sence in the blood and necessarily also in the various tissues, of elements coming from the internal secretion of all parts; it is not surprising, therefore, to find that any organ can give a liquid which might in a measure be used in place of any other. 5. When we know how great, how various are the morbid, physical, or dynamic alterations the nervous system can produce, it is easy to understand that what it can do in one way it can also do in just the opposite way, so as to re-establish the normal state physically and dynamically. This may serve to explain the extreme variety of favourable effects that may be due to certain liquids which increase considerably (as is proved) the power of action of the cerebro-spinal centres.

CLINICAL LECTURE ON THREE CASES OF MULTIPLE PARALYSIS OF CRANIAL NERVES.

Delivered in University College Hospital.

By H. CHARLTON BASTIAN, M.D., F.R.C.P., F.R.S.,
Physician to the Hospital, and to the National Hospital for the Paralysed
and Epileptic.

(Concluded from page 1161.)

THE next case to which I shall refer is that of a patient who was in the hospital about six years since. Although fewer cranial nerves were involved, the case presented many characters very similar to that which has just been considered.

W. K., aged 41, railway porter, was admitted into University College Hospital under my care on June 8th, 1887. (House-Physician, H. P. Dean, M.B.)

History.—About twelve months ago the patient began to suffer from pain in the head and neck, which commenced about the mastoid region. In two or three days it extended up to the vertex, and gradually spread to the frontal and occipital regions. The pain in the head was unilateral, and confined to the right side, but in the neck it was bilateral; it was of a dull, aching character, generally worse at night, and was accompanied by buzzing in the right ear, and imaginary objects floating in front of the right eye. The pain was the same when the patient was in the erect or in the lying position. There was no pain in the face. Not long after the pain had commenced—the patient thinks about four or five months—he found he was becoming somewhat deaf, especially in the right ear; not only were sounds duller than natural, but their quality and pitch seemed to be perverted. About ten months ago he noticed he could not speak so distinctly as he did, and this has gradually got worse up to the present time. Between three and four months ago the patient noticed that he was losing the sense of taste, but it was never completely lost. It seems better now than it was three weeks ago. Next in order came certain eye symptoms. This was about ten weeks ago, in March, 1887. First there was a glueing of the right eyelids together in the morning; and soon he noticed that on looking at objects with both eyes there was double vision. He has recently found that his legs are very weak, and they frequently feel as though they would give way under him. Patient is not aware of having received a blow or injury of any kind to the head. His family history and previous history are good. No history of syphilis can be obtained.

Present State.—The patient is a tall well-built man. He is at present very weak, and has difficulty in walking. On each side of the sagittal suture over the posterior parietal region the bones are considerably thickened. There are no swellings to be found in any other parts of the cranium. On the right side of the neck, by the posterior part of the sterno-mastoid, an enlarged lymphatic gland can be felt, about the size and shape of a filbert. No enlarged glands are to be felt in other regions of the body. The patient complains of an aching pain across both maxillary regions, and of a similar pain, sometimes of a shooting character, reaching from the nasal bones in front around the right side of the cranium to the back of the neck. He also complains of a pulsating noise in the right ear, which is sometimes of a whistling or thumping character. These noises are stopped by pressing the carotid. He has never noticed any noises in the left ear. The pain of which the patient complains keeps him awake at night, and is sometimes so severe that he holds his head with his hands. Before admission he sometimes felt giddy, but never fell. Patient's speech is very indistinct, thick, and slow, but he says it was formerly very clear, and that he could sing tolerably well.

Cranial Nerves.—1st. Sense of smell good. 2nd. Patient cannot read an ordinary newspaper with both eyes together, but can read with either by itself. Distant vision fairly good. Both optic discs are distinctly redder than natural, though their edges are quite distinct. 2nd, 4th, and 6th. On looking to the right, the patient's right eye can only be moved a little beyond the position of rest. On looking at near objects there is slight internal squint of the right eye. Pupils are moderately contracted, and react to light and accommodation. 5th. The sensation over face and movements of jaw natural. 7th. No facial paralysis on either side. 8th. Patient can only hear the ticking of a watch when it is placed within half an inch of either ear. 9th. On the anterior two-thirds of the tongue the patient cannot appreciate the difference between syrup, peppermint, or salt, but can recognise an acid (the dilute hydrochloric acid of the *Phar-*

macopota); but when this is diluted with one-half its quantity of water, he fails to recognise it. Over the posterior part of the tongue and palate he can distinguish all these substances easily [? right half of the tongue only referred to]. 10th. There is some difficulty in swallowing. Voice thick and hoarse [no record of laryngoscopic examination here, but see note of June 28th]. The left half of the palate is considerably higher than the right; on telling the patient to say "Ah!" the uvula is moved towards the left, and the left side of the soft palate moves more than the right. No vomiting. Appetite good. 11th. Sterno-mastoid and trapezius act well on both sides. 12th. The right side of the tongue is considerably smaller than the left, and presents a wrinkled and shrunken appearance. The tongue, when protruded, is pushed towards the right side. On the right side the muscles of the tongue contract to faradism much less than they do on the left side.

There is no peculiarity in the patient's walk except what may be due to weakness of the legs. Grip, R. 85, L. 75. Sensation normal on both sides of the body. All the organs of the abdomen and chest seem to be healthy.

This patient remained in the hospital just over three months, when death occurred. The symptoms gradually increased. The pain remained very severe, though varying from time to time. Relief could only be obtained by injections of morphine, after other drugs had been tried without success. The pains were almost always worse on the right side, and often in the occipital region. The subsequent development of symptoms and the course of the patient's malady may be gathered from the following extracts from the notes.

June 22nd. Great difficulty now in swallowing. Grip, R. 100, L. 96.

June 28th. Worse as regards speech and swallowing; also more paresis of right sixth. More pain, and the gland in the neck enlarged. Larynx examined, and vocal cords found to move naturally.

June 30th. This morning his taste was tested again. On the anterior two-thirds of the tongue, after it had been carefully dried, there was complete loss of taste of syrup, quinine, and dilute hydrochloric acid; also when the tongue remained moist there was the same loss. Taste is more impaired at the back of the tongue than formerly. It takes the patient some time to recognise the taste of the acid and quinine, and he completely fails to recognise the syrup. The left side of the tongue now seems more shrunken, and it is pushed, when protruded, less to the left side than it was formerly.

July 3rd. Yesterday afternoon when patient was in the yard he felt a numb feeling in his right hand, and this hand also became weaker than the left. On arriving in the ward the grip was found to be R. 20, and L. 60. Pain in the head and neck has been much better during the last two days.

July 5th. Patient's throat was examined with the laryngoscope. The vocal cords move easily but very feebly. He cannot now move his eyes outwards from the position of rest, on either side. His tongue is protruded more in the middle line than formerly. Grip, R. 60, L. 95.

July 11th. Patient complains of stiffness in opening his jaws. The right side of the tongue remains in about the same condition, but the fibrillary twitchings are more marked; on the left side the muscular wasting is more marked, and there are also slight twitchings. The uvula is slightly deflected to the left side, and the arches of the soft palate scarcely move at all, though more on the left side than on the right. Knee-jerks cannot be obtained on either side. Plantar reflexes somewhat exaggerated; no ankle clonus. Right grip 80, left 97.

July 14th. Since yesterday the patient has been in a great deal of pain. This morning a digital examination of the whole pharynx was made, and on its posterior wall, just above the level of the soft palate a swelling was felt. The surface of this was rather soft and uneven, but it felt firmer internally. It was situated in the middle line, and seemed to extend equally on either side. Its shape was oval, with the long diameter transversely. The gland in the neck was larger, and tender as before. Grip, R. 90, L. 95.

August 4th. Behind and below the ramus of the jaw on the right side there is a diffuse infiltration easily to be felt, both from the pharynx and from without.

August 11th. Patient continues to be in the same pain, only relieved by morphine. The atrophy of tongue continues to increase; the glands in the neck to enlarge, and they are now much more painful and less movable than before. The indurated mass beneath the jaw is better marked, and the whole of the soft palate is pushed more forward than it was a week ago.

August 27th. Patient continues slowly to get worse. He has two hypodermic injections of morphine a day (m and mii), which slightly alleviate the pain. He talks, sings, and shouts in his sleep when under the influence of morphine. The right optic disc is very red and swollen; the edge is not definable, and the veins are large and tortuous. The left disc is red but the edge is definable.

September 5th. Patient has had some diarrhoea for the last three days. His tongue is covered with a thick brown fur. In showing his teeth the facial muscles act well, and the naso-labial folds are equal.

September 10th. Patient has wasted very much since the last note. There are no additional paralytic symptoms, but the diarrhoea has continued and cannot be stopped by medicines or by opium suppositories.

September 11th. Patient remained perfectly clear in his mind, but died at 5.30 this morning.

Necropsy, thirty-one hours after death.—Emaciation well marked. Heart, lungs, and pleurae normal, except for a small patch of pneumonia about the size of a walnut, and one small nodule looking like old tubercle. Nothing abnormal about the abdominal viscera.

Brain.—On removing the calvaria the brain was found to be rather smaller than usual. The parietal bones were thickened along their line of junction posteriorly. On removing the brain it came out easily until the region of the pons was reached, when some very delicate fibrous tissue seemed to attach the brain to the base of the skull. When it was completely removed, a large nodular mass could be seen projecting from the basilar process of the occipital bone. This was covered by a thin capsule of connective tissue, and was of a pinkish colour, contrasting notably with the white dura mater. The tumour extended upward as far as the middle of the body of the sphenoid and downwards nearly as far as the foramen magnum. Laterally it extended to the junction of the temporal bone with the body of the sphenoid and the occipital bone, encroaching more on the right side than on the left.

The second, third, and fourth nerves did not appear to be pressed on or involved by the tumour. The fifth was separated from the edge of the tumour by a just perceptible interval on the right side, but on the left side the edge of the tumour was in contact with the nerve. Both sixth nerves were buried in the substance of the tumour. The seventh and eighth nerves were separated from the tumour by a quarter of an inch; the ninth, tenth, and eleventh nerves were separated from the tumour by about a quarter of an inch on the left side, but on the right side the tumour was touching the nerves. The twelfth nerve on the right side was buried in the tumour, but on the left side the edge of the tumour only was in contact with the nerve. The left cavernous sinus seemed of normal size, but the right was distinctly bulged, and on the surface of the dura mater covering it were several nodules about the size of a split pea. The tumour which had been felt in the pharynx during life was found to be in connection with the tumour above described (the dimensions of which are unfortunately not given). Microscopical examination showed the growth to be a sarcoma.

The pons Varolii was very much flattened in its antero-posterior diameter, especially on the right side, where the mass of the tumour was greatest. The medulla oblongata was also flattened. The brain otherwise presented no change worth mentioning.

The enlarged gland in the neck, described during life, was found to have become resolved into a mass of dark, coffee-like fluid.

In some of its principal features this case resembled the last. The disease occurred in a man of just the same age, and also independently of any cause that could be ascertained. There was a similar constant, widely diffused, but very severe headache, unassociated with sickness, with optic neuritis, and with any definite one-sided paralysis. It is true that when the disease was far advanced, on July 3rd, about two months before the patient's death, he became very distinctly paretic in the right arm; and about two weeks before his death (August 27th) some changes were noted in the optic discs which seemed to indicate a commencement of optic neuritis; but then the *post-mortem* examination showed that there was a cause for these differences, seeing that the growth in the base of the skull had ultimately formed an actual tumour, projecting from the occipital bone and pressing against the pons and bulb. Although the weakness in the right arm beginning at the time mentioned was partly recovered from, yet, to a lesser extent, it persisted to the end.

There was in this case a definite history of deafness, more marked on the right side, coming on after the commencement of the illness, and associated with persistent subjective noises of various kinds, still no implication of the eighth nerve was found on either side. It seems possible that the patient was previously deaf on the left side, and that this defect only began to be noticed when the hearing of the right side also failed, and he commenced to suffer from tinnitus. Both these conditions may have resulted from an extension of the growth from the occipital into the right petrous portion of the temporal bone. The last case showed well to what an extent these growths may spread so as to infiltrate adjacent parts.

There is also considerable difficulty in accounting for the

impairment of taste which the clinical examination showed to be undoubtedly present in the anterior two-thirds of the tongue, and, to a lesser extent, in the posterior third. There was certainly no affection of the intracranial root of the seventh or fifth nerves on the right side, by means of one or the other of which the gustatory fibres of the chorda tympani usually reach the brain,¹ and we could scarcely imagine that the chorda tympani had been involved by the growth in the temporal bone without a simultaneous involvement of the facial nerve. We are thus driven to suppose the existence in this case of some other variation in the course of the gustatory fibres to the brain, and that they might perhaps have been contained in the root of the glosso-pharyngeal itself, which was shown to be slightly affected on the right side.

No secondary nodules of new growth were found in other parts of the body, though we may suppose that the enlarged gland in the neck had been affected in this manner, and that the growth had subsequently undergone a process of softening similar to that which had caused the production of a pseudo-cyst in the previous case, in the part of the growth involving the parotid.

The nerves affected in this case were not nearly so numerous as in the last. The sixth and the twelfth nerves on each side were those that were principally affected; whilst, to a lesser extent, the right glosso-pharyngeal and the right spinal accessory were also involved. In addition there was a possible implication of the right eighth in the temporal bone itself. There was no evidence that the pneumogastric proper was affected, on either side, to any very appreciable extent. This patient's temperature was mostly normal; at no time was it higher than 99.5°, and, during the last few days, whilst he was suffering from the diarrhoea, which was one of the immediate causes of his death, it remained subnormal.

The last case to which I have to call your attention was altogether more chronic in its course, and the malady was due, I think, to a rather different pathological cause. The notes of this case were taken by a former house-physician at the hospital in Queen Square, who is now a distinguished neurologist.

R. H., aged 42, ostler, was admitted to the National Hospital for the Paralyzed and Epileptic under my care May 27th, 1873.

History.—(As the patient could only hear and speak imperfectly, it was very difficult to obtain his history.) Health up to last spring perfectly good. He seems to have had a sore on the penis in April, 1872; subsequently he had much headache on the left side, at first behind the ear, and then more generally over left side of the head. In July paralysis of the left side of the face came on, and he could not shut the eye. This lasted for about a month, and then improved somewhat. About October the right side of face became affected, and his lower lip dropped, as it is now. Then he lost hearing, first becoming deaf suddenly in the left ear in one night, and in the right ear about three weeks after. The onset of deafness in the right ear was less sudden, and occupied a day or two. The tongue became powerless about the same time. Power and sensibility of limbs were always intact. During the last few months he has had, as he has now, some subjective sensations of noises in the ears.

Present State.—Mind seems unaffected. The cranial nerves: 1st. Sensation of smell fairly good. 2nd. Reads the smallest type with each eye. Optic discs healthy. 3rd, 4th, and 6th. Ocular movements seem free and regular in all directions. There is no history of any diplopia. 5th. Sensibility of face seems normal. Masseters contract with equal force. 8th. Face seems absolutely paralysed on each side. Features expressionless. Forehead smooth, lower lip everted and hanging down so that the whole of the inner surface of the lip is visible. (Fig. 4. See BRITISH MEDICAL JOURNAL, June 3rd, opposite page 1148). The eversion is a little greater on the right than on the left side. No voluntary attempt produces the least visible movement in the face, nor does any emotion. When he attempts to close the eyes the balls are rolled up under the upper lid, but there is no flicker of contraction in the orbicularis. The facial muscles contract readily to a weak battery current. The labial sphincter to six cells of Störner's constant battery. No contraction can be obtained to faradism. Irritability of nerve trunk lost entirely both to faradism and galvanism as strong as he can bear them. 8th. He cannot hear any spoken sounds, but is sensible to the occurrence of a very loud noise, as the falling of a coal scuttle. The sounds of a piano he cannot hear, save when several of the lower notes are struck together. He has a subjective sensation of a continuous noise like a railway train, constant in the erect position but ceasing when he lies down. 9th, 10th, and 11th. The arches of the palate hang flat, the left a little lower. The palate can be raised, but then the base is drawn a little to the left; the right arch also becomes very obviously higher than the left. The larynx was examined by the late Sir Morell Mackenzie, who found the abductors of the vocal cords paralysed on both sides, but the right much more so than the left. Articulation very imperfect, still he manages to speak intelligibly in a guttural voice, pushing up the lower lip for the labials. Sensibility of the larynx is also diminished. To touch and prick it is fairly good on the tongue. Touches are also felt on the palate, but they excite no reflex movement, though some such movements are caused by a prolonged laryngeal examination. Taste is very much impaired. Quinine is not appreciated at all. Sugar, after a long time, is said to be "saltish."

¹ See *Paralyses, Cerebral, Bulbar, and Spinal*, 1886, pp. 440 and 447.

and citric acid, after some time, "saltish." The trapezius on the right side is much wasted, so that the right shoulder is considerably lower than the left, and the right supraspinous fossa of the scapula is flatter than the left. The right sterno-mastoid is also smaller than on the opposite side. There is no deviation of the head.

This patient was subsequently admitted here under my care on March 10th, 1874, whilst I was in charge of the wards of Dr. Russell Reynolds. His condition was then found to be substantially the same, and it underwent very little variation during several subsequent years, during which I saw him from time to time. I have been reminded by Dr. Dawson Williams that he came to my wards to see me as late as the first half of 1880, but whether I have ever seen him since I am unable to say.

Here again no definite cause could be assigned for the patient's malady. It is true there was a doubtful venereal history, but only separated by a period of three or four months from the time when the paralyzes of the cranial nerves commenced, rather than by an interval of some years as is usually the case with such lesions. And although the patient was submitted to a long course of treatment with large doses of iodide of potassium together with liquor hydrargyri perchloridi no appreciable benefit was produced. The absence of pain is a point in which this case differs notably from the two others, and another difference is to be found in the long stationary condition and duration of the disease. It agreed with the others, however, in the absence of limb paralysis, of optic neuritis, and of vomiting. I believed this patient's malady to be due, therefore, not to an ordinary new growth, but rather to a chronic thickening of the dura mater over the basilar portion of the occipital and the contiguous borders of the temporal bones. You will recollect how close together the apertures are situated through which the cranial nerves from the seventh to twelfth inclusive pass, on each side of the base of the skull, and consequently how easily they might all be more or less affected by some limited pathological process involving the bones or their covering in this region. I think, therefore, if we had had an opportunity of making an examination that we should have found either a simple pachymeningitis, or else perhaps some localised hyperostosis, which compressed these nerve roots at their points of exit from the skull, in the region indicated.

Taste was very distinctly impaired in this case, and as the roots of the fifth nerves were not affected, we may imagine that the gustatory fibres of the chorda tympani were contained in the nerves of Wrisberg, which go to the brain with the roots of the facial nerves, and subsequently join the glosso-pharyngeal nuclei.

It only remains for me to add a few words in conclusion concerning the diagnosis of such cases as we have just been considering, in which multiple paralyzes of cranial nerves is caused by some disease of the base of the skull itself. We may expect to find in them evidence of a unilateral or other limitation of the lesion (such as occurred in the first and third cases); an absence of paralysis of limbs, of fits, of optic neuritis, and possibly of vomiting; although pain in the head may be severe, continuous, and widespread in seat. In addition to this combination of characters, already sufficiently distinct from those of tumour of the brain, we may have the absence of syphilis or any other assignable cause, and the possible presence, after a time, of a growth in the posterior part of the pharynx, or some other of the structures in connection with the mouth.

There is little likelihood of cases of multiple paralysis of cranial nerves due to peripheral neuritis being confounded with those occasioned by disease of the base of the skull, because in all the former class of cases there would be the coexistence of more or less paralysis of limbs (probably on both sides of the body), and there would, in the majority of cases, be the history also of some acute specific disease, of some alcoholic or other poisoning, or of some exposure to cold, as more or less immediate precursors.

Unfortunately the prognosis, and the chance of doing any lasting good by remedial or other treatment in these cases, is about as bad as it could well be. We must, for the most part, be content to endeavour to alleviate the patient's sufferings as far as possible, to procure sleep, and to stave off the tendency to death which may present itself in various ways. The actual duration of the malady may vary considerably in different cases.

FURTHER OBSERVATIONS ON "NECROSING ETHMOIDITIS."

By ED. WOAKES, M.D. LOND.,

Senior Aural Surgeon and Lecturer on Diseases of the Ear at the London Hospital.

RECENT discussion on this subject has disclosed so much confusion of ideas as to seem to demand a restatement of the case, in the course of which I shall refer to some of the criticisms which have found utterance regarding the condition referred to in the title of this paper.

Quite at the commencement of the past decade I had adopted the custom of examining the nose in almost every patient coming under my observation at the Throat Hospital. Many of them were very chronic cases, among which post-nasal catarrhs formed a large contingent. In some of these I found enlargement of the middle turbinated bodies, the behaviour of which, as watched week after week, attracted my earnest attention. Thus some, after attaining the size of a date stone, appeared to remain stationary, while others became much larger, so as to come to occupy all the space between the septum and the outer wall of the nose. In several of the latter a fissure was observed to form, in the course of time, in some part of the presenting aspect of the spongy process; and through this fissure what seemed like granulations were subsequently seen to project. Upon exploring the cleft with a probe bare and rough bone was felt in certain cases. Recognising here a morbid condition quite new to myself, I removed with a snare several of the larger of these masses, and placed them in spirit, submitting them later for microscopical examination to Mr. Thurston, then Pathologist to King's College Hospital.

It is to be noted that no treatment had been carried out in these cases beyond that of the use of an alkaline lotion. Chromic acid had not then come into vogue in nasal surgery—at any rate, it was quite unknown to me at that time for this purpose; so that whatever was discovered by Mr. Thurston in the specimens he examined could not have been brought about by this reagent, nor indeed by any manipulation on my part. Mr. Thurston's report on these specimens, together with his drawings, was laid before the Medical Society in 1885, and was afterwards published in the *Lancet* of that year.¹

A careful study of the structural changes brought to light by this investigation, taken in conjunction with the clinical appearances and the course of these cases, had impressed me with the belief that the essential character of the pathological changes in progress during the early stages of the disease was that of a hyperplasia and fibrosis of the soft parts; that this hyperplastic and fibrosing process led in the natural course, on the one hand to the development of myxomatous overgrowth, and on the other hand to the invasion with irregular absorption and consequent disintegration of the delicate subjacent bony layer, which was observed to break up into small detached fragments; and that this necrobiotic change was reinforced and accelerated by concomitant thickening of the coats of the arteries, causing narrowing or ultimate obliteration of their lumen, thereby starving the tissues by cutting off their blood supply.

Actuated by this belief, I conceived it my duty to remove these masses as soon as the existence of the above-mentioned changes could be ascertained, with the view of obviating the morbid developments which had been observed eventually to result from them.

I desire here to draw attention to the fact, in the cases referred to as amongst the first observed by me, that when exploring with a probe the cleft above described in the middle turbinated body the instrument was allowed to take its own course through the fissure, and that it thus found its way upwards and outwards towards the outer wall of the nose, to a point corresponding with the continuity of the spongy process with this wall. It was exactly at or near this spot where communication with the ethmoidal cells is most free, that necrosis was found. This fact has been insisted upon by me from the first; and in the directions given for the detection of necrosis,² it is stated that the probe should be passed—

¹ *Lancet*, July 18th and 25th, 1885.

² *Nasal Polypus, etc., in Relation to Ethmoiditis*, page 13.