200° C. After eight hours I opened the tube, but there was no pressure of gas. By this means I obtained a substance, which melts at a temperature below 100° C, and a strongly acid, yellowish fluid, which at first had a sharp disagreeable empyreumatic odour. The distillate from this fluid reduced nitrate of silver (formic acid?). Nothing was extracted by æther from the residual fluid, which had an acid reaction, and formed, with barium, an insoluble crystalline precipitate of unknown composition.

In the decomposition of cerebrine by sulphuric acid, its nitrogen appears to be partly at least given off as free ammonia, as I obtained a precipitate of ammonium-platinum-chloride, on adding chloride of platinum to the sulphuric solution.

I have determined the acid nature of the copper-reducing substance, which is produced at the same time and dissolves in water. It forms salts which resist the action of carbonic acid. It appears to deflect polarised light to the left, in the same manner as the substances which are obtained from mucine, chondrine, and the urine of animals poisoned with chloral and carbonic oxide. I have failed as yet to obtain it pure.

This last acid appears in many ways to resemble Uramidocamphoglycuronic acid, described by Schmiedeberg and Meyer* in the last number of "Hoppe Seyler's Journal."

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*On the Connection between the Mental State and Inequality of the Pupils in General Paralysis.* By Francis Wyatt Thurnam, M.B., Assistant Medical Officer, Bristol Borough Asylum.

Out of 946 cases admitted into the Bristol Asylum since January, 1870, symptoms of General Paralysis of the Insane have existed in 116; of which 83 occurred in males, and 33 in females, the admissions being respectively 440 males and 506 females.

The percentages thus are—

18·863 amongst Insane Males.
6·521 „ „ Females.
12·162 „ „ of both Sexes.

* O. Schmiedeberg and H. Meyer, Ueber Stoffwechselprodukte nach Campher fütterung, "Zeitschrift für physiol. Chemie." III., 6, p. 451, Nov. 7, 1879.

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Out of these 116 cases of general paralysis, inequality of the pupils is noted as having occurred in 73 instances, or nearly two-thirds (it probably existed in a far larger proportion), and in 52 of these, the side of the larger or smaller pupil is stated in addition. The mental state, *i.e.* exaltation or depression, is also recorded in 46 of these 52 cases; in the remaining six cases the statements are too vague (or mental state too varying) to be depended upon, consisting as they do of notes in the case books by various observers.

In 24 of the 73 cases in which inequality was noted, the left pupil was the larger, while the right was larger in 28; not stated in 21. Of those cases (28) in which the right was the larger pupil, depression of the mental faculties was noted in 18, or 64·3 per cent., exaltation occurred in 7, or 25 per cent. Of the instances (24) where the left pupil was larger than the right, exaltation accompanied this condition in 15, or 62·5 per cent.; depression in 6, or 25 per cent.

From the above figures it appears that—

| | | | |
|---|---|---|---|
| Exaltation with left pupil larger, or depression with right pupil larger ... ... ... | } Occurred in | 63·4 | per cent. |
| An opposite condition ... ... | Ditto | 25· | ditto. |
| Varying, or doubtful ... ... | Ditto | 11·6 | ditto. |
| Total ... | | 100·0 | |

Occasionally the state of the pupils has been observed to change with the alteration in the mental state; or it may vary without any such corresponding change being apparent.

The result of these statements goes to show that depression is generally associated with a state of dilatation of the right pupil and contraction of the left (as compared with each other). On the contrary a state of mental exaltation, as a rule, accompanies contraction of the right pupil; the left being dilated, or at any rate larger.

In nearly all the cases mere difference in size has been noted, without stating (except as compared with its fellow) whether either pupil were contracted or dilated.

Contraction of both pupils is often a somewhat persistent and early symptom, while dilatation may supervene later on. There is a general opinion that in General Paralysis the diseased mental state is first shown by depression, and that exalted ideas are more frequent in a later stage. Perhaps we may infer that those cases in which the right pupil was

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the larger and the mental state was one of depression, were in an early stage, while those in which an opposite condition obtained were further advanced.

Now, a state of contraction of the pupil is to be attributed to irritation of the third nerve, and dilatation to paralysis of the same. In a disease depending on a progressive disorganisation of the brain, such as that now under consideration, irritation is the first stage, while paralysis points to the disease being further advanced. Supposing then the disease to have commenced upon the left side of the brain, we should get contraction of the left pupil and mental depression. As the disease advanced we should get contraction of the right pupil from irritation, and subsequent dilatation of the left from paralysis of the third nerve, along with exalted ideas.

The following physio-pathological observations may be of interest as bearing on the subject, and I would draw special attention to the fact of the intimate connection of the origin of the *third nerve* with the *corpora-quadrigemina*, which, as will be seen, are proved by Ferrier's experiments to be the centre for *reflex expression of the emotions*.

The third pair of cerebral nerves (oculo-motor, which also supplies the circular fibres of the iris), arises from a central nucleus situated in the median line below the upper part of the aqueduct of sylvius, and is thus in close relation with the corpora-quadrigemina.

Now the experiments of Ferrier* and others prove that the optic lobes are the centre of co-ordination between retinal impressions and movements of the iris. Destruction of the corpora-quadrigemina causes dilatation of the pupil, while mechanical irritation of its deeper layers causes contraction.

Electrical irritation of the surface of the anterior tubercle of the corpora-quadrigemina of one side causes wide dilatation of the opposite pupil, followed almost immediately by dilatation of the pupil on the same side. There would thus appear to be some partial discussation in the nucleus of origin of the third nerve, or in the optic lobes. Irritation of the corpora-quadrigemina does not produce dilatation of the pupils, if the cervical sympathetic nerves have been divided, owing to paralysis of the fibres which supply the radiating muscular fibres of the iris. The dilatation is probably an indication of sensory irritation; sudden painful

* "On the Functions of the Brain," 1876.

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stimulation of sensory nerves being often associated with such a condition.

The corpora-quadrigemina, especially their deeper parts, seem to be centres chiefly concerned in the reflex expression of emotions, and this curious coincidence becomes of special interest in reference to the supposed connection between mental states and the condition of the pupil in general paralysis.

In Ferrier's experiments* the expression of emotion, generally pain or fear, was the result of an impression travelling along an afferent nerve (the hemispheres having been removed). But we may imagine an impression of a mental idea occurring in a supposed "centre of depression or exaltation" to be conducted to this reflex centre, viz., the optic lobes, and thence to be reflected along the third nerve as an expression of emotion, perceptible in the state of the pupil.

The phenomena of aphasia illustrate in a remarkable manner the functional difference between the cerebral hemispheres on either side, and show that in ordinary individuals the education of centres of volitional movement takes place in the left hemisphere. It has been noticed, however, that in some cases aphasia has been associated with left hemiplegia in left handed persons, in whom we may conclude that from some hereditary or other tendencies the centre, on the right side, had been the favoured one.

Ferrier calls attention to the less volitional and greater automatic power of the right hemisphere, and Bastian† believes that the "irritatory action of the left hemisphere, in relation to speech movements, is connected with a very slight precedence in its development, as compared with that of the other hemisphere; and that this precedence is itself a more or less remote consequence of an inherited tendency to right handedness."

Now as we find localisation of the speech "centre" in the third frontal (Broca's) convolution of the left side to be the result of education, hereditary tendency and habit; so without necessarily imagining "centres" for each particular mental state, we may imagine that cerebration, accompanied

* The condition of the iris was also found to be affected on irritation of the cerebellum, which causes contraction of the pupils, more particularly of that on the same side as the irritation. The pupils dilate on stimulation of the posterior half of the superior and middle frontal convolutions, and contract on stimulation of the angular gyrus.

† In his "Paralysis from Brain Disease," 1875.

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by mental exaltation, takes place habitually in one hemisphere, while ideas, attended by depression, have their origin in the other. M. Voisin* supposes the existence of a "centre of grandeur," which his reviewer, in the "Journal of Mental Science," for Oct., 1879, calls a "fanciful idea," considering that grandiose delusions are the result of unchecked or uncompared ideas. To this objection, it might be replied, by those who are prepared to go so far, that the unchecked ideas were the result of paralysis of a centre of depression, which, in healthy states of the mental apparatus, exercises a comparing or inhibitory faculty as regards the centre of grandeur.

Without committing myself to asserting the existence of a "centre of grandeur," I would point out that an investigation of the facts, as set forth in this paper, would tend to support M. Voisin's theory, and would point to the possible existence of a "centre of exaltation" in the right hemisphere, the irritation of which may give rise to grandiose delusions or exalted ideas (especially when, through paralysis of the comparing power, or opposite centre, it is unchecked in its action), while mental states of an opposite nature may be produced by irritation of a "centre of depression" on the left side of the brain.

Since the foregoing remarks were written, my attention has been called to Austin's† observations on this point; which I find also noticed by Sankey,‡ who does not, however, confirm them; but I was not at the time aware that previous observations had been recorded or made public.

It will be seen that my independent observations tend to confirm those of Austin, who writes as follows—"When the right pupil has been the more affected, the *general* tone of the delusions has been melancholic; and with a more implicated left pupil, their *usual* complexion has been elated, and their colouring gorgeous." To this rule he finds but two exceptions in a hundred "unselected" cases. In writing of the pathology of this disease, he concludes "that the ganglia of pleasure and pain are on different sides of the encephalon," and localises the seat of painful and pleasurable emotions in the right and left optic thalamus respectively; he also considers that disease of these great central ganglia is to be regarded as the primary physical cause of the malady. The

* In his "Traité de la Paralysie Générale des Aliénés," 1879.
† "On General Paralysis," 1859.
‡ "Lectures on Mental Diseases," 1866.

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writer of this paper is not inclined to localise the "centres of exaltation or depression" beyond placing them in the respective hemispheres. He also considers that these "centres," which are equivalent to "ganglia of pleasurable or painful emotion," are situated on opposite sides of the brain to those given by Mr. Austin.

In attempting to explain this discrepancy of the conclusions arrived at, it at once appears that in Mr. Austin's case the more disorganised the right thalamus was, the more surely was this condition associated with melancholia, and *vice versâ*. Now in the author's opinion this state would be attended by paralysis of the function of the part, while if the disease were less advanced in the opposite centre the function of the latter would predominate. Such complete disorganisation as occurred in Mr. Austin's cases points to the fact of the stage of irritation, which might be attended by increased functional activity being past. The cortical changes, upon which the mental phenomena are generally considered to depend, seem to have escaped observation, as they are barely alluded to by Austin; while from more recent accounts of *post mortem* observations he would appear to have exaggerated the amount and importance of the affection of the basal ganglia.

It must be borne in mind that the cases from which the statistical portion of this paper has been compiled are taken as recorded in the case books, and that the object of the paper is suggestive rather than assertive.

## CLINICAL NOTES AND CASES.

*Spontaneous Hypnotism.* By SIDNEY COUPLAND, M.D., Physician to the Middlesex Hospital.

The following case, which fell under my notice in the summer of 1878, seems to me to present points of unusual interest. Its subject is a young friend of mine, and I saw the case very often during its strange and varied progress:—

C. N., æt 12, is the second child of Mr. A. N., a man of robust frame, considerable intellectual power, and of a rather finely balanced nervous temperament, who has enjoyed good health, but is subject to attacks of "nervous headache." Of his five brothers two died from "rapid consumption;" the others are alive and well. His wife, who was somewhat strumous in youth, has enjoyed fairly vigorous health

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