THE LUMLEIAN LECTURES ON THE PATHOLOGICAL RELATIONS OF THE VOICE AND SPEECH.

Delivered at the Royal College of Physicians of London.

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LECTURE III.

MR. PRESIDENT AND GENTLEMEN,—I propose in to-day's lecture to confine my attention to those affections of speech which are dependent on lesions of the higher nerve-centres—affections which are commonly included under the term "aphasia". I need not repeat the well-known story of how Gall first localised the faculty of speech in the anterior cerebral lobes; how MM. Dax, father and son, demonstrated, as the result of long-continued observation, that disturbances of speech occurred mainly, if not wholly, in dependence on lesions of the left cerebral hemisphere; how M. Broca, at a later period, identified the posterior part of the left third frontal convolution, together with, perhaps, a portion of the adjoining second frontal convolution, as the special centre for articulate speech. Yet notwithstanding the remarkable observations on which the last conclusion was based, and the rapid accumulation of facts which, on the whole, tended strongly to confirm its truth, many distinguished physicians, having regard to the important exceptions which occasionally presented themselves, and from a disinclination to believe in the localisation of cerebral functions, hesitated for a time to accept it. But this localisation, to which many pathological as well as physiological considerations had long pointed—on which Hughlings Jackson had especially insisted, and which Bastian and Broadbent had assumed in their writings on aphasia—has, during the last few years, been established beyond the possibility of doubt by the experimental researches of Fritz and Hitzig, and of Ferrier; and some, at any rate, of the apparent exceptions have been in the case of left-handed persons, in whom we have reason to believe that the functional importance of the cerebral hemispheres, as well as that of the limbs, is transposed. There are few, therefore, now who, in the main, do not acquiesce in Broca's generalisation, that the posterior part of the left third convolution, together with some neighbouring tracts, is the special centre for the expression of the thoughts in language; and who do not also accept his explanation, that the predominance of the left side of the brain over the other side is connected with the predominant use of the right arm and leg, and is due to a special aptitude of the left hemisphere to take the lead in self-education, in determining actions requiring special skill, and in the higher mental operations.

Broca did not regard the spot here indicated as the intellectual centre of speech, but as the supreme centre for the motor processes of speech; as the agent of the mind for the automatic expression of the thoughts in articulate language and in writing—a view which Hughlings Jackson adopts when he speaks of it as being "the way out" for speech. Apart from the pathological consequences of disease of this area, there are several considerations tending to establish the truth of Broca's inference. One is the discovery that, in the case of many of the lower animals, experimental injury of the posterior part of the third frontal, and the lower part of the ascending frontal, convolution on one side, causes, according to its character, paralysis or spasm of the opposite side of the tongue and lips—a fact which implies direct connection through the motor tract between this particular part of the brain and the muscles which are concerned in articulation. Another is the anatomical fact, that all that region of the cerebral surface which is anterior to the fissure of Rolando, together with the ascending parietal gyrus situated behind that fissure, and therefore Broca's convolution, is especially connected with that part of the corona radiata which springs from the corpus striatum, and the portion of the internal capsule derived from the crusta of the crus cerebri—in other words, with the motor tract. Moreover, this region, as M. Betz has shown, is characterised by the presence of giant-cells, like those which distinguish the anterior or motor horns of the grey matter of the cord.

If, then, Broca's convolution is to be regarded simply as the centre for

the motor processes of speech, it is clear that it forms part only of the cerebral mechanism concerned in speech. Bastian, in his article before referred to, published ten years ago, insists with great clearness that there are in the cerebral surface perceptive centres. "It seems almost certain", he says, "that impressions from the organs of sense to the perceptive centres in the cerebral hemispheres travel along different routes, although we may be more or less ignorant as to what these routes are, and also as to the extent and situation occupied in the cerebral hemispheres by the several perceptive centres."

He goes on to say: "We may be sure that such centres are in connection with afferent fibres, bringing them into connection with ganglionic masses, existing nearer the base of the brain and the medulla oblongata; that upon these lower ganglionic masses sensory impressions travelling along their respective masses impinge; and that each thus undergoes that first modification of the series which is to convert the primary stimulus into a distinct perception, after the final action of the cells of the cortical substance in the corresponding perceptive centre." And the view which he expresses is, that spoken words caught up by the ear are carried, as acoustic impressions, by a definite route to a supreme acoustic centre, where they become perceptions, and are stored up in memory, ready to be revived during thought, and to be translated into articulate speech, through the agency of the commissural fibres leading from the acoustic centre downwards to the corpus striatum, which he seems to regard as the co-ordinating centre for the motor processes of speech; but that, while written words striking the eye are similarly conveyed to a superior visual centre, there to be converted into visual perceptions capable of revival in thought, writing is effected primarily by the revival of the auditory impressions of words, which then automatically revive the visual impressions of the letters composing words, and thus evoke, by means of the corpus striatum, the muscular co-ordinations involved in writing. It may be added, that he assumes that there is a free intercommunication of fibres between the perceptive centres and all others; and that, adopting Herbert Spencer's views, he regards the power of naming as being dependent on the integrity of the memory and the capability of performing the simplest acts of inference, and its loss, therefore, as apparently the consequence of a general weakening or failure of the intellect, rather than of any lesion occupying a definite seat. Broadbent, in a very ingenious paper, read three years later, adopts Bastian's views with some modification. He assumes, with Bastian, that there are distinct perceptive centres in the convoluted surface of the brain connected with each of the special senses, in which the impressions received from the organs of sense become perceptions. He assumes that the perceptive centres of audition occupy the marginal convolutions of each hemisphere, and that words are revived in these as remembered sounds; and that the outlet for "intellectual expression in spoken words", or the supreme centre for the motor processes of speech, is situated (where Broca places it) in the posterior third of the third frontal gyrus, the cell-groups for spoken words being placed in the corpora striata. He assumes, further, that in simple parrot-like repetition or speech, the auditory perceptions or remembered sounds originate in the ordinary perceptive centre a stimulus, which acts directly on those groups of motor cells in the corpus striatum which co-operate in the production of the corresponding articulate movements. He also maintains that the perceptive centres have only a subordinate mental function; that in them the perceptive acts are rudimentary only; that they take cognisance merely of those attributes of objects which affect the particular sensory nerves which are in relation with them, and of the causes which underlie them; and that there is some higher centre still with which all the perceptive centres are in relation, in which are combined the perceptions of the several perceptive centres, and in which a conception or idea of an object as a whole is obtained. This also he regards as the naming centre; and he holds that speech, as an intellectual function, takes its start, not from the perceptive centre, but from this higher ideational centre, operating through Broca's convolution (which determines the exact combinations of words in which ideas are to be clothed) on the appropriate cell-clusters in the corpus striatum, which, by influencing the subordinate nerve-nuclei, call forth the combined movements on which articulate language depends. Broadbent, without discussing the matter at any length, indicates also that other perceptive centres—notably that connected with vision—have similar relations with that of hearing to the ideational centre, and somewhat similar relations with it to language, at any rate written language. The practical differences, therefore, between these writers seem to me to be that, whereas Bastian assumes the presence of perceptive centres, in which verbal impressions are received and revived in thought, and which in all cases, so to speak, play directly on the keys for verbal enunciation situated in the corpus striatum, Broadbent assumes that the processes which Bastian enumerates and the routes which he indicates belong solely to words as acoustic impressions and reflex motor coordina-

tions; and that, for language as an intellectual function, there is a higher centre, to which all the perceptive centres converge, and from which, when wishing to express our thoughts in language, impulses proceed, first, to Broca's convolution (which in the former case is avoided), where the suitable selection of words is made, and thence to the corpus striatum, where, as also is the case with simple reflex speech, the cell-groups which represent articulate sounds and words are called into action. The difference, however, is hardly so great as it seems, except in the clear recognition by Broadbent of the linguistic importance of Broca's convolution; for Bastian assumes the presence of some higher mental powers than those which he discusses, and which are concerned in naming and remembering, but he regards them as functions of the general intellect, and does not venture to localise them.

The above views were formulated before the experimental researches of our distinguished colleague Dr. Ferrier, and those of his foreign fellow-workers, had determined the existence in the surface of the hemispheres of specific areas connected severally with specific groups of motor processes and the different sense-organs. These researches give a special value to the older speculations; and, while they help to correct them, they help also to substantiate them. As we have already shown, Dr. Ferrier, by a happy coincidence, places his centres for the special movements of the tongue and lips as nearly as possible in the posterior part of the third frontal convolutions. Immediately above and behind them, he recognises centres for the elevation, depression, and retraction of the mouth; and closely adjoining these—namely, in the ascending parietal convolutions—are the areas connected with specific movements of the hand and wrist. Thus, according to this gentleman, we have a group of centres comprised within a comparatively small area, which would seem to have some specific relation with those movements of the organs of articulation and of the organs concerned in writing, which are determined by mental operations. Again, Dr. Ferrier shows that the perceptive visual centre, the centre connected with the upward termination of the visual tract, occupies the whole extent of the supramarginal convolution and the pli courbe, and that the perceptive acoustic centre to which auditory impressions are directly conveyed, corresponds to the whole length of the first temporo-sphenoidal convolution. It is an important anatomical fact, that all the above motor areas are comprised within that part of the brain-surface which has a special relation to the motor region of the corona radiata, and that all the sensory areas occupy that portion of the brain-surface which is similarly related to the upward extension of the sensory tract. It is also an important fact, that these several motor and sensory areas are nearly continuous, and therefore so placed as to admit of easy intercommunication, and that they are all included in the district supplied by the middle cerebral artery, and consequently are liable to common implication when that vessel is obstructed. I do not claim to be in any degree a metaphysician; and I have no personal speculations of any value elucidative of the subject under discussion to place before you for your guidance or your consideration; but I am bound to say that, recognising as I do that various recent investigations, starting from different points and conducted in different lines, unite in demonstrating the localisation of cerebral functions—and especially that the posterior and lower part of the cerebrum, which is directly connected through the optic thalami and the posterior part of the internal capsules with the sensory region of the cord, is itself the supreme centre of perception, comprising within itself the perceptive centres belonging to the several organs of sense; that the anterior and upper part of the cerebrum, which is mainly in relation through the corpora striata and anterior portions of the internal capsules with the motor region of the cord, is the supreme centre for the co-ordination of those movements which are directed by the mind, and includes within itself subordinate centres which have specific motor functions; and that thus, just as the sensory and motor tracts of the cord are in horizontal connection with one another, so that afferent impressions made upon the former are translated to the latter as motor impulses, and just as the optic thalamus and corresponding corpus striatum present similar mutual relations, so there is reason to believe that impressions made in the sensory areas of the brain evoke, through the corresponding motor areas, special combinations of movements—I am, I repeat, bound to say that I recognise, if not literally, at any rate essentially, some such localisation of the several processes of speech as is represented in the diagram. Without binding myself to accept it in detail, I am inclined to think that this diagram, which is furnished by Kussmaul in his article on Disturbances of Speech in von Ziemssen's *Cyclopaedia*, fairly represents the conclusions that may be accepted provisionally in regard to the arrangement and connections of the areas concerned in speech. He assumes, as will be seen, a sensory centre for acoustic word-images, and a similar centre for optical word-images, which are probably, as we have shown, the first temporo-sphenoidal gyrus and the supramarginal convolution with the pli courbe

respectively; he also assumes a motor centre for the co-ordination of sound-movements into spoken words, and one for that of strokes produced in writing into written words, which would seem to be situated in or near the third frontal convolution; and he further assumes, with Dr. Broadbent, a higher ideational centre where articulate sounds and the visual images of objects blend, where ideas are formed, and whence impulses to express one's self in language, whether by the mouth or by the hand or in any other way, emerge. And he considers that mere imitative speech is effected directly through the conjoint agency of the acoustic centre and the centre for the speech-movements of the lips and tongue, or indirectly in written characters through the acoustic centre and the centre for expression in writing, or directly in written characters through the conjoint agency of the visual centre and the centre for expression in writing, or indirectly in spoken language through the visual centre and that for speech-movements. And, further, he considers that spoken or written speech, as an intellectual operation, is evoked in the ideational centre by the action of the perceptive centres or by the ideas which originate within itself, and that it becomes expressed through the agency of one or other of the co-ordinating centres for word-movements.

The main points of this scheme on which I am disposed to be critical are: first, that I do not recognise the need for assuming that the ideational centre in evoking word-movements should have to act upon the motor centre through the perceptive centre, unless, indeed (as it probably should be), this ideational centre be regarded as merely the diagrammatic differentiation of a special cerebral function which has no exclusive anatomical seat; secondly, that it seems to me that the diagram ought to have attached to it subordinate co-ordinating centres—namely, on the motor side the corpus striatum, and on the sensory side the optic thalamus; and, thirdly, that the diagram represents the arrangements of only one side of the brain. It is obvious, indeed (a point of which Dr. Broadbent has not been forgetful), both on anatomical and on physiological grounds, and judging from the effects of the destruction of the organs of sense, that the perceptive centres of one side of the brain have little or no preponderance in importance over those of the other side of the brain; and that they differ therefore in this respect from the supreme motor centres, and probably also from the ideational centres connected with them, which, so far as speech is concerned, are potent on the left side, but remain in functional abeyance on the right. Thus, consequently, while words seen or heard with either eye or either ear are perceived in their respective perceptive centres; they not improbably, in any case, evoke distinct ideas only when they are taken cognisance of in the left side of the brain, and, as a general rule, only evoke spoken or written language when they act on the special motor organs through the motor centres of this side. And, as regards the subordinate centres—namely, the corpora striata and the optic thalami—I am inclined to think, with Dr. Broadbent, that the motor groups for literal sounds, and probably also those for the mechanical details of writing, are placed in the former ganglia; while, on analogical grounds, I think, with Bastian, that subordinate sensory co-ordinations take place in the optic thalami.

It is at any rate not difficult, with the aid of some such plan, to explain many of the clinical phenomena presented by aphasic persons. Thus, it is conceivable that if the auditory perceptive centres be implicated, or their connections with the ideational centre divided, the patient would, as Dr. Broadbent urges, fail to understand the meanings of words which he hears and probably of those which he utters; that if the visual perceptive centres be affected, or their communications with the ideational centre cut off, the patient would fail to understand written language, and probably lose the power of writing; that if the left corpus striatum or the fibres between this and Broca's convolution be destroyed, there would be at least temporary loss of power of uttering articulate sounds; that if Broca's convolution be injured, the power of vocal utterance, and probably also that of expression in writing, would be impaired or lost; and that if the ideational centre be the seat of lesion, the patient would be no longer able to recall words or perform many of the higher mental operations connected with language. By means of such a plan again, it is easy to understand how persons who have lost the power of recalling names may yet be able to repeat words dictated to them, and how persons who have lost the art of writing to dictation, or spontaneously, are yet sometimes able, not only to write a copy, but to translate printed words into their writing equivalents. It is evident, however, that the close neighbourhood of the several centres above referred to, their intimate and complex relations with one another by nerve-fibres, the association with the predominant side of the brain of the other side, which probably co-operates with it, though feebly and uncertainly, and the fact that the affections of the brain implicating speech, though generally paralytic, are sometimes irritative, collectively render it very improbable that we shall often meet with typical cases of

very simple disorders of speech. Cases that come before us are almost always complicated, and yet the grouping of the phenomena they display is often curious and suggestive.

It seems to me probable that there is an important difference between the co-ordination of the organs of articulation for speech and that of the hand for writing. In the former case, the different positions which the organs assume are determined, even from the beginning, neither by sight nor by touch, but simply by the nature of the sounds evolved as recognised by the ear; and it is likely, therefore, that if the special groups of cells for the co-ordination of the necessary movements fail to act, the patient may lose absolutely, at least for a time, the power of articulate language, even though he retain the use of his tongue for other purposes. In the latter case, although not improbably a similar series of co-ordinations is developed in the process of learning to write, and may conceivably be destroyed by disease, it is clear that so long as the patient retains the general use of his hands, he may still, under the guidance of sight and touch, be able to copy what is set before him, or, if he remember the forms of letters, to reproduce them in their proper shapes. Of course, it would be different if the supreme centres for the combined movements of writing were the seat of disease.

From this, I fear, tedious and somewhat barren disquisition, I proceed to narrate several cases which have been under my care, and which illustrate, in a greater or less degree, some of the physiological points that have been under consideration.

The first case I shall cite is one that I have already published; it is of great rarity, and to me it was of much interest. It is that of a Canadian, thirty-six years of age, who was steward on board a steamer plying between India and China. Having previously enjoyed good health, he was attacked, on the morning of March 7th, 1868, while in the Straits of Banca, with headache and feverishness, which were followed a few hours later by a series of violent epileptic fits. He remained unconscious for several hours. On coming to, he found himself lying on the floor of the cabin, and soon discovered that, although he could see and understand everything that was going on, he was totally unable to move a limb, had entirely lost the power of speech, and was stone-deaf; he could not hear a pistol fired off close to his ear. He remained in this condition up to the time of his arriving at Singapore, on March 20th. He was then transferred to the General Hospital. At that time, his right leg and arm were still weak; the left limbs were numb and powerless; there was pain and tenderness of the scalp; he was still deaf and dumb, and had, further, considerable difficulty in masticating his food; this was due, in some degree, to pain in the back of the head, provoked by the movements of mastication. He gradually improved. In the first week, he gained the use of his right side, and audition was so far improved that he could hear when spoken to loudly. Hearing was restored by April 22nd. He also regained to a large extent the use of the left arm, and he improved remarkably in his general health. He left the hospital in the middle of June, and started for England in a sailing vessel. At this time, he was still incapable of articulation, and had difficulty in mastication. The left leg was useless, and the left arm was so weak, that he could not use the crutch which had been provided for him. His voyage lasted four months, and he was received into St. Thomas's Hospital on November 1st. On admission, he complained of numbness in the left leg, with loss of power and tremors in it when he tried to use it. He could walk tottering with a stick, dragging the left leg after him. There was no paralysis of any other limb, and he had perfect control of the rectum and bladder. Hearing, sight, and the other special senses were healthy. He complained of tenderness of the scalp, but there was nothing abnormal to be felt there; and of some pain at the back of the head and neck on the right side, a little behind the mastoid process. He seems also at this time to have had a little difficulty in mastication, yet he could eat solid food, and swallow with ease. He was unable to speak, but appeared perfectly sensible. There was no sign of disease of the heart, lung, or kidney. Three days after admission, I saw the patient for the first time. He was quite intelligent, and understood everything that was said to him; he could read to himself, and understand everything that he read; and he could maintain a conversation of any length, he writing on a slate, and his interlocutor speaking. He wrote with remarkable facility, and in a very excellent legible hand; and he expressed himself with point and accuracy, except for an occasional error in spelling or construction, evidently due to defective education; but he could not utter a single articulate sound. He could, however, perform with his lips, tongue, and jaws all varieties of voluntary movement; and he was capable of vocal intonation. I think he could have hummed a tune, but I could not get him to make the attempt. No change took place in his condition up to November 25th, at which date, having spoken to him casually from time to time during my visits (for he was not a

patient of mine), I had come to the conclusion that his inability to speak was probably due to his having forgotten how to combine automatically the movements of these organs so as to obtain from them the elementary sounds which, in combination, constitute articulate speech; and I had determined to make the attempt to teach him. I explained to him my view of his case, which he appeared to understand perfectly, and I gave him my first lesson, which lasted five or ten minutes. I explained to him that ordinary vocal sounds are compounded of two factors, namely, laryngeal intonation, which he could even now produce, and articulation effected by the lips, tongue, and associated parts, of which he was as yet incapable. I then got him to sound a laryngeal note, and subsequently by explaining to him and showing him how to modify the shape and size of the oral passage and aperture, and getting him at the same time to expire, either with or without laryngeal intonation, made him sound, both in a whisper and in a loud voice, certain of the more simple and obvious vowel sounds. I do not mean to say that he learned at once to articulate these letters accurately, but he so far succeeded that those about him identified his attempts and recognised his success. At my next visit, in three or four days, I found that he had, by practice, completely mastered the letters I had taught him. I then set to work to teach him the labials, *p*, *b*, *f*, *v*, *m*. Closing my lips firmly, I then opened them with a sudden smack, and got him to do the same. We both thus pronounced the sound of *p*. I asked him if he did not recognise it as such, and I made him repeat the sound till he recognised it fully. I then explained to him that, in order to make the sound perfectly clear, it was necessary that a vowel sound should be prefixed or added, and I got him to follow up the sound of *p* by a vocalised *e*. In his first efforts, the two sounds were uttered at a considerable interval, one after the other, but gradually he approximated them, until he succeeded in making them nearly continuous. There remained, however, even at the end of the lesson, a slight but quite appreciable fault. Next, closing my lips as before, I produced laryngeal intonation without allowing air to escape through the nose, and, while producing this sound in my throat, opened my mouth. I made him do the same, and he recognised that he had thus, almost without knowing it, articulated the letter *b*. Again, still setting him the example, I got him to place the upper teeth upon the lower lip, and simply blow between them. He thus uttered the sound of *f*, and perceived clearly that he had done so. Then, by repeating the same actions with the addition of a musical laryngeal note, he sounded, and recognised that he had sounded, *v*. Finally, I got him to close his lips, and, without opening them again, to make a continuous laryngeal sound; in other words, to allow the air passing between the vocal cords to escape by the nose; the essential sound of *m* was the result. Not only at first, but in every other case, as soon as I got him to see that he had really articulated the letter-sound I was teaching him, I endeavoured to make him associate its pronunciation with that of some prefixed or appended vowel; and in every case with considerable, though not absolute, success. At subsequent visits, I taught him, by the same process, the lingual and guttural consonantal sounds. And thus, in the course of four or five lessons, each of ten minutes' duration, given within less than a fortnight, he acquired the power of articulating all the simple vowel sounds and all the simple consonantal sounds, including those of *th* in "thing", *th* in "thy", *ng* in "tongue", *sh*, and *z* in "azure". On December 4th, he wrote, "I do not feel very well this morning; I got a fall last Thursday night (accidentally); one of my crutches slipped, which gave me a severe shaking; my back is rather painful, and a great deal of pain in the head from the fall; can pronounce all the vowels except *i* and *u*; cannot pronounce *g*, *h*, *j*, *q*, *w*, and *y*". The truth, however, was, that he could pronounce all the elementary articulate sounds, but he could not yet combine sounds which he had not been taught to combine, and he could not, therefore, utter the names of the letters which he enumerated. I need not say that *i* and *u* represent compound vowel sounds, and that the name of each of the other letters is made up of at least three distinct elementary sounds. At the end of a fortnight from the beginning of my treatment, I began to teach him to combine letters. Selecting certain consonants, I made him pronounce them in conjunction with the various vowel sounds. I now found little difficulty in the task, and I recommended him to practise new combinations for himself, for which purpose I suggested that a child's spelling-book might be useful, and he got one. I think it was on my next visit, three or four days afterwards, that he came forward and greeted me with a slowly uttered "Good morning, sir". His progress from this time was marvellously rapid. Within another ten days, he was able to talk well, except that he talked somewhat slowly, and evidently had to give more thought to the pronunciation of his words than healthy people ordinarily have to do. He improved subsequently in readiness of speech, but even when he left the hospital he spoke with apparent effort and slowly. This manner may, however,

have been natural to him; for when his speech was restored, he spoke with his original American accent.

His lessons were, as I have shown, few and short. But so soon as he had realised the fact that he had organs capable of evolving articulate sounds, he supplemented my instruction by the most zealous practice. Thus the vowel and consonantal sounds which he uttered imperfectly during a lesson were learned accurately by my next visit; and as soon as he had begun to combine sounds, he practised them in various combinations with great industry, being assisted by the sister of the ward, the nurses, and especially by two or three intelligent patients, who, being interested in his progress, gave him constant assistance. Before he could articulate at all, and in the earlier period of his recovery, he often wrote, "There is a sort of difficulty I cannot explain which prevents me from speaking"; and always during his earlier attempts, he complained of pain at the back of the right side of the head and neck attending them—pain of the same kind and in the same place as that which had formerly attended the act of mastication. This disappeared before long. Whilst the recovery of his speech was in progress, he gradually regained the use of his left arm. There was no improvement, however, in the condition of the leg up to the end of December. About that time, treatment by faradism was commenced, and continued with great success. He could walk without a stick in about a week; and he left the hospital, apparently well, on January 18th, 1869.

Where the lesion was situated which caused the interesting combination of phenomena presented in this case is of course only a matter of inference; but all the early incidents of the case, and many of the later ones, point distinctly to implication of the region lying between the floor of the fourth ventricle and the surface of the pons Varolii. That the lesion effected little permanent damage is evident; but it must have occupied such a position as for a time to have obstructed completely the usual route along which the co-ordinated impulses for the movements of articulation find their way. The affection of speech here was a simple and uncomplicated one, and one that may be readily explained by an interruption of the fibres anywhere between the supreme centre for the movements of spoken language and the specific groups of nerve nuclei whence the several nerves concerned in speech emerge. I have only once since had a case under my care in which I have endeavoured to instruct the patient in articulation. The failure to articulate, however, which was incomplete, was associated with other aphasic phenomena, so that my success was only partial, and not permanent.

[To be continued.]

IDIOSYNCRATIC SUSCEPTIBILITY TO HENBANE.

THE following is a brief record of a case which came under my notice a few days ago.

A. G., a strong healthy man, fifty years of age, sent to my house for some aperient pills, and I gave his messenger some of the colocynth and henbane pills of the *Pharmacopœia*. On seeing my patient a few days afterwards, he told me that the pills had not "suited him"; and, in explanation, said that, half an hour after taking two, he began to feel very ill—so ill that he was compelled to cry out to his wife that he had been poisoned. His mouth felt as if drawn together like a purse, as he graphically described it. His throat was dry and painful, so that he could not swallow his spittle. There was a feeling of numbness over the right side of the body and down the right arm. On standing, he was compelled to grasp the mantelpiece, or he would have fallen; he was giddy and weak, and almost blind. He lay down on a sofa; but the faintness and general powerlessness continued, though in a less degree, for about four hours. At the end of that time, his bowels moved, and all alarming feelings passed off; leaving behind, however, dryness of the mouth and soreness of the throat, which continued for twenty-four hours after the other symptoms had disappeared.

In this case we have all the well known symptoms of poisoning by henbane; and the case is all the more unusual, that the symptoms appeared so early and with such gravity after the administration of a dose of henbane which is far from being large. Garrod states the ordinary dose of extract of hyoscyamus to be from five to ten grains. But my patient had no more than three grains and one-third, the proportion of henbane to compound colocynth pill in the combined pill being as one to three; the two pills taken weighing exactly ten grains.

On cross-questioning my patient, I elicited the fact that several months ago he had experienced the same symptoms, though to a less marked degree, after taking one colocynth and hyoscyamus pill; so that in that instance one grain and two-thirds of the extract had produced its physiological effects.

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REMARKS

ON THE

PRODUCTION OF CYSTITIS BY CONTAGION, THROUGH THE USE OF INSTRUMENTS.

By SIR HENRY THOMPSON, F.R.C.S., etc.,

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I HAVE long suspected that cystitis is capable of being propagated by the direct transference of inflammatory products from the bladder of one patient to that of another. All are sufficiently familiar with the fact that purulent matter from the vagina, and probably from the uterus also, produces inflammation of the male urethra, and that conjunctivitis may be caused by contact with pus from either source; and I believe it is quite unnecessary to imagine that any specific quality attaches to purulent matter produced in these localities, rendering it more than ordinarily virulent and contagious. Certainly no proof can be adduced that such quality exists; a decision on this point, however, does not necessarily affect the question whether cystitis may be originated or not by contagion.

Every one knows that the operation of sounding the bladder—it may be for stone or for tumour, etc.—is sometimes, although rarely, followed by an attack of inflammation more or less severe. Such an occurrence is, in some circumstances, not unnatural. A delicate organ is mechanically disturbed, and, if force be employed in the process, some inflammation of the mucous membrane is a not improbable result. Hence the extreme importance of adopting a method and instruments which shall accomplish the object in view with the smallest degree of distension and movement; and also of forbearing to make such an exploration, except in circumstances which manifestly indicate its necessity. In my experience of such cases of this kind as have fallen under my observation during many years, I have remarked that the inflammatory attacks which follow sounding occur in two modes, distinct from each other. Thus, in some instances, the patient has a shiver, occurring within three to four hours of the time of the examination; soon afterwards, the urine is passed too frequently and with pain, becomes cloudy, and some general fever sets in. In such, the cause of inflammation is clearly a mechanical one, and, if the patient be healthy, it soon subsides with rest and treatment. But, in a few other instances, no disturbance occurs until the lapse of forty to fifty hours, or thereabout, after the sounding. The subject of the examination has been in all respects well since the sounding took place, and felt, if anything, only slight soreness during the first few hours following the operation. After the interval named, he experiences a little undue frequency of micturition, loses appetite, is chilly or has a shiver; and by degrees symptoms of cystitis appear, and continue a marked course for a few days, with varying persistence according to circumstances. Usually, the patient attributes his condition "to some cold he must have caught the day after the examination", and by no means attributes his troubles to the instrument, as he infallibly does in the circumstances first described.

Why, in certain circumstances, these phenomena should occur so long after the provocation which must have given rise to them, has, as I have already intimated, frequently afforded me an interesting subject of speculation. But a case has recently occurred, which I have been enabled to watch closely, and which seems to throw light on the nature of these examples of the second kind. I shall give the chief particulars in detail.

A medical man, under sixty years of age, having had occasion, as he thought, to pass for himself a silver catheter (No. 10) daily, had a new one made; there was a peculiarity in its construction, the lower or curved portion, about two inches and a half in length, being separate and attached by a screw to the shaft. Such catheters were frequently made formerly for the purpose of packing in a surgical pocket-case. He passed this daily with great ease during some weeks, on no occasion producing irritation. One day, and this was the only occasion on which he used the catheter for another person, he introduced it into the bladder of a patient whose urine was highly muco-purulent, and who was indeed suffering with severe cystitis. He believes that, immediately after using the catheter, he washed it in the ordinary way. Subsequently, on that day, he employed it as usual for himself; and it is somewhat curious that he did not use it the next day—not because he felt any irritation, but, on the contrary, because he was arriving at the conclusion that the instrument was no longer necessary. The next day but one after his