: The reception given Macewen’s 1888 Address

It was on August 9th, 1888 that Macewen, aged 40, gave his invited address “On the surgery of the brain and spinal cord” to the surgical section of the Annual Meeting of the British Medical Association in Glasgow. In his introduction, Macewen explained that its subject matter had been partly determined by the invitation explicitly precluding him from speaking about the work of others and partly because he had been given “a very direct hint” to select his brain-surgery work. He then briefly outlined the history of the influences that had led to the development of surgery of the brain and cord and rapidly placed his own work into that context. The 1888 address turned out to be even more of a triumph than either of those noted in Part I: that after his address on osteotomy in Copenhagen in 1884 and that after Barr’s communication of Macewen’s work on cerebral abscesses,

7Ferrier also told Whitson that M.D. was wrong in crediting Macewen with inventing percussion of the skull for diagnostic purposes because Ferrier himself was the first to point to its value. The reference is to what is still known eponymously as Macewen’s sign: the unusually resonant sound elicited by percussion of the skull in cases of cerebral abscess and hydrocephalus. Apparently Whitson wanted to publish Ferrier’s letter in full but possibly for that reason Ferrier telegraphed him asking him not to. He was prepared to allow Whitson to refer to the use of percussion as an aid to diagnosis (Glasgow University Archives, DC79/2. Ferrier to Whitson, December 23rd, 1884).
which Barr was to give to the congress of otologists in Brussels a few weeks after the Glasgow meeting. There was a difference. The Glasgow triumph was not simply personal: it was a public recognition of Macewen’s priority in using localizing signs in conducting surgery on the nervous system.

We saw in Part I that after the *British Medical Journal* had outlined the main features of Macewen’s address it honored Macewen for pioneering brain surgery. It judged the address to be “in many respects the most remarkable contribution to surgical literature which the present day has produced” (*British Medical Journal*, 1888a, p. 322), and went on, in panegyric mode, “our readers will not think us extravagant in saying that it marks an epoch in surgery, the initial stage of a branch of our art obviously destined to a glorious and beneficent future” (*British Medical Journal*, 1888a, p. 324). If the *Lancet* editorial was more restrained - Macewen’s address “worthy of unqualified praise” - it did say that his success was “we might almost say, phenomenal” (*Lancet*, 1888, p. 329). According to the *British Medical Journal* the audience was much less restrained; it had received the address with enthusiastic applause and passed a hearty vote of thanks at the conclusion of the session (*British Medical Journal*, 1888b, p. 325).

The Glasgow press reported the reception more fully, even more fulsomely: various parts of the address were interrupted by “hearty applause,” on Macewen’s concluding it there were “loud and prolonged cheers” (*Evening News*, Glasgow, August 9th), and the learned audience carried the vote of thanks for it “by rising to their feet and cheering again and again” (*Daily Mail*, Glasgow, August 10th. See also *Christian Leader*, Glasgow, August 16th, 1888). Then, as if his verbal descriptions were not enough, Macewen produced a number of his brain and spinal surgery patients, “juveniles and adults ... for examination .... The patients were all in good health, the adults all able to be at work” (*Herald*, Glasgow, August 10th. See also *Evening News*, Glasgow, August 9th). This demonstration was “so remarkable,” the *British Medical Journal* opined, “that it alone would suffice to render the Glasgow meeting memorable in the annals of surgery” (*British Medical Journal*, 1888b, p. 325).

At Glasgow there was also considerable interest in Macewen’s other operations. The day before the address Macewen demonstrated, sometimes by operating, his techniques for the radical repair of hernia and for joint excision (*British Medical Journal*, 1888b, p. 324). Immediately after the address, William McClean and William Connell were among the patients shown, Macewen’s *Private Journal* records that McClean was “found quite well - very small scar on brow considering primary damage.” He was also photographed, and prints were pasted into the *Journal* (Macewen, 1876-1886, Vol. 4, pp. 136–139 and Vol. 5, pp. 36–37). Macewen “was loudly applauded and received numerous congratulations on his brilliant results” for his “most remarkable” reconstruction of Connell’s humerus. The following day he again demonstrated, also by operating, his osteotomies, patella repairs, urethrectomy for stricture, and treatment of wrist dislocation and hip disarticulation (*British Medical Journal*, 1888b, pp. 324–325). The Journal reported that the theatre was “packed to suffocation,” a fact confirmed by Macewen’s Visitor’s Book: he had an audience of 54 at the first demonstration and 144 at the second (*British Medical Journal*, 1888c, p. 385; Macewen, n.d., Visitor’s Book, August 8th and 10th 1888).

Finally, in evaluating the 1888 address, the *British Medical Journal* stressed that Macewen’s operations took place

before the case under the care of Dr. Bennett and Mr. Godlee . . . . With indisputable justice, therefore, may Dr. Macewen claim the proud distinction of having been the leader in this country, and we believe in the world, of this great advance in our art (*British Medical Journal*, 1888a, p. 323).
Speaking in Edinburgh four years later again, David Ferrier put it more pithily, possibly even with a touch of Scottish nationalism: “the honour of actually having led the way ... belongs to our countryman, Macewen of Glasgow” (Ferrier, 1892).

Ferrier’s endorsement is of special significance. Not only does he seem to have pushed Macewen into publishing on Mrs. McKirdy and Francis Newlands in 1885, but in that paper Macewen closed by enumerating all his operations, summarizing that on John McKinley and pointing to the role of localization in planning them. He then drew attention to the clinical and experimental observations that had provided the guides before saying:

Comparatively little advantage has hitherto been taken advantage of these observations as a guide to surgical operations. I had therefore much pleasure in describing to Professor Ferrier, when he visited my wards in Glasgow in the spring of 1884, some cases of the same nature as those here presented, and I was glad that he so soon afterwards had the opportunity of advising and assisting Dr. Hughes Bennett and Mr. Godlee in the case in which the latter removed a tumour from the brain (Macewen, 1885, emphasis added).

Macewen’s inclusion of Ferrier in these remarks explicitly nominates Ferrier as his ally in the priority debate and, were the claim an illegitimate one, we would hardly find Ferrier granting Macewen, as he did in 1892, the honor of leading the way.

Conclusion

There is no doubt at all that Macewen carried out his operations on the dates he gave, for the conditions he described, with the methods that he said he had used, and with the outcomes he reported. And, where we have enough evidence about the seven cases, in none does it seem doubtful that Macewen planned the operations on the basis of the localization that he claimed. All were before the Bennett and Godlee operation. Further, and although I have not presented the details here, my reading leaves me in no doubt that, relative to Gowers and Horsley, the same is true of his surgery on the cord. Despite the limitations of some of the source material, there is no good reason to doubt Macewen’s claim.

Others have drawn the same conclusion. Even Cushing, who had expressed reservations over the nature of the intracranial lesions Macewen had localized – “he had the ill fortune not to have happened on a true brain tumour” – was nevertheless quite definite in his judgment “to Macewen belongs the distinction of having being the chief pioneer in cranio-cerebral surgery” (Cushing, 1927, note I, p. 14). Hence, what we find in Macewen’s Private Journals and in his other records and publications confirms the opinions from the British Medical Journal in 1888 and Ferrier in 1892, that the honor of leading the way belongs to Macewen.

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