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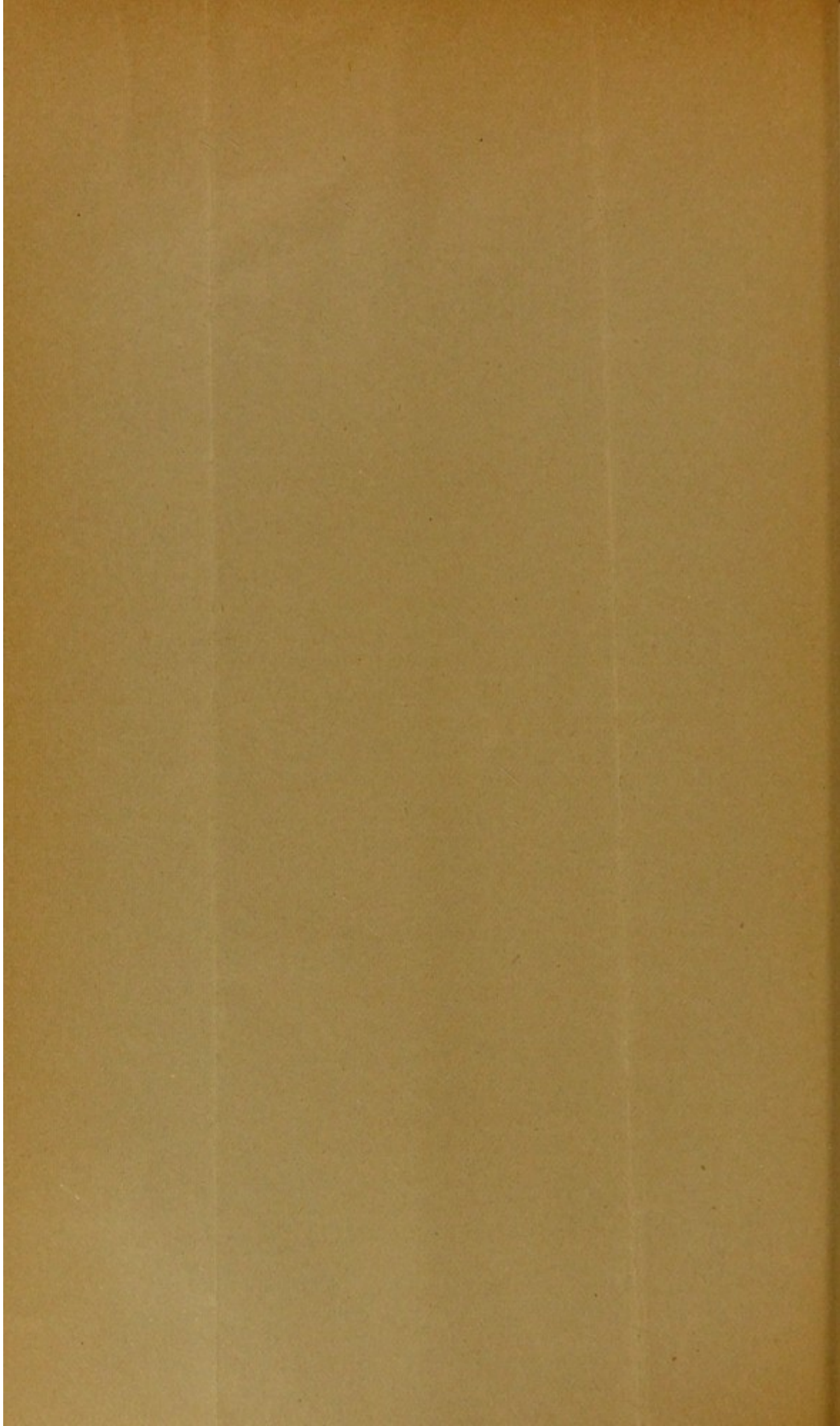
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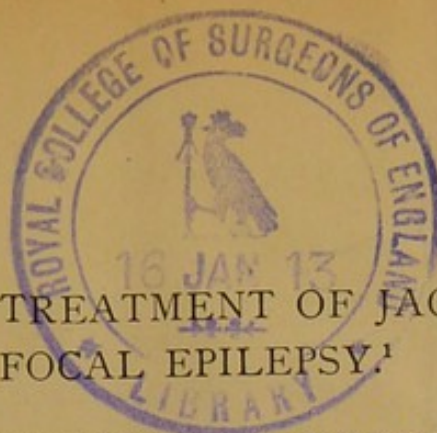
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THE OPERATIVE TREATMENT OF JACKSONIAN AND FOCAL EPILEPSY.¹

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WHEN Hughlings Jackson, about ten years ago, suggested the removal of the discharging lesion for epilepsies, if the spasms began "very locally, developed deliberately, and when the fits are often repeated," the idea was promptly accepted, and soon the bulk of the profession and the laity viewed this operation as the only proper course to pursue at any stage of, or in any form of epilepsy, where the merest suggestion of a discharging lesion could be detected. Moreover, if the patient survived the operation, permanent recovery was confidently expected. The pendulum soon began to swing in the opposite direction, and because permanency of results cannot be assured, the prolonged immunity from seizures commonly conferred by such operations seems to be becoming considered as not worth having. This is unscientific, and if operators would publish their "end-results," I believe the proper place of trephining as a therapeutic measure would soon be ascertained, and possibly better results secured.

D. Hayes Agnew, in 1891, called attention to the lack of permanency in results, confining his attention to cases operated upon by Philadelphia surgeons, and gives in his list a case of mine as cured,—*i.e.*, it had remained free from recurrence for three years. I shall give an abstract of the history of this case, when the reader can decide for himself whether even this patient was cured.

I shall make as few comments as possible upon my illustrative cases, permitting the histories to speak for themselves, emphasizing merely those points which seem to me especially worthy of notice.

¹ Read by request before the Tri-State Medical Society at Chicago, April 7, 1896.

C. L., aged twenty-seven years, with a family history containing no record of epilepsy or any chronic neurosis, was in perfect health until nine years of age, when he was struck upon the left parietal region by a piece of wood, the blow causing unconsciousness lasting for three hours. Immediate convulsions followed the return of consciousness, the seizures recurring thrice in rapid succession. He was positive that the paroxysms chiefly involved the right side and resembled those he had while under my care. For the three succeeding months he had a diurnal fit, followed by a fortnight's intermission. Next the fits numbered from three to four daily for five weeks, when a two-weeks interval of complete immunity occurred. Between ten and fifteen years of age he averaged five seizures weekly, but during the next five years only about four occurred each week. From the age of twenty until May 7, 1888,—*i.e.*, for about seven years,—the number of attacks increased, until latterly he always had at least one daily, even forty having been noted during one twenty-four hours. Treatment in various institutions failing to afford relief, he entered a Philadelphia hospital, where the seizures were observed by Dr. C. K. Mills to commence on the left side,—*i.e.*, on that of injury, and consequently must have been of dural or, at least, fifth-pair origin. You will note that this differs from the patient's account of his earlier attacks, but a man reduced to the condition he was in when I saw him was hardly competent to recall the facts as they had been eighteen years before, especially as his present paroxysms were said by others to commence exactly like his first ones. A surgeon removed a one and a half inch button of bone by the trephine, the cut overlapping the fissure of Rolando, a scar over the excised portion of bone being also removed, because pressure upon this cicatrix *excited the paroxysms*. The bone was replaced, but one convulsion occurred ten days after the operation, the wound healed, and he was free from seizures for probably about six weeks, when some return of the fits and a sinus at the site of the operation-wound led him to enter another hospital, where the partially necrosed bone button was removed from a bed of granulations. Prompt relief and healing occurred, but upon September 1 he entered the Jefferson Medical College Hospital under my care, suffering from his old ailment in an aggravated form. Avoiding all unnecessary discussion of details, a study of twenty-five of the convulsions showed that the discharging lesion was located in the centre governing the motions of the right thumb, the procession of symptoms progressing very slowly from the prodromal pains at the site of injury to the total loss of consciousness.

October 4, 1888, after the usual preliminaries, an area of bone was removed by the trephine to reach a spot where the membranes were not attached to the brain. The old and new bone orifices were made one by removal of the intervening bridge of bone. The cicatrix in the scalp was found to be continuous with a dense scar, blending membrane and cortex into one mass over the lower two-thirds of the motor area for the right side. This scar was carefully removed with the knife, the thumb-centre was located by electricity and excised. The electrical excitement, despite profound anæsthesia, caused a typical paroxysm. After removal of the centre none could be induced by application of the electrode to its former site. Recovery ensued, leaving only some weakening of the thumb and inability to perform some of the more delicate movements of the hand. This man, leaving the hospital on the twenty-fourth day, later went South, married, and supported a family by manual labor, but, unfortunately, at the end of about two and a half years—for the exact details were not sent me—recurrence took place.

What lessons should the course pursued by this case teach us? First, that our predecessors were correct in attributing certain forms of epilepsy to the irritation of nerves by cicatrices either of bone or soft parts, and that in this case an excision of the painful scalp cicatrix—pressure upon which induced a fit *commencing upon the same side as that of injury* which conclusively demonstrated that the convulsions could not be of cortical origin—was the proper treatment, not a blind removal of bone and replacement of the same, thereby providing a new source of irritation. The history further shows that the first operation, entailing prolonged irritation from the presence of the necrosing bone, caused the formation of so much granulation tissue that scalp, membranes, and cortex became fused, and a "surgical epilepsy" was manufactured, which affected the opposite side primarily, and was thus now of cortical origin. Are all the lessons exhausted? No, for the result of my operation shows that the gradual contraction of the new cicatrix and consequent irritation of the brain eventually caused a recurrence of the disease, and that in similar cases some means must be devised to prevent adhesions forming between the brain and membranes, otherwise this class of operations will rarely prove to be other than palliative.

Let me next relate a still more favorable result, and again ask the question whether the patient can be regarded as cured.

H. B., aged twenty-four, entered the University Hospital, Ann Arbor, Michigan, in December, 1890, with this history: Seven years ago he had been struck on the left side of the head by a fence-rail. Two years later—*i. e.*, five years ago—he began to have fits; these would recur daily for from two to three weeks, when an intermission of from one to two weeks would occur. The paroxysms always commenced by a twitching of the right angle of the mouth and by movements of the wrist. He did not lose consciousness during the fits. Operation was done December 18, 1890, the centres for the angle of the mouth and tongue on the left side of the brain were located and removed, requiring only a limited manipulation and destruction of brain-tissue. Paralysis of the right side of the lower face, floor of the mouth, and tongue was marked for the first week, while total aphasia lasted for nine days, doubtless from compression of the motor speech-centre by blood. At the end of three weeks all paralysis seemed to have disappeared. He had one fit two days after operation, and, so far as can be ascertained, remained absolutely free for somewhat over three years, but now has attacks at long intervals. I cannot give the exact date of recurrence or frequency of the attacks, as the patient lives in the interior of the State. Up to September 15, 1893, he worked as a farm laborer, and was regarded as being a sound man.

Here was a case of moderate severity, of comparatively short duration,—five years instead of eighteen years,—and not requiring such operative procedures as would result in a cicatrix binding cortex and membranes together over a large area; still, recurrence is taking place, but more slowly than in the first instance.

The next case is most interesting, because it is either one suggestive of a new departure in head surgery, or shows that it is not always due solely to removal of the discharging lesion that cures result after operations for cortical, focal, and other epilepsies.

A girl, eight years old, was admitted to the University of Michigan Hospital, February 21, 1894, under a colleague's care. She had been perfectly well until sixteen months ago, when she had an attack,

lasting for one week, characterized by unconsciousness for three or more days, a high temperature,—reaching once 107° F.,—and resulting in right hemiplegia, contracture of the flexor muscles of the right hand and of the calf muscles, which latter condition persisted until after a severe scald of the same side, when it nearly disappeared, although detectable when admitted upon even a superficial examination. Convulsive attacks occurred almost daily, affecting principally the right side, commencing in the hand, then involving the tongue, and finally the whole right side. While generally involving only the right side and unattended by loss of consciousness, the convulsions were sometimes generalized and consciousness was lost. March 7, 1894, I exposed the centre for the right hand and located it by the battery, but the brain being decidedly depressed rather than elevated, and nothing abnormal being detected beyond some congestion of the pia mater and a doubtful induration of the brain, I declined to proceed further, the exploration having been undertaken at the urgent solicitation of a colleague, it being my original belief that very much the condition found at operation existed,—viz., some destruction of brain tissue had resulted from an apoplectic effusion, and that neither cyst nor any condition remediable by operation existed. Instead of daily paroxysms she now had intervals of days between the fits, sometimes a week elapsing. She returned home improved, the attacks finally ceasing for several months, when, after a slight relapse, the extraction of some troublesome teeth again seemed to give her complete immunity. The interesting part of the case is, however, that the contracture of the hand entirely disappeared and the muscles of both upper and lower extremities regained their lost bulk and power, leaving only a little acquired pes equinus, which my assistant corrected by tenotomy and apparatus, so that the child at the last report was free from her fits and recovered from her paralysis. Whether this has proved a permanent or only a temporary recovery I am not in a position to say, as the patient lives in another State.

To what were the good results due in this case? Were they more than a mere coincidence? I am convinced that they were. Did the results follow merely from the profound effects of the mechanical injury to the central nervous system inflicted during the operation, such an effect as is often produced by other operations, even those involving only peripheral nerves, as the extraction of a vesical calculus? I think not, because the results were not noticed at first, but the recovery was gradual, and *pari passu* with the improved function of the damaged centres and dis-

appearance of the contracture and paresis. Did the bone opening provide a safety-valve, whereby the intracranial circulatory pressure was permitted to undergo great oscillations without producing serious congestion in the diseased and unduly irritable centres? Did this permit such a modification of blood-supply to the damaged centres as to be just compatible with normal nutrition and repair, for it will be recalled that it was thought that there was congestion of the pia mater over the motor centres? Or did I unwittingly separate delicate adhesions between the membranes and the cortex? I think not. If similar results should follow operations in other cases of post-hemiplegic Jacksonian epilepsy, might it not be well to trephine for contractures and paresis following apoplexies or localized meningitis involving the motor area in children when epilepsy is absent, after all improvement ceases to manifest itself? While not advocating operation in such cases, and fully recognizing the danger of generalizing from too few data, yet it has seemed to me, in such an otherwise hopeless condition in the young, that the possibility of effecting good by trephining was at least worth a careful consideration.

The last case which I shall cite is that of an unmarried farmer, thirty years old, who entered the Hospital of the University of Michigan, June 6, 1892. When a boy he had the fronto-parietal region extensively fractured. About eighteen months before entering the hospital paroxysms resembling those he had on entrance were first noticed. The frequency of the attacks had increased until for some unascertainable time previous to admission they succeeded one another with such rapidity that it was difficult to detect any intermissions. Under medicinal treatment there was a transient improvement, but for seventy-two hours before operation he was practically in the status epilepticus. It is true that he maintained that he never lost consciousness, but this is difficult to believe and impossible to either prove or disprove. He was becoming rapidly exhausted, and the operation was done June 16, 1892, as a life-saving measure. The commencement of the attacks showed that the discharging lesion was located in the centres for the left thumb, angle and floor of the mouth. These were removed, and although for a few days the seizures persisted, the intervals rapidly increased until on his discharge he seemed entirely free from his fits, only some weakness of

the left arm and leg remaining, the result of exhaustion of the motor centres caused by their prolonged over-excitation. For the next two months he was free from all convulsions, and was so well that about a month after leaving the hospital he cut two acres of corn daily for a number of days in succession. The result of this highly imprudent over-exertion and exposure to the sun was an attack of acute mania, probably due to a meningitis, this being accompanied and followed by his old convulsive attacks. Paresis of the left leg and arm with contracture involving the hand now became pronounced and has remained. A diurnal seizure is the rule at present, although on the one hand he may have more, on the other a week may pass without a single attack.

There is little doubt that the constant congestion of the motor centres caused by the muscular efforts necessary for field labor maintained a condition of the intracranial circulation, which, at first necessary for repair of the operative injury, should and would have passed away if ordinary precautions had been observed by the patient, but which terminated in an attack of meningitis fatal to the function of the already enfeebled centres, and productive of adhesions which have again given rise to his old seizures. That these conditions are not due to an ordinary apoplectic attack is proved by the gradual supervention of the symptoms after his maniacal attack. While it is probable that the convulsions would have recurred in the course of time, the interval of complete immunity would have been longer, and the hemiparesis and contracture would not have occurred if the patient had not recklessly neglected the advice given him as to avoiding all physical exertion and mental excitement for a long period.

The brief histories related, the remarks made, and the conclusions now to be given have seemed to me only worthy of attention because they are the results of the rather unfavorable experience of a former enthusiast for the removal of cortical centres in epilepsy, and give what is unusual, the somewhat unsatisfactory end-results of cases reported by the operator himself. It is common enough to read of *cures* (?) a few weeks or months after operation, but rarely are the *relapses* recorded years later.

The course pursued by other cases of epilepsy upon which

I have operated simply confirm the conclusions to which I have somewhat reluctantly been forced:

(1) Removal of the discharging lesion in cortical and Jacksonian epilepsy can only be regarded as palliative, the operative scar in all instances thus far accessible to me in time becoming a new source of irritation.

(2) The earlier the operation is done after the disease becomes fully established, the longer will the immunity last, and it is possible that if trephining is done very early, the operation may in a few instances prove curative, especially if any reliable method can be devised to lessen the extent of the inevitable scar and adhesions between the brain and the membranes.

(3) That operation is not so dangerous in competent hands as to forbid our urging trephining in this class of epilepsies, especially when done *early*, because the chance of prolonged immunity is great, and the fits are apt to be lighter and to recur at greater intervals after relapse than before trephining.

(4) Removal of the discharging lesion is imperatively demanded as a life-saving measure in those rare cases where the intervals between the fits are so short that the paroxysms are practically continuous.

(5) In all cases, but especially those characterized by frequent paroxysms, it is an error in practice to permit the early resumption of work, particularly manual labor. Thus, in addition to the last case cited, I would call attention to another where I trephined for ordinary traumatic epilepsy, which remained perfectly well for nearly two years, until, attempting to lift a heavy weight, the encephalon becoming suddenly congested, the patient at once had a fit, since when the convulsions have been nearly as frequent as they were before operation.

(6) Operation removes only one of the factors productive of epilepsy, but the ready response to inadequate stimuli still remains, and can only disappear, if ever, after a prolonged period; therefore, careful avoidance of everything which can either through the mind or body excite sudden and severe acute cerebral congestion, or undue, prolonged, mental strain—constant congestion of the nervous centres, must be avoided for the longest practicable period, for the remainder of life, if possible.