ON CERTAIN POINTS
IN THE
PHYSIOLOGY AND PATHOLOGY
OF THE
FIFTH PAIR OF CEREBRAL NERVES.

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THE knowledge which we at present possess respecting the functions of the cerebral nerves is mainly derived from two sources, viz. from the results of vivisections in animals, and from pathological cases in which the energy of one or more of these nerves had been impaired during life. By combining the two series of observations, and correcting the one with the aid of the other, it has been possible to establish, on the whole, pretty accurate notions on this matter; and no diversity of opinion can now be said to exist amongst physiologists and physicians about the functions of the majority of the nerves in question. In fact, the only two cerebral nerves the physiology of which still remains in an unsettled condition are the pneumogastric and the fifth.

That so much uncertainty should still exist concerning the functions of these two important pairs of nerves is easily accounted for by their being endowed with far more complex

functions than the rest of their fellows, which either preside over the organs of special sense or impart motive power to certain muscles or sets of muscles, to which the anatomist's scalpel has traced them long ago. Moreover, it should be considered that, while disease of the other cerebral nerves is comparatively frequent, affections of the pneumogastric and the fifth, without simultaneous lesions of important neighbouring organs, are exceedingly rare. We have, therefore, up to the present time been obliged to trust almost exclusively to the results of vivisections as a guide to their physiology, while the corrective influence of pathological observations has been wanting. It appears to me, however, indisputable that the evidence derived from pathological cases, occurring in otherwise healthy adults, who can give a reasonable account of their symptoms, must be far superior to that which is merely deducted from vivisections, since animals cannot inform us of their sensations; and the conclusions drawn from their actions, reflex movements, and general aspect after operation, must to some extent be guess-work, depending upon the interpretation given of those phenomena by individual observers, and which may be, and often is, influenced by bias or prejudice. Moreover, animals frequently die a few days after the operation, so that any ulterior effects of the vivisection cannot be clearly ascertained.

Having been fortunate enough to observe, in the practice of the Infirmary for Epilepsy and Paralysis, a case of complete loss of function of the whole fifth pair of cerebral nerves, unaccompanied by any other affection of cerebral or nervous matter, an excellent opportunity has been afforded me of fully investigating the functions of the trifacial nerve, with special regard to certain points which are still involved in obscurity, and on which I trust that my observations will shed some light. A careful perusal of neuro-pathological literature has shown me that this case is unique in its kind, and may be looked upon, in a certain sense, as a complete physiological dissection of the fifth nerve, which has hitherto been wanting. I therefore consider it sufficiently important

to be brought before the Society, together with such remarks and conclusions as have been suggested by the phenomena observed.

P. G—, æt. 27, unmarried, a sheep-farmer living in Australia, had been in good health until June, 1866, when, on riding across a vast plain in Queensland, and being exposed to a keen wind blowing steadily into his face, he was suddenly seized by severe pain in the left side of the head, eyes, and face. At first the sensation was as if the face were frost-bitten. The pain then became of a dull, throbbing character, and continued so for five weeks. He put himself under the care of a local practitioner, who prescribed iodide of potassium and a blister. Some time after, on a similar exposure again taking place, the right side of the face became affected in the same manner, but the pain was not so severe, and the attack did not last so long as the first. When the pain was quite gone the corneæ of both eyes became covered with thick opacities, and the patient completely lost his sight on the right side, while on the left he could still faintly distinguish light and objects at a short distance. The power of mastication also became completely lost, and the skin and mucous membranes of the face quite numb. He then went to Sydney, where he was admitted into the hospital, in which he remained five months. The surgeon under whose care he was there ordered the eyes to be strapped up, probably with the intention of preventing perforation of the cornea (Snellen). As time went on, some of the symptoms were rather improved, but as the patient was still incapacitated from doing any work whatever, he came to England, and placed himself under my care.

I first saw the patient on April 21st, when I found him in the following condition :

His intellect and memory were in no way impaired. He was able to fix his attention on subjects just as well as previous to this affection ; indeed, he complained much of the enforced idleness caused by the loss of his sight. This made him occasionally irritable and low-spirited. There

was a peculiarly hard, almost statuesque expression of the features, which was due partly to a slight œdematous effusion into the cellular tissue of the face and partly to the complete loss of muscular sensibility. On applying Faradisation by moistened conductors to the muscles of the face, these responded readily by contraction to the electric stimulus, but there was a complete absence of that peculiar sensation which, in a healthy person, always accompanies electromuscular contractions, and which is caused by the stimulation of the sentient nerve-fibres which are distributed in the muscular substance. This latter was in no way affected, showing that the morbid influence had not reached the portio dura. Indeed, all the varieties of physiognomical expression could be produced at will, but the effect made was more like that of an automaton than the natural appearance of sentient and animated features.

The sense of smell was quite normal, and had never been impaired. On applying a sufficiently powerful continuous galvanic current to the mucous membrane of the nose, a decided phosphorous smell was perceived by the patient.

Vision was obstructed by thick leucoma of both corneæ, although the optic nerve was not affected. Indeed, the patient was able not only to distinguish light and shade with both eyes, but he could also see near objects, and read single letters of No. 20 (8-line Roman) of Jäger's test-types with the left eye, where the leucoma was not so thick as in the right. He was, however, quite unable to guide himself in the streets. He suffered a great deal from photophobia, and had to wear an eye-shade. This was a remarkable circumstance, as, in consequence of the leucoma of both corneæ, only very little light could penetrate to the retina.

Mr. Soelberg Wells has been kind enough to make a careful ophthalmoscopic examination of the fundus of the eye, and has furnished me with the following report of the appearances noticed by him:

"In both eyes the pupils became well dilated under atropine. In the right there are very delicate, thread-like adhesions between the edge of the pupil and the leucomatous

portion of the cornea. In the left eye there are slight remnants of uveal pigment on the central portion of the anterior capsule, indicating that a slight iritis had formerly existed. The lens and vitreous humour are clear, and the back-ground of the eye is quite normal. In the right eye, on account of the dense central leucoma, the optic disc, &c., could only be very imperfectly seen, but in the left eye it was quite visible."

The motor nerves of the eye were in their normal state, there being neither ptosis, nor strabismus, nor double vision, and all movements of the eyes, upwards, downwards, and laterally, being easy of execution.

The pupils were rather constricted, and were only very slightly influenced by variations of light and shade.

In describing the condition of the fifth nerve, I shall speak—1st, of the skin of the face and scalp; 2nd, of the mucous membranes of the eye, nose, and mouth; and 3rd, of the muscles of mastication.

1st. The common sensation of the face and scalp was entirely lost in both sides, the limit of the anæsthesia being, vertically, a line running one sixth part of an inch inwards from the horizontal and ascending branches of the lower jaw, and, horizontally, a line drawn from the tragus of one ear, right across the skull, to the tragus of the other ear. All the parts comprised between these lines, including the temples, forehead, nose, cheeks, and chin, had lost their sensibility. As regards the ears, the tragus was anæsthetic, and part of the external meatus benumbed, while the concha was perfectly sensible. In like manner the skin of the back part of the skull and the skin of the neck had preserved their ordinary sensibility.

In the anæsthetic parts of the face and scalp just alluded to, neither pricking, pinching, nor any other mechanical irritation, was in the least degree perceived by the patient. With regard to electricity, it appeared that Faradisation by dry conductors did not produce any sensation, even when a powerful current was used. On applying to the face the continuous galvanic current of ten cells of Daniell's battery,

which deflected the needle of the galvanometer to an angle of 35° , and which, in a healthy person experimented upon at the same time, caused not only a feeling of heat and pricking in those parts of the skin to which the electrodes were applied, but also a sensation of taste in the tongue, and a flash of light, chiefly on breaking the circuit, no physiological effect whatever was produced in the patient. On using a current of twenty cells of the same battery, which deflected the galvanometer to an angle of 50° , and in a healthy person caused contractions of the muscles of the face, both at the entrance and the cessation of the current, together with strong feelings of pricking and heat, vivid flashes of light, giddiness, strong galvanic taste, and a faint perception of a phosphorous smell, no sensations whatever were produced in the patient, but the facial muscles responded readily, chiefly on making the circuit. On further increasing the power of the current to thirty cells, which deflected the galvanometer to an angle of 72° , and in a healthy person caused the perception of dazzling flashes of light, strong phosphorous smell, and such powerful feelings of heat, giddiness, and sickness, as to be unbearable for more than a second, the patient perceived a slight sensation of warmth and pricking, a slight coppery taste, a slight phosphorous smell, and slight giddiness. These sensations had much the same degree of intensity wherever the poles were applied.

The sense of *temperature* was completely absent, for neither intense cold, as caused by the application of ether spray and ice, nor heat, caused the least sensation. This had been so from the commencement of the affection; and the patient had several times, on lighting a pipe, accidentally scorched his face without being aware of it at the time.

The sense of *touch* was entirely gone, for neither of the two points of the æsthesiometer was in the least degree perceived by the patient.

Nor was the sense of *locality* preserved, for the patient could not tell where he was touched or pinched.

2nd. *The mucous membranes of the eyes, nose and mouth.*

a. The conjunctiva of both eye and eyelid was completely

anæsthetic on both sides, and could be touched by the finger, and blunt and sharp instruments, without exciting reflex movements or lachrymation. The patient stated that, when he washed his face, he generally kept the eyes open, and never felt the contact of either water or soap. The secretion of the lachrymal gland appeared to have totally ceased, and the application of substances which generally excite a flow of tears, such as ammonia, mustard, &c., had no effect whatever. There was, however, pathological hyper-secretion of conjunctival mucus, by means of which the eye was kept moist. Indeed, the cornea appeared covered with streaks and shreds of mucus, which gave a peculiar death-like appearance to the eyes. This mucus was most probably secreted by those mucous follicles which have been first described by Professor Krause, and which are situated below the conjunctiva, where this membrane is reflected from the eyeball on to the eyelid.

b. The mucous membrane of the nose was quite insensible to the touch of blunt or sharp instruments, and no sneezing followed the application of snuff. There was, however, a most abundant secretion of mucus, which had, at one time, been so excessive, that thick scabs were continually forming in the nose. This mucus was of so acrid a nature that, on running down to the lip, it made the skin of the sulcus naso-labialis, and part of the lip beyond this sulcus, on both sides, very sore, and caused the moustache to fall out there. Otherwise the beard, and hair altogether, were in perfect condition, from which it appears that the growth of hair is not under the direct influence of the fifth nerve. That part of the upper lip where the acrid secretion from the nose used to run, appears now quite white, similar to a scar from burning, or from the application of sulphuric acid. At one time the nose used to bleed very readily when slightly touched, but it had not done so lately. The reaction of the nasal mucus is at present neutral.

c. The mucous membrane of the *mouth* was also completely anæsthetic, as far as the gums, the tongue, the inner surface of the cheeks, and the hard palate, were concerned. The

tongue presented a most frightful spectacle, having been severely bitten and lacerated in every direction during the act of taking food, the patient being entirely unconscious of his biting the tongue whenever he did so. Some parts of the inner surface of the cheeks had also been bitten, and were badly ulcerated. The secretion of buccal mucus was so excessive as to oblige the patient to have a pocket handkerchief constantly applied to the mouth, in order to prevent the liquid from running down the chin. The lips appeared covered with a sort of froth, such as we see it in a patient who has just come out of an epileptic attack. Both corners of the mouth were very sore, being macerated by the constant flow of mucus. The reaction of this liquid was slightly alkaline. The secretion of saliva appeared to be entirely arrested, and neither irritant substances, nor the movements of mastication, caused an increased flow of moisture in the cavity of the mouth.

The insensibility of the gums was so complete that, on one occasion, when the patient had a tooth drawn, he felt nothing whatever of the operation. The remaining teeth were perfectly healthy.

The sense of taste was not lost, for the patient tasted salt, sugar, and quinine, on the front as well as on the back part of the tongue. Yet, in the anterior part of that organ, the perception of taste seemed to have lost its quickness, for while, on my applying sapient substances to the posterior part of it, the patient would at once exclaim, "bitter," "sweet," "salt," he took about five or six seconds on the front part of the tongue to describe the taste, but he never made a single mistake therê. He also perceived the galvanic taste of five cells of Daniell's battery, if applied directly to the tongue.

3. *The muscles of mastication.*

The muscles of mastication which are animated by the minor portion of the fifth nerve had not escaped the pathological influence. At one time the temporal and masseter muscles, which move the jaw upwards, were completely paralysed, so that it dropped, as in a dead body, and the mouth

was always open. Both pterygoid muscles being also completely paralysed, mastication was rendered impossible, and the patient never masticated the food he took for sixteen months consecutively. He was, therefore, obliged, when taking solid food, to have it cut very small, and then bolt it. Curiously enough digestion had never suffered in consequence of the want of mastication and insalivation, which I think must be explained by the circumstance that a thorough moistening and soaking of the food taken with a slightly alkaline liquid went on at least as copiously as it could have done before, owing to the pathological hyper-secretion of buccal mucus, of which I have already spoken, and which, therefore, in this case, seemed to exercise a kind of compensating influence.

For several months previous to the patient coming under my care, the voluntary power had gradually returned in the temporal and masseter muscles, so that the mouth could be closed, and the vertical movement of mastication was well carried out. The pterygoid muscles, however, remained paralysed, so that the lateral movement of the jaw was impossible. He had also much difficulty in putting out his tongue.

Other muscles animated by the minor portion of the fifth nerve are the mylohyoid, the digastricus anticus, the tensor palati mollis, and the tensor tympani. As regards the three first named, no morbid symptom could be discovered, showing that they were paralysed. The position and function of the soft palate were in no way altered, which is probably due to the circumstance that the tensor palati mollis receives nervous fibres, not only from the minor portion of the trifacial, but also from the pneumogastric and the accessory nerve.

The patient complained of a continuous rushing noise in the head, which he compared to that made by the paddle-wheel of a steamboat. It would, however, be difficult to determine at present whether this symptom was due to paralysis of the motor fibres animating the tensor tympani muscle, or to anæsthesia of the sentient petrosus superficialis

minor nerve, which proceeds from the ganglion oticum to the tympanic plexus of nerves.

The sense of hearing was perfectly normal.

The speech was rather thick and indistinct, in consequence of the lacerated condition of the tongue, but not from any affection of the hypoglossus nerve.

All the remaining parts of the nervous system were in good condition, nor was there any disorder of the chest, stomach, liver, bowels, skin, or genito-urinary organs.

There was no history of scrofula or syphilis.

Such being the condition of the patient, no real difficulty could be experienced in determining the nature and exact seat of the pathological lesion. The patient had evidently suffered from rheumatic inflammation of the neurilemma, first of the left and afterwards of the right trifacial nerve, where it emerges from between the transverse fibres of the pons varolii, at the base of the brain. This inflammation had resulted in effusion and subsequent compression and atrophy of nervous matter. The affection must be traced to the nerve-trunk at the base of the brain, and not to any more peripheral part, because not a single fibre of the fifth nerve had escaped the injury. If the lesion had been more peripheral, for instance, if it had been confined to the Gasserian ganglion, the muscles of mastication would not have suffered. At the same time it was evident that the disease could not have spread to the pons varolii, because there was an entire absence of all symptoms which occur in disease of the pons. *The lesion was therefore confined to the course of the fifth nerve, between the pons and the Gasserian ganglion.* As the case did not end fatally, it was impossible to verify the diagnosis by actual inspection, which, however, could have added but little to the pathology of the case.

The treatment consisted of the systematic application of the continuous galvanic current to the several branches of the fifth nerve, the positive pole being fixed as centrally as possible, while the negative was being gently passed along the peripheral ramifications of the nerve. No medicine was given.

After this treatment had been followed for about three months, with several interruptions due to extraneous circumstances, the following change had taken place in the patient's condition :

The symptom of photophobia had entirely disappeared. Indeed, the patient was able to leave off wearing the eyeshade after the first few applications of the galvanic current.

The tinnitus aurium was likewise almost entirely gone ; it was only occasionally slightly perceived when the patient was lying down at bedtime.

The opacity of the cornea was considerably less on the left side. The patient can now read No. 10 (pica) of Jäger's test-types with the left eye, while, when he first came to me, he could with great difficulty make out single letters of No. 20 (8-line Roman). On the right side the improvement was also satisfactory, as the patient could read single letters of No. 20 with that eye. When I first saw him he was obliged to be led by another person, but now he was able to guide himself in the streets, to read the names of the streets at the street-corners, and to read the sign-boards of shops.

Common sensation had to a great extent returned in the left side of the forehead, the right cheek, and the chin. In the other parts of the face it was still considerably impaired.

The sense of locality in both sides of the face was re-established, for the patient could distinctly tell where he was touched or pinched.

The sense of temperature had come back to some extent, for the patient was able to distinguish between heat and cold, although not so keenly as previous to the affection.

The sense of touch had returned in the left side of the forehead, the right cheek, and part of the chin, as shown by the proper perception of the two points of the æsthesiometer.

The secretion of tears and saliva had to some extent returned ; the excessive secretion of mucus had been considerably checked. The lips appeared now quite dry, and were no longer covered with froth.

The lateral motion of the muscles of mastication was to a great extent re-established.

The patient has been advised to continue the galvanic treatment, and I believe that the function of the fifth pair will, in course of time, be entirely restored by it. The patient is now quite able to follow a light occupation.

I conclude this paper with some remarks on various points in the physiology and pathology of the nervous system, on which the case just related appears to have an important bearing.

1st. The olfactory nerve is now admitted by the majority of physiologists to be the special nerve of the sense of smell; yet Magendie, to whom experimental physiology owes so much, concluded, from his experiments on dogs, that smell was only perceived by the nasal branch of the fifth pair, and that the olfactory was a nerve with the function of which we were not yet acquainted. The substances with which Magendie experimented were chiefly ammonia and highly odoriferous French cheese, and, as these things affect the common sensation of the mucous membrane of the nose just as much as the special sense of smell, Romberg justly objected to Magendie's experiments, that no sufficient distinction had been drawn between the *common* and the *special* sensibility of the nose. Romberg's criticism of Magendie's views was generally acquiesced in by the profession, and it is only lately that Claude Bernard has re-opened the question, and, without actually upholding the theory of his illustrious predecessor, adduced arguments to prove that we were not yet in a position to pronounce decisively on the relative functions of the olfactory and the nasal branch of the trifacial nerve. The fact, however, that in my patient the sense of smell was not in the least impaired, although the common sensibility of the mucous membrane of the nose was entirely lost, proves satisfactorily that the views of Magendie and Claude Bernard are untenable, that the trifacial has nothing to do with the perception of smell, and that the special nerve for that sense is the olfactory only.

2nd. The presence of *photophobia* in a case where the

entrance of light on the retina was almost entirely prevented by leucoma of the cornea, goes far to show that this symptom has little or nothing to do with the condition of the optic nerve or the retina. Indeed, M. Castorani has already drawn attention to the circumstance that in animals where the optic nerve has been divided an injury of the cornea will produce photophobia; and that able physiologist, Dr. Brown-Séquard, has shown that, after the section of the optic nerve, the iris still preserves the faculty of contracting under the influence of light and dilating in the shade, from which it would appear that the iris has a sensibility to light peculiar to itself, and independent of that of the retina. Now, the cornea receives nerves from the same source as the iris, that is, branches of the fifth which have passed through the ophthalmic ganglion. In my patient photophobia was one of the most troublesome symptoms, and only disappeared under the tonic and sedative influence of the continuous galvanic current. We are therefore led to look upon photophobia, if not always, at least under certain circumstances, as a neurosis of the corneal branches of the trifacial nerve, and, like many other neuroses, curable by galvanisation.

3rd. The physiology of the mucous membranes of the eye, nose, and mouth, is still in a very unsatisfactory condition as regards the question of the special kind of nervous influence by which the secretion is excited and by which it is regulated. Ludwig's experiments have thrown considerable light on the physiology of the salivary glands, by showing that Faradisation of the lingual and auriculo-temporal nerve causes an abundant flow of saliva, while Faradisation of the sympathetic arrests the secretion of saliva. Branches of the fifth pair are, therefore, the *exciting*, and sympathetic fibres the *inhibitory* nerves of salivary secretion. Now, it appears from the symptoms observed in the case of my patient, that just the reverse obtains as far as the secretion of conjunctival, nasal, and buccal mucus is concerned; since, for this latter function, the sympathetic appears to be the exciting, and the trifacial the inhibitory nerve. By assuming this to be the case, an easy explanation is offered of the pathological

hyper-secretion of conjunctival, nasal, and buccal mucus, which occurred in the case just related, after the inhibitory influence of the fifth pair was withdrawn, and the sympathetic was allowed to have full swing. It appears to me that thus a bountiful provision has been made in the distribution of nervous influence about the face, for exceptional circumstances, such as disease or accident. For, as the fifth nerve is endowed with imparting the secreting impulse to the lachrymal and salivary glands, and the sympathetic does the same for the conjunctival, nasal, and buccal mucous follicles, it appears that the important function of keeping the surfaces of the organs of special sense, and the commencement of the digestive and respiratory tract, properly moistened, has been entrusted, not to one, but to two separate nerves, either of which will to a certain extent discharge the function of the other, if that other should be incapacitated by disease or accident.

4th. The pathology of *tinnitus aurium* consists (to use the words of my friend, Mr. Hinton) "at present of a few scraps of positive knowledge, with a great deal of conjecture." Mr. Hinton believes that this symptom has not any precise pathology in the sense of having any uniform cause, but that its pathology is like that of neuralgia. The case of my patient shows that, at least under certain circumstances, *tinnitus aurium* is a symptom of neurosis of the trifacial nerve, and, like many other neuroses, curable by galvanisation.

5th. I have now to consider the question whether the sense of taste is dependent upon the glosso-pharyngeal nerve, or upon the lingual branch of the fifth. There is hardly another point in the physiology of the cerebral nerves about which so much discrepancy exists amongst the best observers. Thus Bérard, Burrows, Stamm, Noble, and Vogt, are in favour of the glosso-pharyngeal, while Sir Charles Bell, Bishop, and Blasius, have attributed the faculty of taste to the lingual nerve. Amongst the more recent writers on this subject, Romberg sided for the glosso-pharyngeal, while Claude Bernard maintained that the two anterior thirds of

the tongue received the faculty of taste from the fifth, and only the posterior third of that organ from the glosso-pharyngeal. I believe that the case just related is decisive as to the correctness of Romberg's view. At the same time I am led to think that the quickness of the perception of taste is materially enhanced by a normal condition of the fifth pair; for, as I have already stated, my patient generally required five or six seconds before he could make out the nature of the sapient substance on the anterior part of the tongue.

6th. Finally, I have to make some remarks upon the curious fact of the absence of cerebral symptoms during the application of a powerful continuous galvanic current to the face and head. Authors are far from unanimous as regards the question of the action of galvanism on the nervous centres. Many observers deny that galvanism acts at all on the brain and spinal cord if only such a strength be used as is medically applicable, founding their opinion on the fact that the nervous centres are encased in thick masses of badly conducting osseous tissue, which they think would prevent the arrival in them of the electric current, since the latter prefers following good conductors, such as cellular tissue, muscles, and the like. This opinion, however plausible at first sight, is refuted by the every-day experience of physicians who occupy themselves with the medical application of electricity, and I have no doubt that in course of time it will be completely abandoned. Two theories have been put forward to explain the cerebral symptoms, such as giddiness, dizziness, sickness, &c., caused by the application of the continuous current to the head and face—one by myself and the other by Dr. Erb, of Heidelberg. My theory was, that these effects are produced by reflex action from the peripheral branches of the fifth pair to the base of the brain; while Dr. Erb is of opinion that the current is directly transmitted to the cerebral substance, right through its bony case, and more especially by way of the blood-vessels, which penetrate from without to the inside of the skull. The principal reason for my theory was, that we see cerebral

symptoms produced, not only by sending the current straight through the head, as, for instance, when one pole is put to the occiput and the other to the forehead, or one to the right and the other to the left temple, but also by applying the poles of the battery to any parts of the face close together, where no portion of the brain is included within the galvanic circuit ; and this argument has never been refuted.

I look upon the present case as a decided corroboration of the correctness of my views ; for it appeared that, when the reflex function of the fifth pair was in abeyance, no cerebral symptoms could be produced, even if the current was sent straight through the head ; and it was only by increasing the galvanic power to such a degree as to rouse the faint remnant of sensibility of the trifacial nerve that a slight feeling of giddiness was caused. Now, as the physical relations of the skull, brain, and blood-vessels were in no way altered in this case, there ought to have been no alteration as regards the production of cerebral symptoms, if Dr. Erb's theory were correct. But, as there was a most decided diminution of cerebral response, it is satisfactorily proved that the transmission of the continuous galvanic current to the brain is effected, not physically, but physiologically, by nervous action. The settlement of this question, which has for a long time been a vexed one for all those who have occupied themselves with electro-physiology and electro-therapeutics, I look upon as one of the most satisfactory deductions from the case which I have submitted to your consideration.