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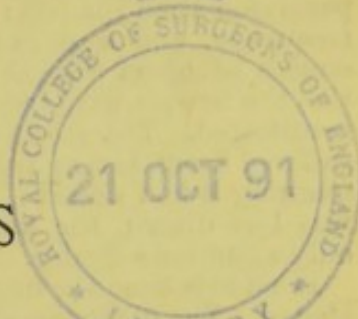
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REMARKS ON A CASE OF ALTERNATE PARTIAL ANÆSTHESIA.

By SIR GEORGE PAGET, M.D., F.R.S., K.C.B.,

Regius Professor of Physic, University of Cambridge; Consulting Physician
to Addenbrooke's Hospital.

MR. H. M., aged 59, had a sudden paralytic seizure on June 16th, 1858. He was a widower, of temperate habits, cheerful disposition, quick perception, and ready intelligence, and had the general appearance of perfect health. From his boyhood up to 44 years of age he had been subject to attacks of severe headache, accompanied by sickness, which were at one time so frequent as to recur every week, and which generally confined him to his bed for twenty-four hours. At the age of 53 he became subject to occasional pain in the right sciatic nerve and transient lameness. He was sometimes attacked by this pain while walking in the street, and then had much difficulty in reaching home. At 56 years of age he became subject to a painful constriction and stiffness at the back of his neck, which returned at intervals of a few weeks, and was generally relieved in a day or two by purgatives. The last attack of this kind preceded by about a month the seizure on June 16th, 1858.

For twelve months before this seizure he had been subject to vertigo, more especially while lying on his left side; and for a few weeks he had been unusually prone to drowsiness, so as to have fallen asleep twice on one day during dinner. Notwithstanding these symptoms he had gone about as usual, attending to business and entering into society with his habitual cheerfulness.

During the night of June 15th, in very sultry weather, he had severe pain on the left side of the head. When he got out of bed, early in the morning, he felt giddy and instantly fell to the ground, without losing consciousness. He was seen almost immediately by Mr. Hough, and two hours later by myself. His entire left side was paretic and felt numb. His mouth was drawn to the right side, his left upper eyelid was drooping, and he could not raise it. He was conscious, clear, and composed. He complained of persistent vertigo, double vision, and nausea, and of

phlegm collecting on the left side of his throat. His tongue was furred, and he had hiccough; his pulse was 84, not full; and the impulse and sounds of his heart were feeble.

Twenty-one leeches were applied to his temples, and calomel and active purgatives were administered in repeated doses; but these acted only once scantily, and in the afternoon his right arm was observed to be paretic and somewhat ataxic, though less paralysed than the left; and the pulse rising much in force and frequency, and a drowsiness and lethargy coming on, fifteen ounces of blood were abstracted from the arm. Two hours after this the bowels were freely evacuated, and some amendment was manifested. The stools were unhealthy. In the night he again suffered from severe pain in the left side of his head, but next morning it had ceased; the vertigo was diminished, the mouth was less drawn, the hiccough less frequent, and the vision was only sometimes double.

From this time the urgency of most of the symptoms gradually abated. The distortion of the face first disappeared, and the eyelid drooped less. The double vision and hiccough did not continue much beyond eight or nine days. He had more and longer trouble with his throat. He complained of difficulty of swallowing, which he referred chiefly to the left side of the throat, and said that phlegm collected there and could not be raised without repeated efforts. Frequently, also, he had a sudden attack of dyspnœa, with a feeling of suffocation, which made him start up suddenly from his sleep, and was not relieved until some phlegm had been dislodged. This at first occurred several times every night, but gradually became less frequent, and in little more than a fortnight both dyspnœa and dysphagia ceased to give him much trouble, though they recurred now and then in a slighter degree for three months. For a week or two his voice was hoarse.

On the third day after the attack it was observed that the left conjunctiva was inflamed, and the left nostril obstructed with mucus. These symptoms subsided in the course of a few days, but subsequently the left eye on several occasions became congested on the recurrence of pain in the left brow, and for many weeks its vessels appeared fuller than those of the right eye, and a like difference was observable for many months between the two cheeks, the left being persistently fuller of blood and warmer than the right. The sense of numbness which he had experienced in the whole left side was no longer felt in the trunk and limbs after a few days, but the paralytic weakness was more lasting, the grasp of the hand remaining feeble, and the faculty of directing it continuing impaired for nearly three months.

In his right hand he sooner recovered strength and directing power, so that after five weeks he was able to write with neatness and precision, but for many months was liable to a temporary enfeeblement of the right limbs accompanying attacks of pain about the left brow; and at these times the right limbs, which had been but little paralysed at first, became temporarily weaker than the left limbs.

He was able to draw up his legs in bed, but at first was incapable of standing. This inability was due partly to intense giddiness. When the giddiness had abated he became able—at the end of three weeks—to walk with support. He walked with tottering steps, looking down at his feet, but not dragging them. The legs were carried awkwardly, but not stiffly; both of them were weak, the left being commonly the weaker.

It has already been mentioned that for twelve months he had been subject to vertigo whenever he lay on his left side. This

symptom became more urgent at and after the paralytic seizure. For some time he was quite unable to lie on his left side, the vertigo becoming unbearably distressing on any attempt; and, for a like reason, he was unable for some days to stand or even to sit up in bed. When he recovered the power of walking the giddiness was still troublesome. If he made an effort to walk, as soon as he had risen from his chair the giddiness became overpowering; but if he stood still for a few seconds he could then proceed with little or no giddiness. In the course of a few weeks the liability to vertigo gradually decreased, but the peculiar tendency to it when lying on his left side was slow in yielding.

On July 30th, when partially convalescent, on going out in a carriage (for the second time), he had a sudden seizure of vertiginous character. He felt as if the carriage were suddenly overturned, and he stretched out his hands to save himself, believing in the reality of the accident. On this occasion the vertigo subsided gradually, and left a confused feeling, referred to the left temple and left forehead, that lasted for two or three days, in the course of which he was three times suddenly awakened from sleep with a feeling as if one side of the room had fallen down below the other.

Throughout his illness his mind remained undisturbed, except on two or three occasions in the first fortnight, when it wandered for a few seconds on his awaking from sleep, and once after some exertion.

The pain in the left side of the head, which had ushered in the paralysis, repeatedly recurred during the following weeks, and less frequently for some months. It was referred chiefly to the left brow and orbit, and was accompanied by suffusion of the eye. Not infrequently it was described as a painful tension. On July 15th he awoke from a dream of having received a violent blow in that locality, and, on awaking, found a pain there, and was troubled with it more than usual for two or three days, during which his right leg seemed to be more weakened than the left.

The symptoms of chief interest in the case were the impaired sensibilities. Immediately after the seizure on June 16th there was on the left (most paralysed) side a general sense of numbness, but this passed off in the course of a few days, except from the face, where it was long persistent, though slight. On June 18th I found that his two hands were not equally sensitive to heat. On July 23 and many subsequent occasions I examined the sensibilities with care.

The regions in which the sensibility of the skin was persistently impaired were the left side of the face, the right side of the trunk, and the right arm and leg. In all other parts of the integument the sensibility was normal. The anæsthesia was, therefore, crossed or alternate. Moreover, the lesion of sensibility, where it existed, was not in the same degree for all kinds of impressions; the sensibility to heat and cold was very greatly impaired, and the susceptibility of pain was wholly lost, while in the same parts the sensibility to simple contact was so little impaired that the lightest touch was readily perceived—as readily, indeed, when I touched his right hand as when I touched his left. In this respect there was no appreciable difference between his two hands.

The tactile discrimination was but little impaired. On July 23rd he picked up a pin without difficulty; he wrote readily, and could use his right hand to count the pulse in his left wrist, though it was small and soft, and he had been wholly unprac-

tised in feeling pulses. His handwriting was excellent, but he said he did not feel his pen so distinctly as before his attack; and, on examining the palmar aspect of the finger-ends with a pair of blunted compasses (on Weber's plan), I found that the limit of single and double sensations was a quarter of an inch.

This same right hand was wholly insensible to pain from pinching or pricking. Impressions of these kinds excited no pain whatever, but only a kind of tingling or thrill, which passed up his arm, and which he could not find words to describe exactly, but said was more akin to a slight degree of what is called "pins and needles" than to any other feeling of which he had experience. The whole of the right arm and leg and right side of the trunk were found equally insensible to pain from pinching and pricking—to the astonishment of the patient, who had never suspected anything of the kind. The left side of the face was likewise insensible to pain, though there also the lightest touch was perceived, and the tactile discrimination was comparatively little impaired, the limits of single and double sensation when the compasses were applied being an inch on left forehead and three-quarters of an inch on right forehead.

The regions which were thus insusceptible of pain presented also remarkable abnormalities in their sensibility to heat and cold. All objects that were applied to them seemed warm: none either cold or very hot. Thus the temperature of the air of the room being 72° F., and that of his right hand 96° F., and left hand 97° F., water at 68° F. and 72° F., seemed in each case warm to the right hand and cool to the left, and the glasses containing the water seemed warm when applied to left cheek or forehead, cool when applied to his right cheek. When he got into bed, the sheet seemed cold to his left leg, and warm to the right. Even a lump of ice excited in the affected parts a sensation of warmth. When it was placed in his right hand the patient said it seemed warm. When put into his left hand it occasioned so unpleasant a coldness that he instantly dropped it. If the ice was drawn across his chest from the right side to the left, it occasioned a sensation of warmth until it reached the mid-line, when the patient instantly shrank from the vivid impression of cold. Similar phenomena were exhibited in the face, the ice exciting a sensation of warmth in the left side of forehead and face. The perverted sensation was here exactly limited to a well-defined space, bounded by the mid-line, the coronal suture, or thereabouts, a vertical line about an inch in front of his left ear, and a line below the left ramus of the lower jaw. It included therefore all three branches of the left trifacial nerve, but the motor branch was not paralysed, and all other parts of the head preserved their sensibilities.

The sensibility to cold seemed, therefore, not only to be impaired but perverted; the ice excited a feeling of warmth. I obtained a rough measure of this warmth by requesting the patient to compare it with the normal sensation of the opposite side. On trial it was found that a piece of ice held in his right hand excited a sensation of warmth like that which was felt when two fingers of his left hand were plunged into water at 82° F., and the ice applied to the left side of his forehead seemed as warm as a glass of water at 82° F. applied to its right side.

The sensibility to the higher degrees of heat also was greatly impaired. Thus, though all objects excited in his right hand a sensation of warmth, water at 105° seemed less warm to that hand than to the left; and water at 140° , in which he could not keep his left hand for a moment, could not only be borne by the right hand, but excited but little sensation of warmth.

The affected parts were, however, not wholly insensible to differences of temperature. When two fingers of his right hand were plunged alternately to the same depth in water, at 60° , and water at higher degrees up to 74° , no difference could be distinguished; but when the temperature of the latter was raised to 76° he could perceive it to be the warmer. In like manner, on a subsequent occasion, he could distinguish that water at 96° or 97° was warmer than water at 82° ; but a difference less than 14° he was unable to appreciate.

The sensibility was very much duller than this for the higher degrees of heat, those which in the normal state excite a burning sensation. The difference in the heat of two glasses of water at 82° and 97° , when tried with his right hand, seemed to him greater than between two other glasses at 68° and 140° . The high temperature of the water at 140° was so far from intensifying the sensation of heat, that he spoke doubtfully of its causing any proper sensation of heat whatever, though it did excite a strong tingling sensation in the arm. At this time his right hand and arm, as regards voluntary power, were stronger than the left.

Similar results were obtained on testing with glasses of water the sensibility to heat of the opposite sides of his face; only that here it was the *left* side in which the sensibility was defective and perverted.

The difference of sensations was not in any important degree due to thermometric differences between the opposite sides. Though the right hand was sometimes cooler than the left, the difference on any occasion of my observations was not greater than 1° , and the left side of the face was almost always appreciably warmer than its right side; its abnormal heat arising, no doubt, from the persistent congestion of the cheek and parts about the eye.

The impressions from pinching, pricking, and heat of high or low degrees, which thus failed to excite their appropriate sensations, had this also in common, that all of them excited the kind of tingling thrill already mentioned, and a like tingling was excited in the right arm by moderate mechanical pressure, for example, by my grasping it firmly. The tingling was not an instantaneous effect of the impression; it was not felt till after two or three seconds; it seemed to him to travel up the arm, and was most felt in the upper arm, even when it had originated in an impression on the hand; and when the impression of ice or very hot water was long continued, the tingling in the upper arm became almost painful.

Tickling and galvanism excited their appropriate sensations equally in his right hand as in the left. A lump of ice produced the same sensation of cold when applied successively to the two lateral borders of his tongue. A hot spoon excited a sensation of heat, but of less intensity on the left border.

His sense of taste was a little impaired. He noticed that after his seizure he did not get the full and distinct flavour of what he ate, but he was not conscious of any difference between the two lateral halves of his tongue, and when tried on either side with salt and sugar he appreciated them correctly. His left nostril had lost much of its sensibility, both common and special. The nib of a pen pressed into it was felt, but not painfully; in the right nostril it excited pain, and the natural start and instant withdrawal of his head. A feather passed into the left nostril and moved about in it was felt, but did not cause a tickling sensation; in the right nostril it instantly excited a

tickling which was unbearable. The odours of lavender water and violets were not perceptible with the left nostril, and even carbonate of ammonia, strongly snuffed up, produced no effect, but scented snuff was both felt and smelt, though less perfectly than in the right nostril.

At the time (September 20th) when these observations were made on the nose and tongue, some improvement had taken place in the sensibility of the parts supplied by the two maxillary divisions of the trigeminus. The skin over the left border of the lower jaw had become acutely sensitive to the cold of ice; the lower lip had also recovered sensibility, and in a less degree the left cheek and nostril; while the parts supplied by the ophthalmic division still remained insensible to ice coldness.

At this time also he was strangely affected by loud noises. He had begun to walk in the open air, and one day was passing by King's College Chapel when the organ pealed out. The effect was that he would immediately have fallen to the ground but for the support of a friend on whose arm he was leaning. This effect was entirely independent of any mental emotion; it was produced on another occasion by a boy (whom he met in a narrow passage, bawling out "water cresses." He felt as if any sudden loud noise would knock him down.

The improvement in the left side of the face proceeded gradually. In September, 1859, the left trigeminus had completely recovered its functions, and the parts supplied by it had even become in a marked degree more sensitive to impressions of heat, cold, and pain, than those supplied by the right nerve. He observed, when washing his face, that water at ordinary temperatures, which a year before had felt warm to the left side, now excited a sensation of cold which was even painful. Pinching the skin or pulling the whisker was now more painful on his left cheek than on the right. The left nostril also had become acutely sensitive to pain and tickling, and its sense of smell was restored; but the right side of the face still excelled the left in tactile discrimination. On trying the two sides of the forehead with blunted compasses in directions parallel to the mid-line, I found the limit of perception of two impressions to be six-tenths of an inch on the right side, and nine-tenths of an inch on the left. At this time no corresponding improvement had taken place in the sensibility of his right arm and leg. Ice still felt warm in his right hand. He could indeed perceive that ice was less warm than water at 60° , but when questioned he was doubtful whether, in this discrimination, his judgment were not helped by the tingling sensation in his arm, which he knew from experience was more intense for impressions of very low or very high temperatures.

I tried at what different degrees of heat two glasses of water would seem to him equally warm when three fingers of his right hand and three of his left were dipped into them simultaneously. The right hand in water at 68° felt a warmth like that of the left in water at 83° ; the right in water at 73° like the left in water at 88° ; right at 87° same as left at 89° ; and right at 101° same as left at 95° .

The only changes appreciable in his right arm were that the peculiar thrill excited by ice, hot bodies, etc., had become less in degree than it had been twelve months before; and that the slight defect in tactile discrimination was no longer observable, the limit of double perception with an *æsthesiometer* being three-twentieths of an inch at the tips of the fingers of both hands alike.

His right leg had now for some months been a little weaker than the left. Both it and the right hand generally became weaker for a while on a recurrence of the pain about the left brow, and these attacks (which were not infrequent) were sometimes accompanied by pain in the right sciatic nerve, and a sensation of "pins and needles" in the right arm.

He had had two falls, without loss of consciousness or obvious cause; they were probably occasioned by the defect in his balancing power, but this power had on the whole improved, and he walked with rather more steadiness and less need of assistance, straddling a little, but not dragging his legs.

It is probable that the peculiar impairment of sensibility in his right hand had existed, in some degree at least, for a long time prior to the seizure in June, 1858. There is curious evidence of this in respect to the sensation of cold. He recollects that on several occasions when taking hold of a decanter of toast-water at dinner, it felt so warm that he found fault with his servant for not having prepared it sufficiently early to allow of its cooling; yet when he proceeded to drink it, he found it was cool. His servant also remembers that, on some of these occasions, the water had been fetched fresh from a very cold spring only a short time before dinner. The recollection of these occurrences extended backwards for many months.

As late as July, 1860, he was still subject to some vertigo, particularly if he lay for some time on his left side. But he lived for many years afterwards.

Apart from the rarity of the case, its chief interest is physiological. We are so utterly in the dark as to the nature of sensory impulses, that any facts illustrating their conduction may be deemed worthy of consideration.

It is well known that in diseases of the spinal cord it is far from uncommon to find that, in parts below the lesion, one or two of the different kinds of sensibility are lost, while the others remain normal, indicating that the sensory impulses are interrupted in the former and uninterrupted in the latter, thus leading to the inference of separate conduction-paths through the cord. The case related indicates a separation in the conduction-paths for different kinds of sensibility as high up as the medulla oblongata.

There is another noticeable point in the case. The loss or great impairment of sensibility is in those for pain and temperature. This is an additional instance of what I have repeatedly noticed in disease of the spinal cord: that when one or two of the different kinds of sensibility have been lost and the others or other preserved, those lost have been, in the great majority of cases, the sensibilities to pain and heat; and, in other cases in which, after all the sensibilities have been lost, and recovery was gradually taking place, the sensibilities for heat and pain have most commonly been the last to be restored.

It would seem, therefore, that the nerve-impulses for pain and heat are the most liable to be interrupted; and as these are so often associated in loss or defect, it would also seem that their conduction-paths, if they be distinct, are in closer proximity to each other than to the conduction-path for tactile sensibility. The case I have narrated would indicate that this proximity is not confined to the region of the spinal cord, but exists also in a part immediately above it. The impairment of the sense of smell may, I think, be attributed to the lesion of the fifth nerve affecting the nasal mucous membrane as it affected the left conjunctiva.

From such a case as I have related and the analogous cases in

disease of the spinal cord, it seems fair to infer that the sensibilities of touch, heat, and pain have several and distinct conduction-paths; and the evidence is strengthened by observing that when, in disease of the cord, a leg happens to be hyperæsthetic, the hyperæsthesia may be confined to one only of the three kinds of sensibility; and, again, when subjective sensations are experienced in an anæsthetic leg, these subjective sensations may be of one kind only.

Though little success has attended the attempt to trace out these separate conduction-paths, there is no difficulty in conceiving them. We may, for instance, conceive the impulses from ordinary touch to pass directly in continuous fibrils, while those which excite sensations of heat or pain may pass in different paths through branched cells. But, with regard to separateness in conduction-paths, it may be as well to observe that though the evidence is strong, it does not amount to conclusive proof. The differences may be in modes of conduction rather than in different conduction-paths. It is conceivable that the loss of some sensibilities, while others are retained, may be due, not so much to a difference in conduction-paths as to a difference in the impulses themselves, rendering them severally more or less liable to arrest by different circumstances.