left without aids to diagnosis beyond these which I have yet mentioned. The case which I have supposed is of the worst description as regards diagnosis. In actual practice you will find not merely the seven cardinal symptoms upon which we have dwelt so long, but other minor or secondary symptoms, which, though subject to great variations, often furnish valuable corroborative testimony. These I can only name. They include delusions of every dye—aphasia, altered affections, sudden impulses, morbid appetites, ptosis, muscular twitchings or rigidity, staggering gait, glandular enlargements, vomiting, interrupted circulation, and menstrual irregularities. These, or some of these, may complicate, but more often simplify, diagnosis, which is again facilitated by the absence of other symptoms distinctive of other organic diseases, and by considerations as to the age, history, and habits of the person affected. To show you how contingent are interlaced with necessary symptoms, I shall briefly describe a case to you. Maria S., a widow, 54 years of age, was received into this asylum on the 4th May, 1869. She had then been out of health for some years, never having altogether shaken off the grief occasioned by her husband's death, until the close of 1868, when she became silly and childish, and suffered from a fit, and horrible pains in her head. In the spring following, she had several fits and attacks of transient excitement. She also, by imperceptible degrees, lost the use of her left side; and in consequence of this, as she persisted in moving about, suffered several falls. When brought here, she was a pale, sallow, anæmic-looking woman—so thin, as to be described in the case-book as a living skeleton. She was in a fatuous state. Though garrulous and anxious to talk, especially about her own illness, no reliable information could be got from her, as her memory was utterly fallacious. She could not recall her husband's Christian name, and was oblivious as to all measurements of time, and names of days, seasons, and places. She was often unable to find the word which she wanted, and seemed to introduce into the sentence for which that word was required any other word that occurred to her at random. Her expression was careworn, and also singular, as she had exophthalmos and blindness of the right eye, and ptosis of the right eyelid. The pupil of the left eye was much contracted, and its margin was irregular. The mouth was drawn to the left; and the tongue, when put out, pointed to the left. The sensibility of the right side of the face was much diminished. There was almost complete loss of power in the left arm and leg; there was partial loss of power, with tremor, in the right arm and leg; there was a systolic murmur at the base of the heart, and a thick white fur on the tongue. During her brief sojourn in the asylum, Maria S. became more and more fatuous; her appetite for food being at some times voracious, and at other times altogether absent, so that she had to be fed. The paralysis of the right side increased, uncontrollable vomiting and diarrhœa came on, coma supervened, and then came death on the 15th June. At the necropsy, the brain was found flattened and compressed, and at its base was a cancerous tumour. This took origin in the right temporo-sphenoidal lobe, and extended inwards, being divided by a neck into two parts, each about the size of a small walnut; an outer part, fibrous, containing cysts and fluid contents; and an inner part, soft and pulpy, and of a pink colour, variegated by deep red blotches, and with a delicate fibrous matrix. The outer part was embedded in the temporo-sphenoidal lobe, and the inner lay in a sort of excavation, which had been formed by the absorption of portions of the body of the sphenoid bone, the orbital plate, and the pituitary body, and by displacement of the posterior, orbital, and surrounding gyri. It compressed the roots of the right olfactory nerve, the right optic tract and nerve, and the right fifth nerve.

The prognosis in cerebral cancer, when it is diagnosed, is of course as gloomy as can be: nothing but death, speedy death, can be predicted. It is not, perhaps, utopian to hope that, with the progress of therapeutics, some means may be discovered of resolving or controlling malignant growths. Distinguished and sober-minded surgeons have entertained that hope. At present, however, we must be content with smoothing the pathway to the grave, and with retarding, if that may be, the passage of our patient along that miserable thorny road. If the nature and position of the tumour could be satisfactorily made out during life, its growth might perchance be slackened or arrested by frequent faradisation; change of climate might also be beneficial. It is curious that, while in tubercle that remedy has been, and is, most fashionable and successful, in cancer it should never have received a fair trial; and yet cancer appears to be highly susceptible to the influence of climate. Abounding in Europe, it is rare in Egypt, Algiers, Senegal, and Arabia: even in England its distribution is partial, as Mr. Haviland has conclusively proved. Haunting low lying grounds through which large rivers, prone to overflow their banks, descend to the sea, it eschews dry and elevated districts. Surely the progress and propagation of cancer might be sometimes checked by a resort to those climates which are least favourable to its growth. One of the great objects in cancer of the brain, as in cancer of any other part, is to relieve pain; and that, after all, is best accomplished by the employment of opium, or some of its preparations or alkaloids. The hypodermic injection of morphia is an inestimable boon; nepenthe is a benefactor—it can at least confer an euthanasia. Cannabis Indica acts well; and so, under certain circumstances, do chlorodyne, chloral, and chloroform—the latter being, of course, used with extreme caution. When convulsions occur, bromide of potassium, in combination with tincture of sumbul, is beneficial; and, when delirium and excitement have to be combated, ergot may be had recourse to, or alcohol freely administered, for the delirium is sometimes the expression of exhaustion.

EXPERIMENTAL RESEARCHES IN CEREBRAL PHYSIOLOGY AND PATHOLOGY.

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PRELIMINARY NOTICE.

THE opportunity kindly afforded me by Dr. Crichton Browne, of experimenting on over thirty guinea-pigs, rabbits, cats, and dogs, in the pathological laboratory of the West Riding Asylum, Wakefield, has enabled me to arrive at certain results and conclusions which seem worthy of a brief preliminary notice, pending the publication of details of method, experiments, and illustrations, in the West Riding Asylum Reports.

The following is a summary of the more important conclusions.

1. The anterior portions of the cerebral hemisphere are the chief centres of voluntary motion and the active outward manifestation of intelligence.

2. The individual convolutions are separate and distinct centres; and in certain definite groups of convolutions (to some extent indicated by the researches of Fritsch and Hitzig), and in corresponding regions of non-convoluted brains, are localised the centres for the various movements of the eyelids, the face, the mouth, the ear, the neck, the hand, foot, and tail. Striking differences corresponding with the habits of the animal are to be found in the differentiation of the centres. Thus the centres for the tail in dogs, the paw in cats, and the lips and mouth in rabbits, are highly differentiated and pronounced.

3. The action of the hemispheres is in general crossed; but certain movements of the mouth, tongue, and neck, are bilaterally co-ordinated from each cerebral hemisphere.

4. The proximate causes of the different epilepsies are, as Dr. Hughlings Jackson supposes, "discharging lesions" of the different centres in the cerebral hemispheres. The affection may be limited artificially to one muscle, or group of muscles, or may be made to involve all the muscles represented in the cerebral hemispheres, with foaming at the mouth, biting of the tongue, and loss of consciousness. When induced artificially in animals, the affection as a rule first invades the muscles most in voluntary use, in striking harmony with the clinical observations of Dr. Hughlings Jackson.

5. Chorea is of the same nature as epilepsy, dependent on momentary discharging lesions of the individual cerebral centres. In this respect, Dr. Hughlings Jackson's views are again experimentally confirmed.

6. The corpora striata have crossed action, and are centres for the muscles of the opposite side of the body. Powerful irritation of one causes rigid pleurosthotonus, the flexors predominating over the extensors.

7. The optic thalamus, fornix, hippocampus major, and the convolutions grouped around it, have no motor signification.

8. The optic lobes or corpora quadrigemina, besides being concerned with vision and the movements of the iris, are centres for the extensor muscles of the head, trunk, and legs. Irritation of these centres causes rigid opisthotonus.

9. The cerebellum is the co-ordinating centre for the muscles of the eyeball. Each separate lobule (in rabbits) is a distinct centre for special alterations of the optic axes.

10. On the integrity of these centres depends the maintenance of the equilibrium of the body.

11. Nystagmus, or oscillation of the eyeballs, is an epileptiform affection of the cerebellar oculo-motorial centres.

12. These results explain many hitherto obscure symptoms of cerebral disease, and enable us to localise with greater certainty many forms of cerebral lesion.