

GUNSHOT-WOUND OF THE BRAIN, FOLLOWED
BY FUNGUS CEREBRI, AND RECOVERY WITH
HEMIOPSIA.¹ By W. W. KEEN, M. D., and WILLIAM
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CASE I.—PATRICK HUGHES, late private of Company K, Fourth Regiment, New York Volunteers; born in 1839, in Ireland; puddler both before and since enlistment; wounded at Antietam, September 17, 1862. Wound of entrance in the middle line, one and a quarter inch above external occipital protuberance—a small, depressed wound; wound of exit two by two and a half inches, its centre being two inches to the left of middle line, and three inches above wound of entrance. He fell, did not lose consciousness, but, blinded by blood, crept toward the enemy till warned by his comrades, when he crawled behind the ranks, and was carried, when faint, to an old barn, where he remained nine days. While here, his eyesight, he thinks, was poor. He was then taken to Mount Pleasant Hospital, Washington, D. C., where he lost his consciousness, and was more or less paralyzed in both right arm and right leg—whether slowly or suddenly, and whether it extended to the face, he does not remember. The paralysis and unconsciousness lasted some two or three months. He remembers having had fungus cerebri as large as his fist, which was shaved off some five or six times. When he tried to think, he often used to become almost “out of his head.” His memory was so bad that, between calling the doctor and his turning to hear the question, he would forget what he desired to say. He had no aphasia. In four and a half

¹ Extracted from the Photographic Review of Medicine and Surgery for February, 1871.

months he was able to come to Philadelphia. In walking he was very giddy; noise and laughter used to hurt him badly. His mental and physical power gradually grew better, and in one year his paralysis had almost disappeared.

Present Condition, December 20, 1870.—His memory is quite good, but by no means so good as before the injury. He is rather easily bothered and confused, and more irritable than formerly. The sight of his right eye, he thinks, is poor. Whiskey affects him as usual. Sexual power undiminished. He has no paralysis. The wound of entrance (see photograph—the head was shaved in order to have the photograph taken) is marked by a slight depression in the bone, the wound of exit by a hollow two and a half by two inches, and one inch deep. No bone has closed this opening, but the scalp and hair dip down into the hollow. The arterial pulsations are barely perceptible. When recumbent, the hollow is gradually obliterated and replaced in about one minute by a rounded protuberance. To prevent pain during this change, he supports the parts with his hand. When he coughs, even with moderate force, the depressed scalp instantly bulges up in a cone, which nearly reaches the general level of the skull and obliterates the depression, and then as suddenly subsides.

The eyes, upon examination, present the following conditions: There is no ptosis on either side; entire mobility of the eyes under direction of the will; both pupils normal in size, and responsive to light. Upon the left cornea is to be seen a slight leucoma, the result of a burn from a piece of metal, received two years since. In all other respects both eyes are, in appearance, perfectly normal. Refraction of each eye is found to be emmetropic. The acuteness of vision is for the right $\frac{1}{4}$, and for the left $\frac{1}{8}$; the slight impairment of vision being due to the result of the burn, which caused not only slight opacity of the cornea, but also irregular astigmatism. The power of accommodation is for each eye $\frac{1}{8}$. There is no diplopia, and no insufficiency of either internus.

Upon testing the field of vision, it is found to be divided for each eye by a line passing through its centre, in the vertical direction—total blindness existing to the right, and per-

fect vision to the left, of this line. When, for example, the right eye is fixed upon a point of light eight feet distant, a second point of light is lost to view when it is moved one inch and a half toward the right in a horizontal line; and precisely the same condition exists for the left eye—i. e., the light is lost one inch and a half to the right of the median line. With the *right* eye it is not possible to determine the spot of Mariotte—that is, the blind spot in the field corresponding to the entrance of the optic nerve (*see* the diagram, p. 29)—since the insensitiveness of the retina in that eye commences at the inner margin of the macula lutea, and extends to the entire inner half of the retina. With the *left* eye, that portion of the retina between the optic-nerve entrance and the macula is found normal in sensitiveness; since, when at four feet the left eye is fixed upon a point of light, a second light is clearly perceived as it is moved toward the left until it has reached a point about nine inches to the left, where it is lost, to reappear at a point about thirteen inches from the first light. Beyond this point the field has its normal extent.

By ophthalmoscopic examination no pathological appearances whatever could be observed, either in the retina or at either optic papilla, beyond the distortion caused in the left eye by the astigmatism, probably of traumatic origin, as mentioned above.

REMARKS.—I. This case is briefly referred to in Circular No. 6, S. G. O., 1865, at the bottom of page 15; and Dr. Otis writes us that it will be fully related in the first volume of the “Surgical History of the War,” with the chromo-lithograph of the fungus cerebri. As it must first be presented to Congress and published by the Department, no opportunity was presented us of correcting the history by these notes. The history here presented, therefore, as derived from the patient, must be taken with some caution, since the wound has so severely injured his cerebrum. On all points, however, he gave very clear statements.

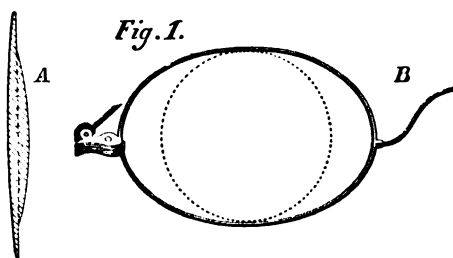
II. The complete recovery from paralysis (as evinced by his subsequent severe labor), and the almost entire restoration of his mental faculties, are remarkable, especially in view of the probable deep lesion of the brain, both by the primary injury and the subsequent fungus cerebri.

With the hope of remedying these objections, so as to allow us to give astigmatic glasses to cataract-patients, I have contrived the glass which I now present to the Society, and which is made in the following manner:

A simple cylindric glass of the required strength is first set in the spectacle-frame in the usual way, the axis of the glass of course running in the required direction. A thin plano-convex glass is then ground, and, taking advantage of the fact that lenses can be cemented together by Canada balsam, this is firmly fixed by its plane surface to the back, or plane surface of the cylindric glass.

As the diameter of the plano-convex is made only equal to the vertical diameter of the spectacle-frame, and not to the longitudinal one, it follows that a large quantity of glass is thus dispensed with, and the weight of the glass is thereby much lessened, the two combined lenses being in fact, when nicely made, only one-fourth of the common spherical cataract-glass as found in the shops.

In the figure, *A* gives a longitudinal section of the glass, the dotted line marking the line of union between the two



lenses, while *B* shows the front view of the glass as it appears in the frame, the dotted line here showing the circumference of the plano-convex glass. As you will observe, the edge of the convex lens is so delicately ground and so perfectly fitted to the cylindric glass that the point of union is barely perceptible when the glass is worn, and the peculiarity of its construction would escape the notice of any but a very observant eye.

The pair which I now offer as a sample has a spherical surface of $+\frac{1}{2}$ (really equal to a biconvex $+\frac{1}{4}$), and a cylin-

dric surface $+1\frac{1}{2}$ C, the patient being astigmatic to that degree in the vertical meridian. With the best correction with spherical glasses, vision equalled $\frac{1}{4}$; with this glass it rose to $\frac{1}{2}$.

The chief objection which would be raised against glasses made in this manner would, in all probability, be on account of their liability to come apart. Whether this is a valid objection remains to be proved. I would say that this pair has been in constant use for four months, and in that time they have been dropped twice; once in a crowd, from which they were only rescued after the frames had been considerably bent. They certainly show no signs of separation between the two lenses, and we know that the lenses of telescopes and opera-glasses are subjected, oftentimes for years, to the extremes of temperature and hard usage, without showing such a tendency, and, even if the glasses should occasionally separate, it is certainly a simple matter to recement them.

This slight inconvenience would be more than compensated, it seems to me, by the increased amount of vision gained, especially when, as in the present case, it is doubled.

In this connection I would remark that it seems to me that a want of uniformity now exists among operators in regard to testing the vision of cataract-patients, which has a tendency, to say the least, to create confusion not only as to the results of different operators which is of comparatively small importance, but also as to the merits of the method of operating itself, which is of vast importance.

It is almost universally considered now, after the so-called peripheric linear has been in vogue for the past eight years, and after it has been consequently thoroughly tried, that it is far superior to the old flap-operation, and this opinion purports to be founded—not as many medical opinions are—on unsupported convictions of its great originator, and a few of his most skilful disciples, but on carefully-prepared statistics, which, as they are based on mathematical principles, are of almost mathematical exactness. It is alleged that, as the basis upon which the statistics for both operations were compiled was the same, namely, Snellen's method, it follows that the comparison must be a just one, and, as the peripheric linear yielded more favorable results, this was the better operation.

From this opinion, prevalent as it is, we demur, and believe that, although the method of testing was the same, yet the standard used was different, and that, consequently, the conclusions drawn are not only unreliable but even erroneous, and that, so far as statistics go, it is at least still a question whether the old flap, and not the new peripheric linear, does not give the best results.

To show that this is the case, reference must be made to the statistics themselves.

In 1863 Graefe published the results of 1,500 cases of flap-extraction.¹ Out of these he got 65 per cent. of immediate good results, with 15 per cent. additional after a secondary operation, making 80 per cent. as a grand total of perfect success. In these cases, "vision of at least $\frac{1}{4}$ " is taken as the standard necessary for a good result. In patients over seventy-five years, however, $V = \frac{1}{8}$ is allowed. There was a total loss of from 5 to 8 per cent.

In a later paper, however,² Graefe gives another series of cases, in which he gets 84 per cent. of perfect results, 11 per cent. of half successes, and a total loss of 5 per cent., and he then states that, in his private practice, the results were even better than this, namely, 91 per cent. of perfect results, 6 per cent. of half successes, and only 3 per cent. of absolute loss. Ninety-one per cent. of patients, with vision $\frac{1}{4}$ and over, and only 3 per cent. of total loss, is a result which we venture to say has never been equalled by any other method.

If we now turn to the peripheric linear, we find at the outset that "Graefe, as Dr. Norris says,³ has not given us so extended and full an analytical report of his cases as would be desirable," but he did publish 300 cases (*Archiv.*, xii., part i., p. 151), in which he got 90 per cent. of perfect immediate good results. But here, instead of taking vision $\frac{1}{4}$ as a standard, he took $\frac{1}{8}$, and we have no means of knowing how many cases were included between $V = \frac{1}{4}$ and $V \frac{1}{8}$. But, if, for the sake of calculation, we take the differ-

¹ Zehender, *Klin. Monatsblät.*, p. 146, 1863.

² *Archiv. für Ophthal.*, vol. xi., part iii., p. 7, 1865.

³ *Hay's Journal*, January, 1871, p. 243.