

Sensory Sequelæ.

Such nervous excitation (say a visual one) arrives at its proper cortical "sensory centre," and, as we have seen, spreads out in the molecular and sub-molecular layers. Here it affects, therefore, intrinsic cortical elements, and in the following way. In the molecular layer (see fig. 23), the incoming sensory terminals come into relationship with the whole apical expansions of the ambiguous cells, as well as the peripheral tufts of the long pyramidal cells. In the sub-molecular layer the whole of the basal expansions of the ambiguous cells, and a portion of the apical expansion of the long pyramidal cells, are affected. These cortical elements, therefore, viz., the ambiguous and the long pyramidal cells, are thereby excited to discharge. The *excitation, rise of nerve-tension, and discharge* of the conjoint ambiguous-pyramidal elements thus affected is the nervous process, the psychical counterpart of which is a *sensation* (in this case a visual sensation) aroused in the mind.

Specific Sensations.

Such a sensation may be *faint* or *vivid*, according to the intensity of the cortical *excitation and discharge*. Similarly, according to its cortical *locality* the sensation may be a *visual*, a *muscular or cutaneous*, an *olfactory*, &c., or other sensation. That such an *excitation followed by a discharge* (nervous) of a primary sensory area will be accompanied by its appropriate *sensation* (psychical) is now a well-established fact based on experimental and pathological grounds. The experimental data are available in text-books of physiology. We shall here briefly refer to the work of neuro-pathologists in this connection, beginning with the immortal work of Hughlings Jackson on "Local Cortical Discharges (Jacksonian epilepsies)."

Jacksonian Epilepsies.

It was thirty years ago that *Hughlings Jackson* taught (1864) that certain forms of epilepsy with local motor disturbances were almost uniformly due to organic disease of

some kind, situated in the Rolandic region of the brain ; a view comparatively neglected then, but which the startling revelations of the experimental school of workers (Fritsch and Hitzig in 1870, Ferrier, 1872, and '79, and others) have since served to call attention to. And following these a brilliant school of clinico-pathological investigators such as *Charcot* (*Charcot et Pitres*: "Localisation cerebrales," *Revue de Medicine*, 1879 and 1883) ; *Nothnagle* (*Topische Diagnostik der Gehirn Krankheiten*, 1879) ; *Wernicke* (*Gehirn Krankheiten*, 1881) ; *Ferrier* (*Localisation of Brain Disease*, 1878) ; *Roland* (*De l'Epilepsie Jacksonienne*, 1887) ; *Allen Starr* ("Cortical Lesions of Brain," *American Journal of Mental Science*, 1884) ; and others, have by their researches conclusively proved the wonderful truth and correctness of the Jacksonian doctrine while adding important confirmatory and other details. But the great and important feature which we have to recognise is that from the vast accumulation of such details, not only have the various centres which regulate muscular movements (kinæsthetic areas) of the organism been thus more accurately localised in the human brain, but also the other important centres which have to do with the reception or perception of gustatory, olfactory, visual, auditory, and cutaneous sensory excitations, have each and all of them received its proper and appropriate "local habitation." And thus the field of the Jacksonian epilepsies has been considerably extended, and now includes those not only starting from this or that focus of the kinæsthetic areas, but also each of the many other foci which are the cortical centres in relation with the other senses mentioned above. And thus it happens that just as when a kinæsthetic focus is aroused the psychical counter-process that is evoked is a sensation (either a cutaneous sensation or a sensation of movement), referred to this or that peripheral body organ (face, hand, foot, &c.), which is in relation with the said focus, so if the focal discharge be stronger the nervous excitation is propagated along the pyramidal tract, and arousing the motor bulbo-spinal centres, produces one or other movement of the speech organs, face, arm, hand, or foot, according as to whether the

seat of the cortical discharge is the tongue, face, hand, or leg area.¹ And similarly with a slight focal discharge occurring in this or that special sense cortical area, we have aroused its psychical accompaniment, viz., a hallucination of this or that sense—gustatory, visual, olfactory, auditory, &c. To particularise, we may add that when in cases of such epilepsies the primary disturbance is a hallucination of hearing, the cortical seat of disturbance is in the posterior part of the two upper temporal convolutions, when a luminous or other visual excitation, the cortex involved belongs to the calcarine or other part of the occipital region, when attended with the seeing of words or letters the disturbance is in the angular region (visual word centre), and when attended with smells or taste the cortical region of disturbance is in the inferior and distal portion of the temporo-sphenoid lobe. We have thus kinæsthetic epilepsies; we have also special sense epilepsies, and to complete the picture we may add—we have psychical epilepsies. Not that the other epilepsies are non-psychical, for each and every one of them is attended by its own psychical equivalent, viz., a feeling of cutaneous excitation or of a peripheral movement or the excitation of one or other special sense.

Psychical Epilepsy.

But in psychical epilepsy in the stricter sense of the word, there is a disturbance of a more distinctively psychical nature, consisting either of a moderate mental disturbance (bewilderment, sudden loss of memory, stupidity, and a dreamy state, or a state of reminiscence—the intellectual aura of Hughlings Jackson), or of a more serious and violent maniacal excitement or intense furor in which the patient may do the wildest and most awful deed, homicide or even suicide, as the outcome of the intense cerebral (psychical) discharge affecting the higher regions of his brain.

¹ The number of cases operated on for Jacksonian epilepsy are now (1885-94) over 300 (about 400) as known to medical literature. (See the writings of MacEwen, Horsley, Bergman, Lucas Championiere, and Allen Starr.)