ON THE PHYSIOLOGY OF LANGUAGE.

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DR. JACKSON treated his subject under the following heads :—

TWO KINDS OF LANGUAGE.

Healthy language is of two inseparable yet distinct forms :—

- (1) Intellectual, i.e., the power to convey propositions.
- (2) Emotional, i.e., the ability to exhibit states of feeling.

The two are separated by disease. It is intellectual language alone which suffers in most of the cases to be described. Emotional language usually escapes altogether.

Intellectual language suffers throughout, not only in its most striking manifestation in (a) words, but in (b) writing, and (c) sign-making.

It is the power of intellectual expression by "movements" of any kind which is impaired, those most special, as of speech, suffering most; those of simple sign-making least, or not at all.

Emotional language is conserved throughout, not only in its most striking manifestation by (a) variations of voice, but in (b) smiles, &c., and in its most simple manifestation by (c) gesticulation.

Although thus circumscribed by the term "defects of intellectual language," there are within this limit many varieties of defects produced by disease near the corpus striatum. The author never uses the terms "aphasia," "aphemia," &c.

It is easiest to say what they are *not*.

- (1) *They are not defects of voice.*
- (2) *They are not defects due to mere paralysis of the tongue and other articulatory muscles.*
- (3) *They are not owing to any fault in the outward organs of reception.*

The Special Nature of the Defects of Intellectual Language.

The author arranges the cases he has to mention, for convenience of exposition, in two classes. In the first class the author supposes

that the sensori-motor processes for speech are more or less *destroyed*; in the second that they are *unstable* from under-nutrition (see [8]).

Class I.—Severe cases *in which the patient is speechless or nearly so, or in which speech is very much damaged.* In the worst of these cases the patient can only utter some one unvarying word or two words, or some jargon.

Class II.—Cases in which there are plentiful movements, but wrong movements, or *plenty of words, but mistakes in words.*

Under Class II, he points out that taking the phenomena of many cases we find evidences of damage to sensori-motor processes, higher or lower in evolution, according to (a) complexity of movements; (b) width of interrelation; (c) number of associations, from ataxy of the grosser movements of articulation to an "ataxy" of movements embodying ideas.

He then considers very generally, and with regard to all varieties of cases, the defects in complementary modes of intercommunication which accompany defects of speech, and takes the opportunity of considering a question asked, *What is the degree of intelligence these patients have?* He expressly guards himself against any implication that language and thought exist separately. The question is not, How is general mind damaged? but, What aspect of mind is damaged?

He considers the mental condition of patients in Classes I and II as regards:—

(a) *Sign-making* is least affected, sometimes seeming to escape altogether. He urges that we should distinguish in degree betwixt power to make simple signs which idiots can make, and the elaborate signs—saying nothing of finger language—which people make who are healthy, except for congenital deafness, and that we should observe if the patients can make signs to signify abstract quality as "blackness."

(b) *Writing.*—This suffers more or less in nearly every case of defect of speech from disease of the hemisphere, but varies as much as the defect of speech itself does.

Indeed, writing, and we may add reading, is the same defect in another form. For in each we have to reproduce the motor symbols of the words. Written or printed symbols are "symbols of symbols."

The patient who cannot write can usually copy writing correctly.

Patients can often sign their own names without copy when they cannot or will not write anything else.

(c) Do the patients know what is said to them? It is usually held that "aphasic persons" do. The author thinks they usually do when they are speechless except for some unvarying jargon, i.e., cases in Class I, but that when—cases in Class II—they have free but disorderly utterance so high as mistakes in words they often do not understand, i.e., quickly understand, words said to them.

(d) Can the patients repeat words said to them? They cannot in Class I; in Class II they can, with or without blunders.

The author supposes the reason in (c) and (d) to be:—

That in Class I, the sensori-motor arrangements for speech are *destroyed* in their *lowest* processes by *limited* disease near to, and involving, the corpus striatum. The sensory aspect of the sensori-motor processes of mind is not reached. It is the "way out" which is broken up.

That in Class II, the sensori-motor processes are impaired, but not destroyed, and that the change is not limited to the region of the corpus striatum, but reaches deeper in the brain.

(e) They cannot read, but they can—often at least—understand what is read to them.

(f) and (g) These points are very cursorily considered.¹

Educated Movements.

The movements of speech are educated movements, and thus differ widely from those movements which may be said to be nearly perfect at birth, such as those for respiration, smiling, swallowing, &c. All the muscles represented in the corpus striatum unilaterally² require a long education, and the most special of these are those engaged in the movements of speech, and next those of the arm. The muscles always acting bilaterally, and chiefly represented bilaterally in the corpora striata, are born with their centres for movements nearly perfect. Thus, then, the term "Intellectual Language" merges in the larger term "Special Movements acquired by the Individual," and the term "Emotional Language" in the term "Inherited Movements" (common to the Race). There is a still more fundamental distinction.

¹ There is nothing to show what these points were.—[EDITOR.]

² It is true that the tongue acts bilaterally, and that it is represented on both sides of the brain. But still it differs from other muscles acting bilaterally, in that each of its sides has a distinct representation in its corresponding (opposite) side of the brain. (See Broadbent's paper, *Med. Chir. Rev.*, April, 1866, p. 479.)

The most General Nature of the Defects.

The author first considers Class I. Here the words previously used give way to terms larger still. In its highest or worst form it is a loss of *voluntary* power with conservation of involuntary capability.

(a) The author first illustrates by the case of gross movements—e.g., a speechless patient may be unable to put his tongue out, although it moves well in reflex, &c., processes.

He next shows that there is a corresponding difference even in quasi-mental movements. "Speechless" patients sometimes ejaculate involuntarily.

(b) It will be found that some of those patients who cannot talk voluntarily can swear. They utter other ejaculations which are of the same category—meaningless for the expression of ideas about things, although useful as vehicles for the exhibition of feeling. They swear or ejaculate when excited, *and cannot repeat the words of the interjectional utterances when they try.*

(c) Next he instances ejaculations more appropriate to the circumstances under which they are uttered, and which are a step higher in speciality.

(d) Next, and highest, a man usually utterly speechless may get out an actual proposition.

Here, again, taking into consideration the phenomena of many cases, it will be seen that there is, so to speak, an ascent in "compound degree" from utterances, like the common explosive oath, most *generally* related to *general* external circumstances, to actual propositions *specially* related to *special* external circumstances — i.e., until the difference betwixt voluntary and involuntary utterance is lost.

The above-mentioned series of phenomena show, the author *thinks*, *that there are in "speechless" patients sensori-motor processes for words somewhere, though usually the "will" cannot get at them.*

This somewhere can scarcely be on the *left* side of the brain, for damage of this side has made the man speechless. These involuntary utterances are, the author supposes, the result of action of the *right* side. In other words, he thinks that the left is the leading side, and the right the automatic.

The Will.

He then tried to show the relation of the so-called "will" to the rest of sensori-motor processes, and this time takes his illustrations from the stock words or phrases which the patients always use. First, he

points out that it is probable that the stock phrase was the leading sensori-motor process when the brain was suddenly damaged, and speaks of two cases in illustration. A man becomes speechless after hard work at *making a catalogue*, and can afterwards say only "List complete." (Recorded by Dr. Russell, of Birmingham.) Another man receives a wound in the left hemisphere *in a brawl*, and can only say, "I want protection."

He then speaks of Spencer's views on the "will" and, as he believes in accordance with those views, calls the "will" the *leading* sensori-motor process of the moment, there being no such separation as Will and Mind.

The Left Side of the Brain the Leading Side, the Right the Automatic.

The author does not think, as Dr. Moxon does (see *Medico-Chirurgical Review*, April, 1866), that the left side of the brain only is educated, but that both are educated. It is certain that damage to the right side of the brain produces no defect of speech in most cases, and equally certain, the author thinks, that the *disease of the left side only cannot prevent the patient getting out words when a forcible circumstance outside himself is in very special relation with the processes for those words*. For he points out that although there is in cases of involuntary ejaculation no prompting by the "will of the patient," so to speak, the occasional utterances are developed with more or less appropriateness to the external circumstances.

Although the cerebral hemispheres are twins, the left may, if we accept Gratiolet's statement, be said to be the first born. It is born with the lead, and thus a patient who has damage to the left side of his brain cannot *initiate* movements in the undamaged right side, either objectively, as in talking, or subjectively as in reading.

The author has recorded a case of loss of intellectual language in a patient who was *left-handed*, but states that in other cases this explanation will not apply, and he admits that there are cases of defect of intellectual expression with *left* hemiplegia which cannot be explained. Some of the patients, however, have been previously paralysed on the right side, although perhaps without any accompanying defect of speech. Still he has never seen a case of disease of the right hemisphere, only as proved *post mortem*, with defect of speech of any kind, but has recorded three cases in which this side

of the brain (including Broca's convolution) was diseased without defect of speech. And all are agreed that when hemiplegia occurs with loss of speech, the hemiplegia is *nearly always* of the right side. He has, however, received reports of two cases, one recorded by Dr. Long Fox, of Bristol, and one by Dr. Pye Smith, in which the Broca's region (on the left) was diseased without loss of speech.

Localization.

The author's views on *Localization* have been already so fully given by himself that it is needless to repeat them. In the last (the fourth) volume of the *London Hospital Reports* the author has reported several autopsies on patients who died aphasic.