Cases brought before the notice of the Pathological Society of London : see Transactions, vol. X / by Dr. John W. Ogle.

CASES

BROUGHT BEFORE

THE NOTICE OF

THE PATHOLOGICAL SOCIETY OF LONDON.

SEE TRANSACTIONS, VOL. X.

BY

DR. JOHN W. OGLE.

Cases illustrating Disease of the Central and other parts of the Brain as a result of obstruction to the passage of Blood through the Veins and Sinuses of the Cranium.

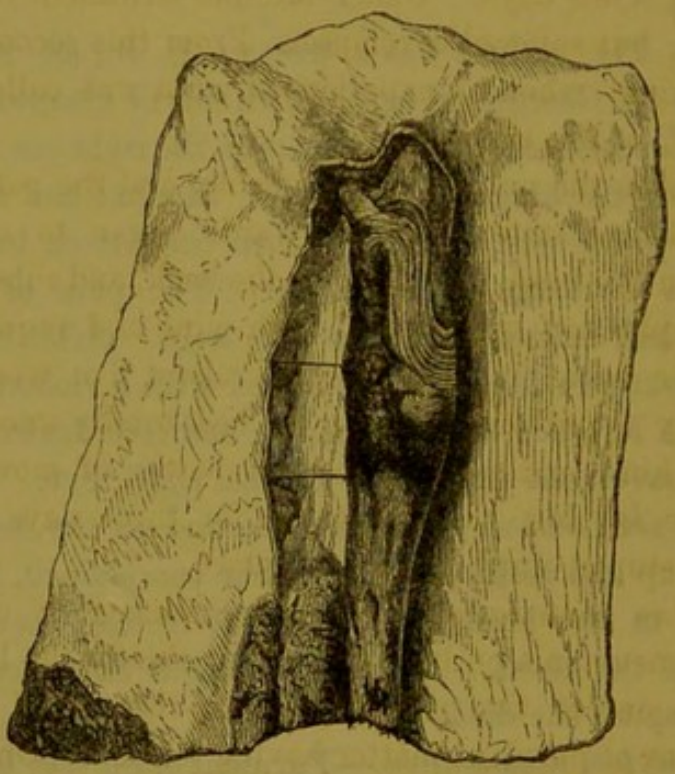
Case 1.—Fibrinous laminated coagulum partly converted into a greenish-yellow puriform fluid within the cranial sinuses. Ulceration of the dura mater connected with disease of the internal ear following scarlet fever. Abscesses of the brain. Strabismus and facial paralysis following a general spasmodic state of the muscles of the limbs.

History.—The patient was a woman, C. B., æt. 22, who was brought into St. George's Hospital with febrile symptoms, albuminous urine, leucorrhœa, and sharp pain in the right ear, from which a considerable discharge was flowing. She had had scarlet fever some years previously, and ever since the attack had been the subject of a discharge from the ear. The pain of which she complained had existed about ten days only. After being in the Hospital about two days she was seized with a violent convulsive attack which left her with the mouth and face drawn to the left side, and convergent strabismus of the right eye. It was not certain that she had lost consciousness, and on the same day she was sitting up and reading in bed. She complained, however, of much pain in the head, and was very restless and uneasy in the region of the chest. About a fortnight after her admission into the Hospital she died.

On *post-mortem examination.*—Purulent fluid was found in the right pleural cavity, and one or two collections of pus in the upper part of the right lung, with hepatization of the neighbouring tissue. The spleen was very large, soft, and flabby ; the other abdominal organs were natural. On dividing the scalp, much purulent fluid was found beneath the pericranium covering the right temporal region, and at this part on section of the bones of the cranium a considerable amount of pus was met with in the veins of the diploë. Pus was also found between the dura mater and the inner surface of the cranium at the posterior part of the middle cerebral fossa on the right side, and in one place the dura mater itself was in a softened blackened and sloughy condition, being with facility removable from the bone. This condition corresponded with caries of the bony part entering into the composition of the internal ear.

The lateral, and petrosal, and cavernous sinuses on this side were very prominent and hard, and on opening them, were seen to be entirely occupied with firm, not very dark coloured coagulum, which in one part observed a most decidedly laminated disposition resembling the coagulum often met with in aneurysms. (See Woodcut below.) In one spot this coagulum was converted into

Woodcut 1.



Represents the laminated and partly disintegrated clot from the lateral sinus. (Reduced one-fourth.)

a light-greenish fluid having bright-red clot among it, and presenting a beautiful coloured mass by reason of the bright contrasts of its hues: and in one place a large vein full of dark firm clots, existed near the mastoïd process, penetrating through the cranium from without into the sinus. Moreover, a certain amount of purulent and fibrinous material existed in the arachnoïd cavity of the right middle cerebral fossa; and a portion of the middle cerebral lobe on the side was very vascular, and slightly softened, and on section, was found to contain a collection of purulent matter of about the size of a walnut. The other parts of the brain, and also the cerebellum were healthy.

Case 2.—Fibrinous coagulum (partly softened and transformed into a puriform discoloured fluid) within the veins and sinuses of the brain. Abscess of the brain. Hemiplegia.

Previous History.—The patient, R. S., æt. 26, was admitted into St. George's Hospital, affected with well-marked pneumonia on the left side of the chest. According to his statement, he had been ill only a few days. Under suitable treatment he got apparently well; but suffered a relapse. From this second attack he was recovering, when he experienced what was called by him a "weakness" of the right eye.

On admission the pulse was very feeble, and the patient was in a very weakened state. He afterwards began to complain of great pain in the head, especially at the back, and subsequently at the left temple, and was treated with wine and requisite stimulants. After being in the Hospital about five weeks, he was unexpectedly found one morning in bed totally unconscious to all around him, and to have lost all power of moving the *left* arm and the *left* leg. He remained for three days in a condition of half stupor, until death took place.

Post-mortem examination.—Showed evidence of considerable and recent pneumonia on both sides (but chiefly the left), of the thorax. In one or two places the lung-tissue had given way, accumulations of purulent matter having formed. On examining the cranium, the following conditions were met with:—The external coverings of the cranial bones, as also the cranium itself, were natural. The external surface also of the dura mater was natural; but on slitting up the sinuses, the superior, longitudinal, and the *left* lateral and *left* petrosal sinuses completely down as far as the commencement of the internal jugular vein, were found to be fully plugged up by firm, and, for the most part, dark,r eddish-brown coloured coagulum. This was, on the whole, pretty firmly adherent to the walls of the venous sinuses; but in one or two parts it had become diffluent, and had broken down into a greyish-brown grumous fluid material. Similar brown adherent clot was found to exist in several of the small and large veins passing from the surface of the cerebral convolutions, and empty-

ing into these sinuses; but in none of these was any of the contained coagulum disintegrated or altered as in the sinuses. The right arachnoïd cavity presented nothing note-worthy, excepting that the vessels seen covering the cerebral hemisphere were very gorged; but the left arachnoïd sac contained a considerable amount of mixed, yellowish, purulent fluid, and soft, fibrinous material. This passed down to some extent into the superior longitudinal fissure, but nothing of the kind was found to exist with respect to the spaces or tissues beneath the arachnoïd membrane covering the brain itself. On dividing the brain, it was generally found healthy and tolerably firm; but at the inferior and posterior part of the middle lobe of the left cerebral hemisphere, it was very slightly diminished in consistency, and at the distance of about one-third of an inch from the surface of the organ at this spot, there existed a cavity of the size of a hazel-nut, lined by a soft, fibrinous material, and filled with purulent fluid. The thin stratum of grey brain substance, which separated this collection of pus from the arachnoïd cavity, was somewhat softened, but nothing more. On opening the lateral cerebral ventricles, they were found to contain a large amount of turbid fluid, and here and there portions of yellowish-white, soft, effused fibrine masses, which were in some cases slightly adherent to the walls of the ventricles, and partly connected with the choroïd plexuses. Other parts of the body presented nothing unusual.

Microscopical examination of the rather softened brain, mentioned as existing at the base of the middle cerebral lobe, showed the presence of a quantity of granular and light refracting matter in several places, the walls of the minute capillaries being beset with fatty particles, and here and there with granular bodies of about the size of pus cells, and occasional ones of a much larger and conglomerate character, and of a dark-grey colour.

The yellowish masses connected with the choroïd plexuses and lining of the ventricles, were found to be covered by a layer of fibrin. These masses were seen under the microscope to contain a large quantity of fat and granular matter, with occasional crystalline particles, and numbers of delicate round cells of the size of pus-corpuscles, with here and there larger cell-like bodies. These bodies on the addition of acetic acid, obviously possessed a

distinct surrounding wall. Very rarely aggregations of light refracting and granular particles forming on the large bodies existed.

Commentary on the two preceding cases.

The *first* case of the two is an interesting example of a series of phenomena not infrequently met with after an attack of scarlet fever. The throat affection, attendant upon the scarlet fever, travels, I presume, along the Eustachian tube to the internal ear; suppuration is established there; then caries of the bony surrounding parts, with inflammation and perhaps sloughing of the dura mater investing the petrous element and the temporal bone follow; then, perhaps, arachnitis, and abscess or softening of the brain attended or not by variable degrees of headache, coma, and convulsive symptoms. In most of these cases, if not all, are to be found deposits of fibrinous material in the neighbouring veins and sinuses, either of the diploë, of the surrounding bones, or of the parts external or internal to them. This fibrin is very apt to soften, break down, and undergo various secondary changes.

Such a course of events, of which scarlet fever is the precursor, is not uncommonly met with; but I would at this time particularly make use of the case in question for the purpose of fixing attention upon the connection which I believe to exist between the abscess of the brain and the peculiar condition of the cranial sinuses and veins.

That a substantive relation often obtains between suppurative disease of the inner ear and that of the brain tissue, has long been observed; but I don't remember to have previously seen any surmise that this connection was brought about by the intervention of a plugging up, and it may be other conditions also, of the intervening venous channels. Of course there is no doubt, that very often the connection between this disease of the internal ear (whether or not contingent upon scarlet fever), and the softening or abscess of the brain, has been simply that of an extension of the diseased action, in a direct way, as by contiguity, from the carious temporal bone, the dura mater being inflamed, and it may be, sloughing; then the arachnoïd becoming implicated, and subsequently, one step further, the subjacent brain. This I say may in *many* cases be the order of sequence in the phenomena which occur, but assuredly there are other cases

in which, as I believe, the relationship is of a different kind, being not one of contiguity or direct involvement, but immediate in character.

We know that a sloughing or purulent condition of parts, especially of such as are rigid and inextensible like bone (and this will more manifestly be so in the case of the inner ear, boxed up as it were in the midst of the unyielding petrous bone) is very apt, particularly in debilitated constitutions, to produce what is termed pyhæmia, for which dangerous result no doubt the plugging or sealing up of the neighbouring venous canals is nature's best and readiest remedy. We also well know, that any considerable amount of constriction or infarction of veins, unless, indeed, speedy and extensive corresponding enlargement of collateral venous communications be established, must of necessity produce great congestion and eventually destructive invasion, so to say, of the tissues which such venous channels are delivering from a surcharge of blood,* by reason of the consequent serous and fibrinous exudations, or even effusions of blood from the ultimate commencements of such veins. This extreme congestion, with its consequences so highly detrimental as they are to the integrity of ordinary areolar and other such tissues, leading to induration, suppuration and ulceration, &c., as in the case of varicose veins, is in a manifold way more pernicious in the case of so finely organized a structure as that of the nervous centres; and our surprise need not be excited when we find with what facility it may lead to abscess in this delicate texture. Thus do I believe, that softening and abscess is frequently originated in the brain: and the assumption obtains considerable support and force when we find, as we do in some cases of abscess of the brain or cerebellum connected with disease of the ear, that the temporal bone surrounding the inner ear-cavities, is but slightly affected; or again, when we find that a certain degree or thickness of more or less uninvolved brain tissue intervenes between the contiguous diseased ear or bone, and the cerebral abscess itself. Surely, if mere contiguity or extension of

* It may be not amiss to recall to mind the anatomical fact that the lateral sinuses as a rule receive the blood from the inferior surface of the posterior lobes of the brain and cerebellum; and the cavernous sinuses from the anterior and middle lobes of the brain.

inflammation only were the foundation of the connection, it could hardly be that inter-lying parts, such as a thickness of the brain (at times of no inconsiderable extent), and even the cerebral membranes themselves would, in many cases, continue to be uncomplicated.

But much as I am of opinion that the above is a truthful interpretation of the connection between disease of the internal ear and certain affections of the brain in many cases,* much more do I suppose it to exist in many instances where softening or abscess of the brain with distention and occlusion by fibrinous deposit of the contiguous veins and sinuses co-exist, and where there is *no* disease of the inner ear or cranial bones. In such cases, I believe, first in order occurs the precipitation or deposition of the fibrin from the blood within the veins, and the disintegration of the brain substance takes place as a secondary but direct and immediate consequence,† the sanguineous overcharging of the particular affected portion of the brain, from which the minute and

* In some cases no doubt the connection alluded to is not at all of a vascular nature like the above, nor yet one attributable to a direct extension or propagation from the ear to the brain (*via* the bone and the dura mater, then the arachnoid, and so on to the brain tissue), but I believe it to be established by means of the small process of arachnoid, which all anatomists describe as passing in the form of a tubular sheath, along with the auditory nerve and through the internal auditory foramen into the petrous part of the temporal bone. I have notes of one or two cases which, when recent, appeared to me to be instances of this. This delicate process of arachnoid membrane becomes implicated in the pathological process within the bone and about the internal ear, and so becomes the medium for its travelling inwards and backwards to the general arachnoid cavity. In these cases, perhaps, as a rule, the brain substance would not be so much affected, but the stress of the morbid action would remain with the investing arachnoid.

† By way of illustration, it may be not amiss or uninteresting to recall to mind the evil effects found in certain untoward cases to follow such a plugging up of venous channels in other parts of the body. For instance, it is well known that gangrene at times follows extreme conditions of so-called phlebitis in the limbs, and in phlegmasia dolens it is not by any means a very rare circumstance to have erysipelatous inflammation and the formation of purulent matter in the affected limb, besides, in milder cases, slight local inflammations. An interesting instance is related by Hasse (see the old Sydenham translation of his work, p. 24), as occurring in his own person. In him the whole saphena venous system had become blocked up by fibrin, and, as he says, "*even the minute twigs of the corium had, by the formation of pustules beneath the epidermis, given proof of active participation in the disease.*"

radical veins pass to form tributary streamlets to the larger out-going currents, producing quite as dire effects as does an over diminution of blood-supply (leading to atrophic disintegration), from the plugging up of its corresponding arterial vessels. The one pathological condition I believe to be as prejudicial, although in a completely opposite direction, as the other. And this method of connection between the affection of the brain and the occluded state of the cranial sinuses and veins may happen, of course, whatever may be the cause of the coagulation within the vessels —whether it be of pyhæmic origin, and succeeding to the formation, retention, and perhaps absorption of pus or its dêbris in other and distant parts of the frame (it may be in the viscera, &c., or on the various surfaces), and therefore, no doubt conservative or protective in intention—or whether it be totally independent of such contamination and spontaneous, so to say, depending on some general and inherent cause which induces a tendency to the precipitation of fibrin in the blood-vessels, accompanied or not as the case may be, with similar precipitation in various organs or other parts of the body.* Such a plugging up and obstruction, primarily of the various venous main channels with their larger ramifications, and secondarily, of the more minute radicles is, I am very much disposed to think, from what I have met with on several occasions, much more apt to occur as a result than is generally imagined, and to pass unnoticed when it exists.† The presence of such a condition of the venous outlets is, in my belief, by no means a rare cause of other changes in the brain, than abscess in the vicinity of the inner ear. The softening of the more interior white parts of the brain, and especially of the central white portions such as the fornix, the

* This might well be owing either to a positive or comparative superabundance of fibrin, or to some agency by which the fibrin, natural in amount, might be more easily than usual induced to precipitate; or it might arise from some altered condition of the fibrin itself under which a similar tendency existed.

† I would here allude to the *in*frequency with which the various cranial sinuses are examined in *post-mortem* examinations. The superior longitudinal one should habitually be examined immediately on the removal of the skull-cap, and before the dura mater is divided; and the other sinuses after the removal of the brain. I may be, perhaps, pardoned for here alluding also to a common error often fallen into, and that is the examination of the organs of the chest before that of the cranial contents, a procedure which of course allows, to a great extent, of the emptying of the cranial veins and sinuses.

septum loucidum, and the surfaces of the various ventricles may, under such a supposition, be accounted for in many cases; as our anatomical acquaintance with the venous system of the cranium teaches us, than any plugging up or narrowing of that tolerably capacious channel called "the straight sinus," existing as it does in the middle of the tentorium cerebelli, and discharging itself posteriorly into the "torcular Herophili," would, by reason of the so-called great veins of Galen, which conduct the effete blood returning from the central parts of the great nervous central mass to this sinus, lead to very considerable detention of blood, and consequently to more ultimate injurious change in those central parts before alluded to.

In the last of the above-detailed cases, it might be thought that the abscess of the brain was a phenomenon secondary to the pus-producing alterations in the lungs, to whatever cause they were attributable. It might again be deemed probable that the accumulation of pus in the lung and in the brain were the results of a cause acting commonly on both organs, and disposing to a precipitation of fibrin which underwent softening changes. It appears to me, however, to be equally open to suppose that whether the collection of fibrin in the cranial veins and sinuses had a common origin with similar deposits in the lungs or not, the abscess of the brain was determined, as I have before said, by the plugging up of such small veins as are allotted to the locality affected, and by the consequent retardation and eventually the arrest of the venous circulation in them.

I have in other places * brought forward instances of diseased conditions which appeared to be the result of a spontaneous tendency to precipitation of fibrin from the blood, along with observations on the general question. In one case which I adduced, a very similar state of the cranial veins and sinuses existed to the ones above recorded, but it was unaccompanied by any organic alteration in the substance of the brain itself. Of course, such ultimate changes and results of this venous obliteration, will only result from a blocking up of the venous channel, in proportion to the rapidity with which the resulting embarrassment to the blood's transit is established, and according as the freedom of col-

* Transactions of this Society, Vol. IV., p. 142, and Vol. VI., p. 31.

lateral circulation as permitted by still uninjured veins is maintained. The degree of such freedom permitted will naturally be dependent upon the amount of plugging up of individual veins or sinuses, and upon the number of collateral or anastamosing channels involved in the blocking up, and otherwise likely to act in a compensatory manner.

In addition to the general remarks above called forth by the consideration of these two cases, I would in particular direct observation to one or two additional details connected with them. Thus, in Case 1, whilst the disease of the inner ear and of the intra-cranial veins, and the cerebral abscess, were on the *right* side, the loss of power in the muscles of the face and mouth was on the corresponding (the *right*) side. At first sight this paralysis might have been thought to be dependent on the cerebral abscess, and to form one of those exceptional and somewhat enigmatical intances of paralysis resulting from disease of the corresponding side of the brain; but the discharge from the outer ear and the actual destruction of the inner ear, in which, no doubt, the portio dura of the seventh pair of nerves was affected, would serve duly to explain the paralytic symptom, quite apart from any supposed absence or deficiency of cerebral influence.

This form of muscular paralysis, however, from injury on the same or corresponding side of the brain, *is* very remarkably illustrated in Case 2. In this case we have an instance of this somewhat perplexing pathological phenomenon. Hemiplegia existed on the "*left*" side of the body clearly dependent on disorganization of the *corresponding* side of the brain. This I will not now more particularly advert to, as I shall have another opportunity of doing so in a communication which I am preparing for another place, on the general subject of such a form of paralysis.

Dr. John W. Ogle, *3rd of May*, 1859.

Epilepsy; Idiotcy; Hemiplegia on the left side of the Body, with frequent spasmodic action, and chilliness of the paralyzed limbs. Atrophy of the Right Hemisphere of the Brain in connection with distention (from old inflammation?) of the lateral Ventricles; also Atrophy of the Left Cerebellar Hemisphere.

History.—The patient G. C., was a boy æt. 13, who was brought into St. George's Hospital, extensively burnt on the surface of the body, and who died in consequence. It seemed, that from the age of 9 months he had been subject to epileptic attacks, and it was in the course of one of these, whilst unwatched, that he fell into the fire. These attacks, of which the first took place during dentition, had become more and more frequent, and latterly he had had as many as twelve or thirteen in a night. The first epileptic seizure was a severe one, and was followed by paralysis of the muscles of the left arm and leg, which, as the mother said, were constantly "drawn up." During the attacks, which were generally preceded by certain changes in the features, known by the mother to be signs of the coming event, he generally turned very pale, never, however, screaming or foaming at the mouth, and would fall down quite insensible as if fainting. His mouth during the seizures was often drawn to the left side, and the left leg and arm would often be dragged up with force. Otherwise no struggling occurred, and he would lie down quite quietly. After the attacks he generally slept a long time.

As regards the general condition of the body, his left arm and leg were always very powerless, and the whole of the left side of the body almost always felt very chilly, so that he would constantly sit with that side towards the fire. The limbs on the right side were quite unaffected, and he was described as being very "handy" with the right side. His special senses appeared to be perfect, but his temper was most irritable, and at times, especially before the "fits," at which period he could not endure the noise made by other children, he would bite at those near him and even at his own shadow. His mind was decidedly idiotic, and he never could speak more than a few monosyllabic words at a time, and then very indistinctly. His general health was tolerably good, having no habitual cough, palpitation, &c., but he

always suffered from ascarides in the bowels. His appetite was generally good but fastidious. As before said, he died from the effects of the burn.

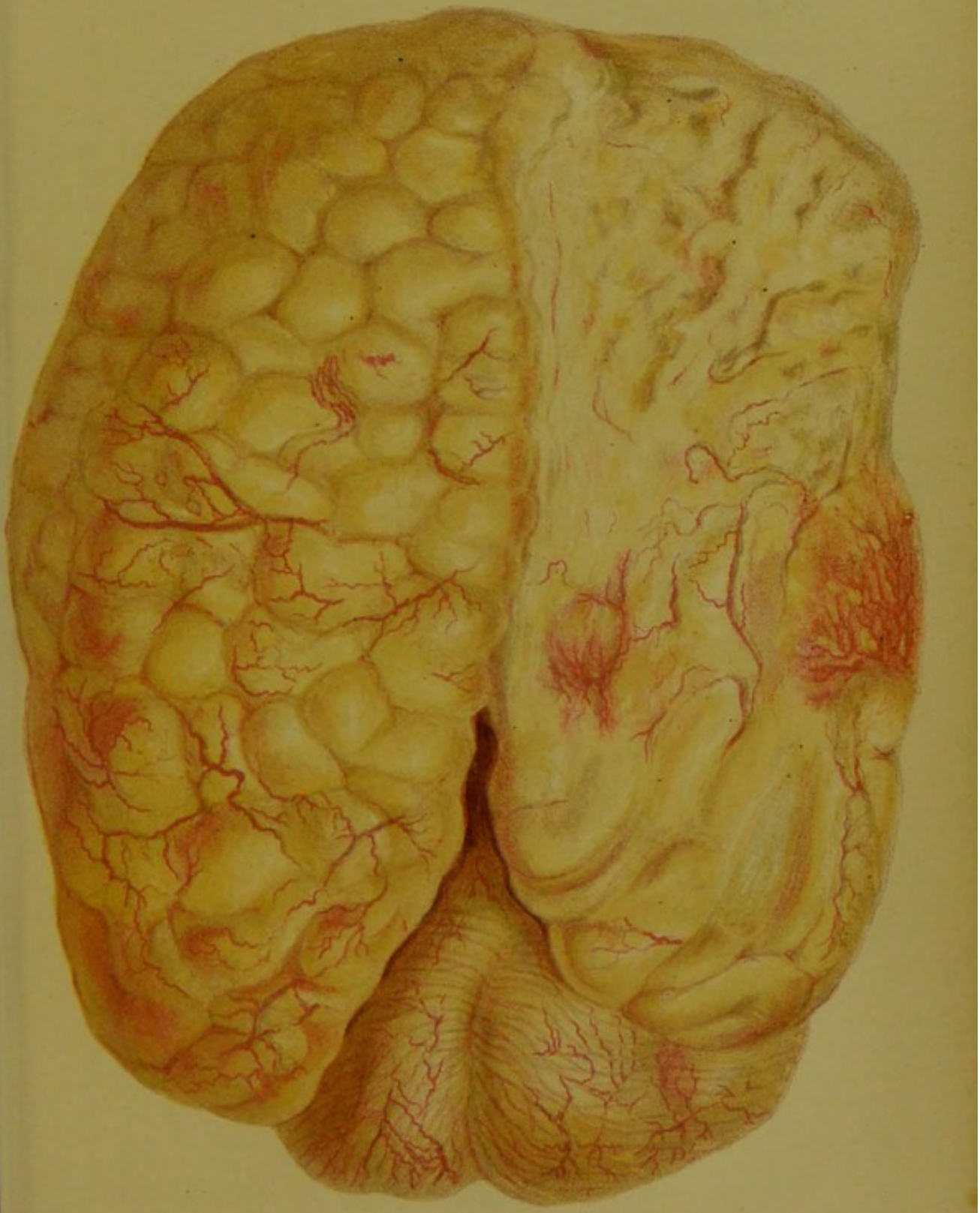
On *post-mortem examination*, the left arm and leg were found much more rigid than the right ones, and were partially flexed.

The cranium was unusually large, but its coverings and the cranial bones themselves were natural, excepting that the latter were of unusual thinness. On removing the scull-cap the various sinuses were found healthy, and the dura mater on both sides, but especially so on the right, was seen to be more than usually distended. On dividing the dura mater the surface of the left cerebral hemisphere appeared to be tolerably firm and natural (Plate IV.), except that in one or two places between the convolutions and under the arachnoïd, specks of light-yellow coloured recent fibrin existed. The large longitudinal sulcus between the contiguous hemispheres was obliterated by firm light-coloured adhesions, and the right cerebral hemisphere had the following unusual appearances. It had the look (at least the anterior three-fourths) of a huge bag distended with fluid, the surface being roughened, and for the most part of an opaque-yellow colour. This colour was owing to great thickening and hardening of the investing arachnoïd membrane, but here and there towards the outer circumference where this membrane was less thick, the blood-vessels were seen to be very numerous and very injected, so as to give in these places a rather vivid-red hue to the surface. The roughening of the surface, which here and there was almost scabrous, depended on the hardening and contraction of the summits of the various cerebral convolutions. Moreover, in several places under the thickened arachnoïd, specks and small masses of yellow old-standing fibrinous exudation were seen. This condition also extended to the lateral portion of this hemisphere, but not to the base. On slicing the brain, which was of unusually large size, from the upper surface, the general structure of the left hemisphere was perhaps not so firm as it should be, but nothing more unusual presented itself. The left ventricle was extremely large. The substance of the right cerebral hemisphere was, however, in a very different condition. The upper surface of the greater portion of this part,*

* The posterior fourth of this hemisphere had its superficial convolutions as

DESCRIPTION OF PLATE IV.

The Figure represents the Upper Surface of the Brain, in a case of Atrophy of a large portion of the Right Hemisphere of the Brain, and of the "left" Hemisphere of the Cerebellum, p. 13.



which at the first sight gave the appearance of a large distended bag, was found to be formed merely of the cortical portion of the brain structure very condensed and indented, and having the thickened and hardened arachnoïd intimately adherent to it. The whole of the medullary part had been absorbed, and the remaining cortical part, which formed only a thin lamina or covering of an enormously dilated lateral ventricle, was of a yellowish-brown hue. Three parts of this corrugated hemisphere then was occupied by this very large right ventricle, which like the left one, contained yellowish clear fluid. (The drawing (Plate IV.) represents the brain after the fluid contents of the ventricle had been in a great degree let out, and therefore somewhat collapsed, having also lost its proper form.) On examining the walls of the dilated ventricles, the right one, that which was so very much the largest, was found to have its inner surface unusually firm and thickened, and at its base the corpus striatum was found particularly prominent and very indurated, forming a knot-like elevation. The cerebellum was apparently natural as to its surface and general texture, but its left hemisphere was very much smaller (perhaps one-sixth), than the right one.

Unfortunately I did not describe at the time of post-mortem examination, the various structures at the base of the brain, so that I am unable to say exactly if the healthy proportion was maintained in point of size, &c., between the various elements at the base, and those composing the surface of the medulla oblongata, &c.

In the spinal cord nothing remarkable was noticed. On examining the abdomen, the testicle on the right side was found to be retained within the abdomen, the other one being in its proper place; both were healthy.

Microscopical examination.—Showed the indurated and enlarged corpus striatum at the base of the right lateral ventricle, to be greatly occupied by fibrous and fibrinous granular and fatty

broad and large as those on the opposite or healthy side. The posterior part of the hemisphere, however, did not extend so far back as it should naturally do, and this was, doubtless, partly owing to actual want of substance, but in part, doubtless, to the shrinking and atrophy of the more anterior portions which allowed it to retire forwards. At least this appearance prevailed on the removal of the brain from the skull. It might have been not so marked when *in situ*.

matters diffused throughout its texture, very little of the proper nervous elements remaining, at least comparatively to the entire mass. In the case of the shrivelled and discoloured cerebral convolutions, fibrinous and granular and amorphous material greatly preponderated, no proper tissue being visible. On examining a portion of voluntary muscular fibre from opposite sides of the body, I could not detect any difference; this was also the case with regard to portions from opposite sides of the spinal cord.*

Commentary.—In this case we have the ordinary law observed of paralysis as to voluntary power of one side of the body corresponding with lesion of the *contrary* side of the brain. It is curious to remark that along with destruction of so large a portion of one hemisphere the organs of special sense enjoyed their complete functions, and the movements of the face, eyes, &c., were entire. The great loss in the substance of the dynamic or grey matter of the brain correspond well with the deficiency of intellectual power.

As regards the causation of this condition of things, the state of the arachnoïd, the effused fibrin both on the surface of the brain and within the substance of the structures within the ventricle, point clearly, in my opinion, to some long antecedent inflammatory action. Some extreme congestion connected at the onset with the general disturbance attendant on the disturbing processes of dentition, and causing the initiatory convulsive attack, was no doubt, as I think, the starting-point. Whether this led to any extravasation, which in a secondary and irritative way established some surrounding inflammatory action, or whether this latter originated independent of any extravasation, it was impossible to determine. The inflammatory processes of course would lead to the excessive distention of the ventricles by the effused fluid, and this over-distention in its turn, to atrophy, by compression of the surrounding parts of the hemisphere.

Two facts involved in this case are so worthy of regard that I would especially allude to them.

1. The circumstance that although the right cerebral hemisphere was so interfered with, and consequently voluntary motor

* (See note * in p. 15.)

power over the muscles on the left of the body so impaired, yet I could find no alteration in the microscopical structure of several of these muscles, which I examined minutely. It must, of course, be borne in mind that the hemiplegia was not absolute, and the remaining power of action may have sufficed to keep the impaired muscular structure sufficiently well nourished. If so, it lends some strength to the expectation that in not hopelessly incurable paralyzed limbs, even a comparatively moderate degree of stimulus duly and persistently kept up daily may suffice to maintain histological integrity, and thus to bridge over, so to say, the great evils entailed by temporary loss of power, which otherwise might become permanent. Neither did I discover any alteration in the microscopical character of the spinal cord.*

2. Another fact of great interest is afforded by this case, as the illustration connected with this communication well shows, and that is the correspondence between atrophy of the *left* cerebellar lobe and a similar but much more advanced state of atrophy of the *right* side of the brain proper. At the time of the *post-mortem* investigation, I did not observe the coincidence in this case, but on inspecting the careful drawing made of it by Dr. Westmacott, Dr. Brown-Séquard, to whom I was showing it, at once pointed to it.

I may take the opportunity here of stating that the highly philosophical observations of Dr. Turner on this subject of the connection between atrophy of one side of the brain and the alteration of nutrition of the opposite side of the cerebellum and spinal cord,† are of the utmost interest and value. In those observations, it will be seen that Turner adopts the following view of the sequence of pathological changes attendant on this atrophy of the brain, which shows itself during life by paralysis of voluntary motion, with conservation of sensibility. In his opinion, cerebral convolutions are first destroyed, and thus the ventricles are in a

* I mention this in reference to the statements of Turck, who has found (see Wagner's Zeitschrift, Vol. VI., 1850, and Vol. VIII., 1852, &c.), that in certain cases, secondary changes as shown by the microscope, are induced along parts of the spinal cord in consequence of disorganization or alteration of the cerebrum.

† "De L'Atrophie partielle ou unilaterale, du Cervelet, de la Moelle Allongee et de la Moelle Epiniere, consecutive aux destructions avec Atrophie d'un des Hemispheres du Cerveau." These inaugurale, Paris, 1856.

secondary manner, dilated to compensate for the retreat of indurated brain substance, along with atrophy and induration of the optic thalamus and corresponding mamillary tubercle. Consecutive to this, the atrophy is continued in the corresponding half of the medulla oblongata, in the crus cerebelli and anterior pyramid of the same side, and then after the decussation of the pyramids, in the opposite half of the spinal cord, and in the opposite lateral lobe of the cerebellum.

In this case of mine, owing to the induration and the very great enlargement of the optic thalamus and the corpus striatum at the base of the third ventricle on the right side, I was inclined to think that the cause of the diseased condition was an inflammatory attack of the inner surface of the ventricle under which the fibrinous deposit had become exuded into the brain tissue, and the ventricle dilated with fluid; that to this the atrophied state of the cerebral convolutions was consecutive. On the point of causation I am inclined to differ with the observations of Dr. Turner in supposing, from such a case as mine, that other causes than that which he assigns, may exist for such cases of cerebral atrophy.

I regret very much that in this case I did not minutely examine the base of the brain, with reference to the statements of Dr. Turner as to consecutive atrophy of the medulla oblongata, &c., I had not, however, at the time read Turner's work on the matter. The atrophy could not have been very marked or it would not, I think, have passed entirely unnoticed; but I am well aware how facts and circumstances do escape observation, unless there be a predominant idea in the mind of the observer.

I may mention, in conclusion, with regard to the testicle retained within the abdomen that I have, on previous occasions, found that the testis, although undescended, has possessed all the proper and healthy microscopical characters of a healthy organ. Of such is a specimen which we have in St. George's Hospital Museum, which, although retained firmly within the abdominal cavity, yet had quite a healthy character when minutely examined. This specimen exists in the new catalogue as No. 2, Sub-series IV., Series XXXV., and was presented by Mr. Cæsar Hawkins.

Dr. John W. Ogle, *17th of May*, 1859.

DESCRIPTION OF PLATE V.

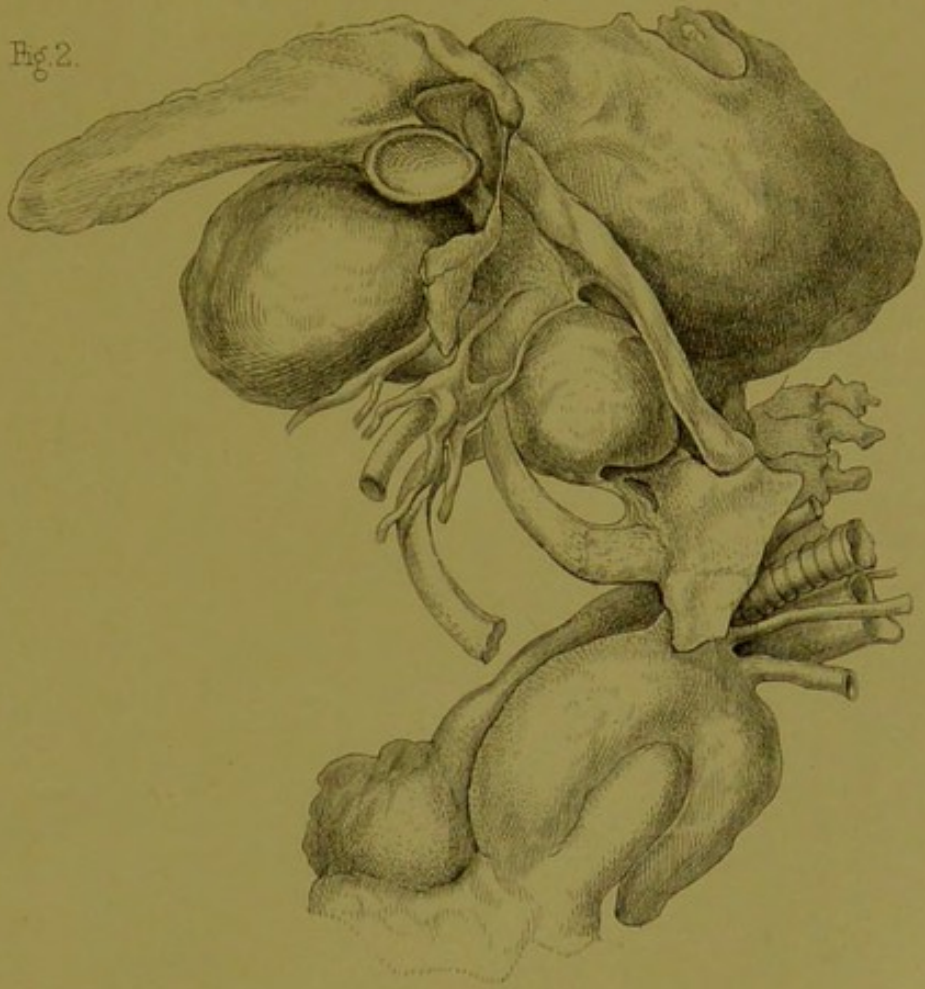
The Figures illustrate a case of unusually large Subclavian Aneurysm, p. 17.

Fig. 1. Posterior view of the Aneurysmal Tumour during Life, showing the Aperture at its summit through which the fatal Hæmorrhage occurred; as also the distortion of the Scapula.

Fig. 2. View of the lobulated sub-clavian Aneurysm, and the surrounding structures dissected after death. The Scapula and Clavicle are seen tilted up somewhat more than was the case during life, owing to the restraint of the Muscles and Integuments having been removed.

Fig 1.

Fig 2.



Tuffen West sculp.

W. West imp.

Enormous Aneurysm of the Right Subclavian Artery—Peculiar Cyanosis and Club-shaped condition of the Fingers, with remarkable Hypertrophy of their Nails—Death after two attacks of outward Hæmorrhage from Rupture of the Aneurysmal Sac.

The specimen was removed from the body of a labouring man, æt. 50, who died in St. George's Hospital.

Previous History.—The patient had three years previously been attacked with hæmoptysis, and spat up about three pints of frothy blood. Ever since, he was the subject of dyspnœa, but went on at his work until a year before his entrance into the Hospital. At that period he caught cold, and his dyspnœa became more urgent, and he had great pain in the elbow of the right arm. He also became subject to giddiness, and swelling and numbness of the right arm and hand.

Symptoms on Admission.—At this time the pulse was remarkably jerking, and he had much pain of a shooting character in the upper part of the chest. He was also unable without very great distress to lie down in bed on the right side. There was a distinctly pulsating tumour above and below the right clavicle, and also at the same parts great tenderness on pressure and dulness on percussion. On auscultation of the tumour, a loud and distinct single murmur was heard above the clavicle over the swelling, and below the clavicle a distinctly double murmur was audible coincident with the sounds of the heart. At the cardiac region a double bruit was heard, most loudly at the apex of the heart, and a single bruit was heard posteriorly, between the spine and the edges of the right scapula. Moreover, at each impulse of the heart, the right shoulder and upper part of the chest at the affected part received a manifest shock, and synchronously the right arm was elevated and jerked outwards from the side of the body.

The tumour increased in size (*see* Plate V., Fig. 1), and the arm became very œdematous. By degrees, nearly all sensibility of the skin of the arm and all voluntary movement became lost, and the arm presented a painful and grotesque appearance, losing its natural character, and assuming that of a stuffed cylindrical cushion, the more remarkable as it became abducted from the side of the chest, and more and more elevated at each impulse of the heart. The pulse at the right wrist eventually entirely failed, and the nails

of the fingers became exceedingly hypertrophied, becoming much broader and thicker, as well as longer; and the ends of the fingers clubbed in shape, and quite darkly *cyanotic* in colour. The tumour above the clavicle became exceedingly large, extending considerably upwards and *backwards*, and its apex gradually very deep-red in colour; it eventually burst, allowing of the escape of about a pint and a-half of blood. For many months the patient could not lie down, and he was greatly exhausted by a second attack of hæmorrhoge, which occurred before death. He obtained most relief from aconite as a lotion.

Post-mortem examination.—Showed that the right subclavian artery generally was very dilated, and along with the arch of the aorta was the seat of several patches of atheromatous deposit. The aneurysm which affected the aorta at a part immediately behind the right sterno-clavicular articulation (*see* Plate V. Fig. 2), had produced great displacement of the right scapula and clavicle, and also caries of the posterior surface of the latter bone, and of the right sides of one or two lower cervical vertebræ. The first rib was very greatly carious and was partly, as it were, lying surrounded by blood clot, within the aneurysmal sac. The sac extended also so much downwards into the axilla and beneath the clavicle, as completely to push forwards and compress the axillary artery and vein, and the various nerves concerned in the brachial plexus, &c. The summit of the aneurysmal sac was exceedingly thinned and softened, and of a dark gangrenous look, especially in the region where the hæmorrhage had occurred during life.

The sac was capable of holding several pints of blood; about half of its contents was coagulum, but none was very discoloured. There was also extensive calcareous disease of the flaps of the mitral valve.

Commentary.—The most remarkable features of this case are:—

1. The very unusual size attained by the aneurysm before bursting, as the drawing shows; and

2. The peculiar cyanotic character of the fingers of the affected hand along with the increased growth of the nails. The increase in the size of the fingers and in the dimensions of the nails I attribute to exalted nutrition induced by the presence of an increased amount of blood in the veins of the part, detained there by the pres-

sure upon and interference with the circulation in the neighbourhood of the axilla. The œdema and want of pulse at the radial artery, in addition to other symptoms, palpably indicate this obstruction.

The case in this respect illustrates in an interesting way the subject of cyanosis in general.

Exhibited 2nd of March, 1859.

Disease of the upper surface of the Sphenoïd Bone. Ptosis of the upper Eyelid on both sides, and complete immobility of both Eyeballs. Dysphagia and difficulty in articulating words, opening the mouth, or protruding the tongue. Loss of Muscular power in the Arms. Death by Apnœa.

History.—The patient, a man servant, æt. 36, was admitted into St. George's Hospital. He had always been of regular habits, having on the whole enjoyed tolerable good health in general, and not being aware of any cause of his illness. He had, however, been the subject, about seven years previously, of very severe cold, to use his own expression, attended with much headache, and purulent discharge from both ears; on being closely questioned, it seemed that since the age of seventeen, he had been on two occasions subject to *double vision*. About six months before admission, he was attacked with a dimness of sight, and afterwards he found, that on stooping, he was subject to giddiness and double sight, which ever since had been frequently troublesome, and accompanied by considerable pain in the head, specially at the back part. "Dropping of the upper eyelid" had also come on, in the first instance on the left side, subsequently on the right, and finally on both sides. The special senses had apparently not been affected, and he did not confess to having noticed interference with any form of sensibility or motor power in any of the limbs, except that often on lying down, the head was wont to fall back suddenly. For three months he had had a slight cough, and for the same period also, some *difficulty in swallowing*.

Symptoms on admission.—The patient had a strange appearance, owing to a partial ptosis of both eyelids, especially on the left side, and complete loss of power in moving the eyeballs, whose axes were

parallel. Moreover, when he attempted, he could not completely close the eyelids of either side; but the mouth or face were *not* drawn to one side. The pupils were equal and regular, and responded, each, to the influence of light. Excepting from the inconvenience attendant on the ptosis and the immobility of the eyeballs, the powers of vision were entire. There was also considerable difficulty in swallowing and articulating, and after attempting to talk for a season, he soon became very tired and unintelligible, until after he had rested. He could walk well, and there appeared to be no interference with the power of moving the legs; but there was a decided diminution of voluntary power in the arms, and he could not grasp any object very firmly with either hand. There was no loss of any of the forms of tactile sensibility in any part of the surface of the body, nor was there any deafness or want of smell or taste.

He complained of pain in various parts of the head, but had never had any vomiting.

The urinary organs appeared to be in a natural condition, but the bowels were generally very costive.

Course of the disease.—He went on getting very thin and low, owing, no doubt, partly to the increase of difficulty in swallowing. He often had the appearance of choking, owing to attacks of dysphagia and difficulty in removing the thick tenacious phlegm which formed in the air-passages. Dyspnœa, with unusual rapidity of pulse, came on; and eventually the whole skin assumed a *dark-blue colour*, owing to want of due aëration of blood. The difficulty of swallowing got worse, and he became unable, in almost any degree, to open the mouth or protrude the tongue, which, however, was not diverted from the straight line. Eventually, the mouth was a little drawn to the right side. No anæsthesia came on. The pupils became very sluggish, and a constant frown appeared on the forehead. The bronchial tubes all over the chest were found, on auscultation, to be clogged with thick mucus; and he died from apnœa, retaining his intellectual powers until the last. At one time his pulse was 144, and the inspirations as many as 29, per minute.

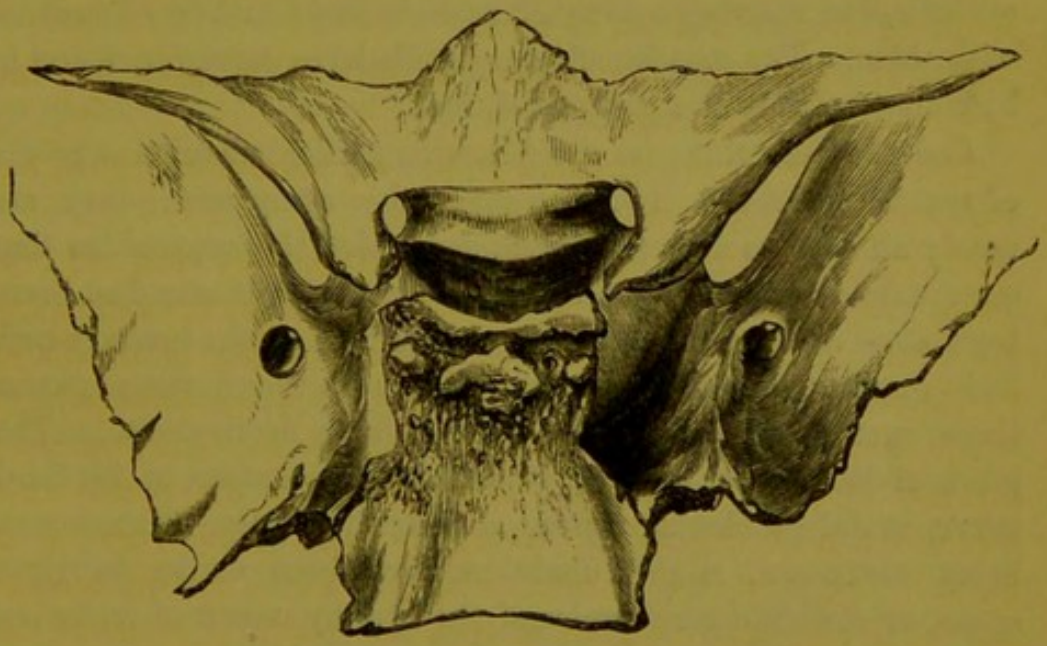
The treatment consisted of gentle salivation by blue pill, and then liq: hyd: bichl: together with counter irritants, under

the impression that some chronic inflammatory action, at the base of the cranium, was going on.

Post-mortem examination.— The various abdominal and thoracic viscera were found natural, excepting that an unusual amount of redness of the bronchial mucous lining existed throughout, along with very extensive accumulation of thick mucus in the tubes.

The integuments covering the skull, as well as all the facial and upper cranial bones, were quite healthy, as also the dura mater and other investing membranes of the brain generally. The brain was carefully examined throughout, and nothing unusual was found in connection with it, excepting that an increased

Woodcut 2.



Shows the excessively porous condition of the anterior part of the square lamina of the body of the sphenoid bone; along with the hard nodules of new bone-substance, thrown out from the surface, behind the posterior clinoid processes.

amount of clear fluid existed in the lateral ventricles, and in the sub-arachnoïdean tissues. There was, however, a considerable amount of opacity and thickening of the arachnoïd membrane at the base of the brain, and especially at the central part; but nothing like indications of recent inflammatory action. After

removing the dura mater, which came off rather readily, from the bones forming the base of the cranium, there was found extensive, chiefly old-standing, disease of this part of the skull.

The upper surface of the body of the sphenoïd, continuous behind with the basilar surface of the occipital bone, and in front with the sella turcica, was very vascular, and much more porous and indurated than it should be; this was so especially in the neighbourhood of the posterior clinoïd processes. Here and there (see woodcut), small elevations or nodules of hard compact new bone existed in connection with this part of the base of the cranium.

Microscopical examination was carefully made of various parts of the brain, as also of the pneumo-gastric nerve in various parts of its course, of the locus niger and other parts of the crura cerebri, and of several of the nerves devoted to the movements of the eyeballs, but nothing worthy of remark was found in connection with them. The muscles of the eyeballs were, however, found to be almost entirely in a *fatty* condition.

Remarks.—In this case the following particulars arise as points of special interest. 1. As regards the symptoms: they are nearly all such as might be predicted under the supposition that some chronic inflammation of the cerebral membranes had been, from some cause or other, set up at the base of the brain, which had implicated in some way or other the various nerves there met with on their course to their destination. The ptosis of both upper eyelids pointed to some paralysis of the third nerve, as did the double vision, although the latter phenomenon being occasional, might, doubtless, have been owing to some spasm of the abductor muscles of the eye, by reason of irritation of the sixth.* Again, the dysphagia, the difficulty in articulating, and the dyspnœa, and other bronchitic symptoms were, in all probability, the result of some involvement of the pneumo-gastric nerves; whereas, the difficulty in protruding the tongue (although it could be moved freely about in the cavity of the mouth) would find an explanation in some inhibitory interference with the hypo-glossal nerve; and the partial paralysis of the facial muscles, in a similar interference with one of the seventh pair of nerves.

* In connection with the ptosis and the fixedness of the eyeballs, it must be remembered that the oculo-motor nerve has a special notch for its passage at the lateral border of the plate of the sphenoid bone, which was diseased.

As regards the difficulty in opening the mouth, that may have been owing to some spasm of the pterygoïd muscles, &c., by reason of irritation of some motor fibres of the fifth pair of nerves, or to some diminished power in the muscles, which depress the jaw. All these symptoms, conjoined with the absence of mental disturbance, the integrity of cutaneous sensibility, and the freedom from anything like hemiplegia, militated against the supposition that the central cerebral substance was itself materially involved. One symptom alone, and that is the diminished voluntary power of the muscles of the arms, was inexplicable, considering what were the changes observed on post-mortem examination. It is most likely that there existed a slight lesion of some portion of the track followed by motor fibres at the base of the brain, which in the examination, I overlooked; or again, that the condition of the cerebral arachnoïd which prevailed at the base of the brain, extended to some extent downwards into the spinal cavity, so as to compromise the motor root of some of the upper spinal nerves.

I will take the present opportunity of stating, that medical men are, as it appears to me, in the habit of attributing implication of nerves, which often exists as a result of inflammatory processes, such as were present in this case, too exclusively to mere external *compression* by inflammatory exudation. That pressure is a very frequent, and perhaps the most common cause of inflammation of nerves found coursing along in the very neighbourhood of inflammatory action—I allow; but still I think that there can be no doubt, that surrounding inflammatory action frequently embarrasses the nerves by directly and substantially extending to them; thus they become more or less disintegrated, hardened or softened, losing all conducting power. Or, on the other hand, their action may be increased, especially in the first instance, and spasm of the muscles, to which they are delegated, excited. This *spasm or excess of action* during life is often confounded with supposed *loss or diminution of power* of the counterbalancing muscles.

2. The peculiar porous, hardened, and roughened conditions of the part of the sphenoïd bone affected, and upon which the chronic inflammatory condition of the adjacent arachnoïd membrane depended, is a subject of interest. This was not made out to be either of syphilitic or strumous origin; the details of the life, the history, &c., seem to point out that it was of

rheumatic origin; and I am inclined to compare the roughened prominences of hard bone which existed at the affected part with such new formations of bone as are not infrequently met with in the neighbourhood of joints in other places in old rheumatic subjects. *Exhibited 2nd of March*, 1859.

Drawing, showing Atrophy of the Muscles on one side of the Larynx of a "Roarer" (Horse). Observations on Modifications of the Human Voice, Cough, &c., in consequence of a greater or less Paralysis of the Laryngeal Nerves by pressure.

The drawing consists of a posterior view of the horse's larynx, in which the posterior Crico-Arytænoïd muscle, &c. (dilator of the glottis), on the left side, was seen to be in a very pale and completely dwindled state.—(See Woodcut 3.) The fibres of the corresponding muscle on the side opposite are, on the contrary, quite abundant, being, indeed, apparently hypertrophied,

Woodcut 3.

Represents the posterior laryngeal muscles of the horse; those of the right side are seen to be in a plump and healthy condition, while on the left side a few shrunk and pale fibres alone remain. (From a drawing by Mr. Richmond, jun.)

firm in texture, and of a dark-red colour. Moreover, there is an unusual condition of part of the cartilaginous structure of the larynx, the free border of the "rima glottidis" on the left side being considerably thinner than that on the other side, and also possessing a less convexity inwards. The original specimen was the property of Mr. Field, the veterinary surgeon, in whose museum it had existed for a length of time, and had been kindly lent to me by Mr. W. Field, Jun., in order that I might have a representation of it made. The exact history of the specimen is a little doubtful, as it is not quite clear whether it is one in which the unwonted condition of the laryngeal muscles in question has been caused by disease, or is the result of experimental interference (which, as I shall attempt to show later on, is the most likely supposition).

I brought the drawing before the notice of the Society, in reference to a subject with which all practical medical men are conversant, viz., the alteration of the human voice, and the peculiar noise attendant upon the breathing in certain morbid states wherein the pneumo-gastric nerve, or its "recurrent laryngeal" branch, are materially involved—a subject which has, on more than one occasion, received the attention of this Society. The peculiarity in respiration alluded to is almost exclusively confined to the act of *in*-spiration, which acquires a character that may be termed at one time "gruff," or "rhonchial," or "raucal;" at another, "shrill," "stridulous," or "whistling." This pecularity of inspiration is well exhibited in certain cases of tumours or aneurysms in the neck, or within the thorax;* but of course it is in some degree recognized also in many other diseased conditions, in which obstruction to the passage of air towards the lungs exists in various parts of the respiratory tract; albeit in none to so well-marked a degree as in those instances where the chink of the glottis is narrowed or occluded during inspiration, either owing to positive spasm of the constrictor muscles of the aperture, or to paralysis of the intrinsic laryngeal muscles, which permits the collapse or approximation of the arytænoïd cartilages during the

* It must not be forgotten, that in these affections this character of the inspiration may in some cases be *tracheal* in its source, or even *bronchial* as well as laryngeal, by reason of direct pressure upon the various parts of the air-passages, wholly independent of any interference with the recurrent laryngeal nerve.

act of inspiration, by reason of the pressure of the air when indrawn, to supply the vacuum attendant on the previous expiration. The peculiarity in the respiratory efforts above spoken of, as well as the modifications of the strength, pitch, and quality of the voice, and the unusual character of the cough observed in certain cases of disease in man (so markedly exaggerated under emotion, quick muscular movement, or any effort which induces accelerated breathing in the patient), has often struck me as being very analogous to that which, in the case of the horse, obtains for it the epithet of "roarer," "high-blower," "piper," "wheezer," "whistler." As in the case of the horse, great difficulty in diagnosis as to the causation of the roaring is frequently met with,* so it is often a question in human patho-

* It appears that the various deviations from the natural condition as respects the breathing, in horses which come under the generic title of "roarers," have been traced to a great variety of causes, but the pernicious influence of almost all of them may be ultimately traced to a narrowing or obstruction of some parts of the cavities or tubing through which the air has to pass on its way down to the lungs. For example, amongst the multifarious causes assigned for this affection in different works I find the following enumerated:—"thickening and induration," or "ulceration" of the lining mucous membrane of the glottis, and the different parts of the larynx, trachea, &c.; "cicatrices," "foreign bodies," "tumours," "cysts," "abscesses," in connection with the above parts; "layers and bands of fibrinous exudation" on the free surface or across the diameter of the larynx or trachea; affections of the laryngeal cartilages themselves, such as "fractures" and other injuries, "ossification" and thickening as from old-standing disease; "distortion," as often brought about by long-continued or tight reining or curbing, as in the breaking-in of carriage horses, establishing, for the sake of a proud bearing, a constrained and unnatural position of the head and neck; or the constant use of the neck-strap in place of the halter, the use of ill-fitting collars, or much pinching of the larynx (often resorted to with a view to the testing of unsoundness), especially in the case of young horses whose cartilages are yielding. Simple spasm of the glottis-closing muscles, owing to superficial ulceration of the mucous membrane at the upper aperture of the larynx is spoken of as a cause, at times, of the various forms of roaring; and also certain diseases in the neighbourhood of the larynx, such as abscesses, diseased salivary glands, &c., which induce atrophy or destruction of the adjoining intrinsic muscles of the larynx. Some of the French writers have attributed it, in some cases, to enlargements or ganglia, situated on the pneumo-gastric nerve, and to various kinds of poisonous agents, animal, vegetable, and mineral.

Mr. Percivall in his "Hippopathology," mentions that the seat of roaring is "occasionally" in the *lungs* themselves, and quotes Mr. Turner to the same effect. In such cases, it is most likely that "wheezing" is the special affection produced.

For a most interesting case of "roaring," in which the cause (unforeseen

logy, of much interest and no slight difficulty, to decide upon the exact origin of the peculiar alteration of the voice or breathing under consideration.

This leads me to speak of the modification of voice, whether respective of the strength, or timbre, or powers of modulation so often noticeable in cases of *pulmonary phthisis*. My impression has long been (and, indeed, according to my experience, post-mortem research has demonstrated it to be so) that the affection of the voice in this disease is, by no means infrequently, quite *un*-connected with any altered condition of the mucous membrane of the parts forming the upper outlet of the larynx, such as we do very frequently meet with in this class of cases, and which, either alone or with an attendant affection of the vocal chords, completely accounts for the hoarseness, or other altered conditions of the voice, cough, &c. It is known that the peculiar arterial whiff or bruit, often audible within the upper part of the chest, apart from any intrinsic disease of the blood-vessels, has been supposed by some to be referrible in many cases to pressure upon, and consequent indentation of, some of the large intra-thoracic vessels by tubercular and consolidated lung-tissue. Should this supposition be correct, I see no improbability in conjecturing that the nervous structures abounding at the upper part of the chest (and among them the recurrent laryngeal, or the main trunk of the pneumo-gastric nerve) may in some cases become involved.* And this might, of course, also occur, not only from the pressure of the consolidated and distended lung, but also as a result of implication of the nerves by thickening with puckering and induration of the neighbouring inflamed pleuræ, or by pressure from certain pleural exudations external to the lung-substance, consequent upon neighbouring inflammatory action. In this manner might the laryngeal muscles (on

during life), proved to be a diminished capacity of one of the nasal fossæ by excessive enlargement of one of the turbinated bones, owing to extreme dilatation of its bony cells, see the "Veterinarian," Vol. X., 1837, as described minutely by Mr. James Turner. It is a curious fact that there are several instances on record proving the frequent *hereditary* character of "roaring."

* The relation of the recurrent laryngeal nerve to the lung and pleura on *either* side of the chest, whether, *i. e.*, as hooking round the aortic arch on one side, or the first part of the subclavian artery on the other, would render the supposition tenable.

one or other side), which are innervated by the nerve branch in question (*i.e.*, the whole of the intrinsic muscles of the larynx, as well constrictors as dilators, save the crico-thyroïd) become interfered with, their action more or less diminished, and their nutrition proportionately impaired.

In such a case, whilst the chest-expanding or chief inspiratory muscles were, it may be, even more than usually active—("the consent of motion," as Le Gallois says "between the muscles of the glottis and those of the chest being arrested"), and the downward force or pressure of the inspired air was approximating the arytænoïd cartilages, which, by reason of the paralysis of their muscles, would be unresisting; the aperture of the glottis would become diminished or even quite closed, thus producing the modifications of voice and cough, or even actual stoppage of breathing quite independent of any diseased condition of the respiratory mucous membrane at any part.* That this unnatural state of the glottis might arise, in natural disease, in consequence of such an interruption of influence from the recurrent laryngeal, is fully borne out by the remarkable experimental investigations of such observers as M. Dupuy, who, in 1826, found† that *roaring* in the horse was the direct and constant result of section or compression of the eighth pair of nerves. Many other experimentalists might be quoted, who found the same result, as may be seen related in the various works devoted to veterinary subjects; but I will venture to quote a forcible passage from the "Veterinarian" for 1837, Vol. X. p. 77,‡ in which the results of the operation are graphically described by the late Mr. John Field, who assisted Mr. Herbert Mayo in

* In some horses who are roarers, owing to disease of the upper part of the larynx, the power of coughing is wholly absent, the necessary forcible preliminary closure of the glottis being prevented.

Diminution of this power of coughing in man I have also seen from the same cause in one or two Hospital patients, the subjects of syphilitic disease of the larynx. In one patient I found that in no way could I satisfactorily induce vomiting either by tickling the fauces or by actual emetics given by the stomach, and his breathing on any hurry assumed quite a roaring character.

† See Mr. Percivall's Hippopathology, Vol. II., p. 47, 1840, wherein reference upon this subject is made to the "Recueil de Medecine Veterinaire."

‡ A Monthly Journal of Veterinary Science, edited by Mr. Percivall and Mr. Youatt at one time.

several of his experimental inquiries. That gentleman observes as follows:—"Having ascertained that the organs of respiration of a horse used for farm purposes were sound, I cast him, laid bare the recurrent nerve of the off side, and passed a ligature loosely round it: he was then allowed to get up, and after a few minutes galloped severely without evincing the slightest defect in his breathing: the nerve was then drawn forward by the ligature, and one inch and a-half of it excised; and immediately on only trotting the horse a short distance such a degree of roaring was occasioned, that, had the exertion been continued he would soon have fallen.* I kept this horse four years; and although his breathing became better, he always continued a sad roarer. At the end of that time I destroyed him for the larynx, which exhibited the usual condition of wasted muscles on the side deprived of the influence of the recurrent nerve."† The above detailed experiment and all of the same nature are replete with the highest physiological interest, and in a practical point of view have a most valuable bearing, inasmuch as they throw considerable light upon those cases in which the glottis in man becomes for a certain length of time manifestly more or less narrowed by muscular contraction, whether this have remote origin in causes inhibiting

* I have found it stated that roarers have been known to drop down dead when put to very extreme exertion owing to apnœa.

† The obvious value of the above-mentioned preparation, and the excessive importance of the experiment would of course render it a matter of imperative necessity that it should be preserved; and I am, I believe, right in assuming that the specimen in the present Mr. Field's Museum, from which my drawing was taken (and the doubtful history of which I alluded to above), is the identical one here described so circumstantially by the late Mr. Field.

One or two other specimens also exist at the present time in the same museum, illustrating atrophy of laryngeal muscles in "roarers," but they are much less marked instances than the above-mentioned one. I observe that Mr. Porter, in his article on the Larynx, in "Todd's Cyclopædia of Anatomy and Physiology," states, that Sir P. Crampton had seen examples of Atrophy of the laryngeal muscles removed from "roarers," in the Veterinary College of London. Mr. Porter also alludes to mention made by Andral of atrophy of these muscles in case of loss of voice.

The Veterinarian "(op. cit.)" and other works of the same character contain several cases related by correspondents in which atrophy of the intrinsic laryngeal muscles was met with in old "roarers." The subject is alluded to by Dr. Stokes in his work on "the Diseases of the Heart and Aorta," 1854, p. 569, and mention also made of a similar case submitted to the Dublin Pathological Society by Dr. Smith.

the nervous supply furnished to the laryngeal muscles, thus more or less paralyzing them, allowing the in-drawing or approximation of the arytænoïd cartilages and ligaments of the glottis during the *in*-spiration of the air; or whether it is to be sought in causes producing active and immediate spasm of the constrictors, such as we have for example, in what is termed "laryngismus," either that frequently met with in children, termed "spasmodic croup" or "laryngismus stridulus,"—or the laryngeal spasm of hooping-cough, or that so frequently encountered in the epileptic and certain hysterical seizures, and allied affections.

The whole subject is also illustrated by the various experiments undertaken for the purpose of showing the influence of the pneumo-gastric nerve and its recurrent laryngeal branch upon the voice and breathing, from the time of Ruffus of Ephesus,* Galen,† Vesalius,‡ Mundinus,§ down to modern days when we have the researches of such observers as Morgagni.‖ Drelincourt.¶ Brunn,** Dr. George Martin,†† Haighton,‡‡ Monro secundus,§§ Dupuytren, Günther,‖‖ Reid,¶¶ Gurlt and Hartwig,*** Longet,††† Romberg,‡‡‡ and others too numerous to quote.§§§

* Morgagni de Sedibus et Causis Morborum, &c.—Ep. XIX., Art. 23.

† De Locis Affect.. Class. 4ta., Lib. I., C. VI.

‡ Hum. Corp. Fabric, 1555, VII-XIX., p. 571.

§ About the 14th century, quoted by Haighton.

‖ Appellationes Part. Hum. Corp., Paris, 1554, p. 32.

¶ Experim. Anatom., 1681.

** Leipzig Commentaries for 1755.

†† Paper in the "Medical Essays and Observations," Edinbro'. Vol. II., p. 96, styled "The experiment of cutting the recurrent Nerves carried on further than has hitherto been done."

‡‡ Paper in the "Memoirs of the Medical Society of London," Vol. III., p. 422, on the determination of the effects of the division of the upper and recurrent laryngeal branches of the eighth pair, on the voice.

§§ Observations on the nervous system, 1783, p. 65.

‖‖ Zeitschrift f. d. Gesammte Thierheilkunde, &c., Vol. I., p. 267, quoted by Romberg.

¶¶ Edinbro' Medical and Surgical Journal, 1838-1839.

*** Magazin f. d. Gesammte Thierheilkunde, 1841, No. 1 p. 98.

††† Recherches Experimentales sur les Fonctions des Nerfs. des Muscles du Larynx, p. 21-22.

‡‡‡ Manual of the Nervous Diseases of Man, Sydenham Society, Vol. II., p. 320.

§§§ References to various experimenters are made by M. Le Gallois, in his Experiences sur le Principe de la Vie, 1812, p. 202.

As regards the interesting question, whether the larngeal or vocal muscles can be supposed capable under any circumstances of regaining their function (one of no slight moment in clinical studies), I will quote the experiments (before alluded to in a foot note) of Mr. Haighton, who whilst satisfactorily determining that the recurrent branches of the pneumo-gastric nerve were the true vocal nerves, showed that the voice could "when taken away by a division of the vocal nerves, again return." He alludes to the circumstance, that even Galen had considered that the voice "ought to return after it had been lost by experiment;" but that supposition of Galen's was merely founded on the fact (of which he was aware) that a communication existed between the recurrent and the upper laryngeal branch.* Haighton proves by experiment, however, that the reëstablishment of the voice does not depend on this nervous communication but on another cause, and that is the reunion of the divided nerve.

It is obvious, that this ascertained fact of the possibility of a return of the voice after excessive injury, or even excision of a part of the nerve is of some practical import when we come to consider, in certain cases, the feasibility of performing the operation of tracheotomy for the relief of laryngismus, depending on pressure at some distance from the glottis, or such operations about the neck as may tend to involve the main pneumo-gastric nerve itself.

As an appendix to the above observations, I cannot resist the wish to draw attention to three deeply interesting cases, illustrating the subject of this communication. The first is one of a man which I find related by Dr. Brinton in Vol. III. of our "Transactions," p. 304, and in which was an aneurysm of the arch of the aorta, considerably destroying the trachea, and having in the substance of its walls the left recurrent laryngeal nerve. On minute examination, the structure of the nerve at the part involved was found completely altered, and the muscular fibres of the laryngeal muscles on the same side were paler than on the opposite side,

* Galen (*loc. cit.*) mentions the circumstance of two boys, from whose necks strumous masses were removed by an ignorant Surgeon, who tore away along with the tumours, in one case, one of the recurrent nerves, and in the other, both of these nerves. Of the one boy, Galen observes, "sed mutum reddidit;" of the other, "ipsum similiter semimutum reddidit.

their transverse striæ being much less distinct, &c. Among other symptoms during life were recorded stridulous breathing, especially on inspiration, and partial loss of voice. A second case (a very marked one) was that of a woman, described by Dr. Todd at page 208 (Feb. 26, 1853), of the sixth volume of the "Medical Times and Gazette," which is the case, I believe, alluded to by Dr. Stokes, in his work before quoted, on the Heart and Aorta, p. 569. A third noteworthy case, of a similar nature (the pressure being caused by a cancerous tumour of the neck), is related by Dr. Budd, at page 62 of Vol. X., in which dyspnœa, the result of injury to the recurrent nerve, caused death. Our medical works and periodicals contain several cases in which alterations in the character of the cough, voice, and breathing have resulted from pressure upon this nerve-branch, or the main trunk of the pneumo-gastric from which it emanates.

Postscript.—Since writing the above, I may state that I have seen two interesting wax models, showing atrophy of the posterior intrinsic muscles of the larynx (in connection with roaring), in the Royal College of Veterinary Surgeons, Red Lion-square, London. I have also, by the courtesy of Professor Varnell, seen several specimens of the dissected larynx of the roarer (perhaps those alluded to by Sir P. Crampton), in the Museum of the Royal Veterinary College, Camden Town. All these, like the one which I have had illustrated above (and also the wax models), showed the atrophy on the LEFT side; and Professor Varnell told me that he does not remember ever to have seen the muscles on the right side affected, unless in cases where BOTH sides were involved. He showed me specimens in which abscess connected with the trachea, as also distortion of the trachea, and tumours connected with the epiglottis, had been severally the causes of roaring. He also said that he had seen atrophy of the laryngeal muscles of the horse owing to ankylosis between the arytænoïd and cricoïd cartilages. *Exhibited 17th of May*, 1859.

Printed by J. W. ROCHE, 5, Kirby Street, Hatton Garden.