THE JOURNAL OF MENTAL SCIENCE.

[*Published by Authority of the Medico-Psychological Association of Great Britain and Ireland.*]

No. 157. NEW SERIES, No. 121. APRIL, 1891. VOL. XXXVII.

PART 1.—ORIGINAL ARTICLES.

On the Weight of the Brain in the Insane, with reference to the Hemispheres, Lobes, Brain-Stem, and Cerebellum. Illustrated by Charts. By A. MERCIER, M.D., Burghölzli Asylum, Zürich. (*See foot-note, p.* 208).

These results are tabulated after weighing 400 brains as follows :—

150 cases of Paralysis.
70 cases of Atrophy.
180 other causes.

Divided according to sex, thus :—

Males—126 cases of Paralysis.
36 cases of Atrophy.
108 other causes.
Females—24 cases of Paralysis.
34 cases of Atrophy.
72 other causes.

In our tables only paralysis and other causes were mentioned, that is, 330 weighings of brains in all. Of the 400 brains weighed, 350 were treated by Meynert's sections, thus :—

Males—117 cases of Paralysis.
36 cases of Atrophy.
81 other causes.
Females—23 cases of Paralysis.
34 cases of Atrophy.
59 other causes.

The cases of atrophy were not taken into account. The total, therefore, is :—

140 cases of Paralysis.
140 other causes.

The weighings were expressed in grammes. An inequality of two grammes and less was taken as equality; an inequality of more than two grammes was taken as inequality. The brains, or parts of brains, were weighed without moisture, and after removal of membranes. The frontal lobe was separated by section along the fissure of Rolando. The medulla oblongata was cut off at the pyramidal decussation. The number of cases or of times was reduced to percentage. By the term *other causes* we mean all cases not arising from paralysis or atrophy.

The sections after Meynert were nearly all performed by Prof. Forel, the weighings by his assistant physicians. The tabular diagrams refer to 280 cases (Meynert's sections) :—

Males—117 cases of Paralysis ; 81 other causes.
Females— 23 cases of Paralysis ; 59 other causes.

Those for the whole brain refer to 330 cases :—

Males—126 cases of Paralysis ; 108 other causes.
Females— 24 cases of Paralysis ; 72 other causes.

All weighings follow one another in a continuous series, and have been taken from the records of the Burghölzli Asylum.

Among other results, the graphic representation demonstrates how greatly the brain substance decreases, especially in the frontal lobe, and in how pronounced a manner this fact reveals itself in females.

With reference to weight, the influence of paralysis on the brain-stem* and on the cerebellum is of very slight value. This is, perhaps, connected with the specific gravity of these parts of the brain.

In paralysis, the right frontal lobe seems to suffer more loss of weight than the left, and this fact is very pronounced in cases of atrophy. The right hemisphere is mostly (cases

* For a full description of Meynert's methods, see his work on "Psychiatry," translated by Sachs, and published by Putnam, New York, 1885. The description of the ganglia of the prosencephalon, thalamencephalon, mesencephalon, and metencephalon is given at page 25, and illustrated by drawings. At page 256 Meynert says that he gives preference to the statistical results of Weichselbaum and Pfleger, because they have enabled us to draw conclusions as to the proportionate weight of the different divisions of the brain. They used his (Meynert's) methods by not joining the cerebellum to the pons and other parts, and they regard the brain-stem, including the prosencephalic ganglion, as an important factor in calculating the weight of the brain. The brain-stem is separated from the mantle by cutting through the corona radiata—that is to say, the caudate nucleus with the island of Reil, the optic thalamus, corpora quadrigemina and crura cerebri, together with the pons and medulla oblongata, are separated from the rest of the brain. Meynert divides the brain into these parts :—Brain-mantle, cerebellum, and brain-stem—synonymous with Brain-Trunk or Axis.—A. R. U.

of atrophy excepted) heavier than the left in "paralysis," and in "other causes" the percentage is over 50.

The inequality is in general more pronounced for the occipital brain than for the frontal.

The equality for the frontal lobe occurs most distinctly in those cases which have been designated "other causes," that is, in the approximately normal (or less abnormal than paralysis, for instance).

By "other causes" (in the diagrams the continued (——) line), we indicate all those causes of death due neither to paralysis nor to atrophy; deaths, for instance, in cases of delirium acutum, typhus, pneumonia, hæmorrhage, foci of softening, etc.

The cases of atrophy were not marked in the diagrams in order to avoid too many complications.

Many conclusions may be drawn from these calculations and diagrams.

	per cent.
TABLE I.—*Cerebellum and Brain-Stem* (each weighed separately). Of 350 cases (all included) there were found:—	
Cerebellum and brain-stem of equal weight 52 times ...	= 15
Cerebellum and brain-stem of unequal weight 298 times ...	= 85
Namely, brain-stem heavier than cerebellum 48 times ...	= 13·7
Cerebellum heavier than brain-stem 250 times	= 71·4
And further (1°) in 140 cases of General Paralysis (40 per cent. of all cases) cerebellum and brain-stem were found of equal weight 13 times	= 9·3
Cerebellum and brain-stem of unequal weight 127 times ...	= 90·7
Namely, brain-stem heavier than cerebellum 17 times ...	= 12·1
Cerebellum heavier than brain-stem 110 times	= 78·5
(2°) In 70 cases of *Atrophy* (20 per cent. of all cases) cerebellum and brain-stem were found of equal weight 7 times	= 10
Cerebellum and brain-stem of unequal weight 63 times ...	= 90
Namely, brain-stem heavier than cerebellum 17 times ...	= 24·3
Cerebellum heavier than brain-stem 46 times	= 65·7
(3°) In 140 cases of *other causes* (40 per cent. of all cases) cerebellum and brain-stem were found of equal weight 32 times...	= 22·8
Cerebellum and brain-stem of unequal weight 108 times ...	= 77·2
Namely, brain-stem heavier than cerebellum 13 times ...	= 9·3
Cerebellum heavier than brain-stem 95 times	= 67·9
TABLE II.—*Frontal Lobes*, right and left (each weighed separately). Of 350 cases (all included):—	
Right and left frontal were found of equal weight 102 times	= 29·2

	per cent.
Right frontal and left frontal of unequal weight 248 times	= 70·8
Namely, right frontal heavier than left frontal 124 times ...	= 35·4
Left frontal heavier than right frontal 124 times	= 35·4
And further (1°) in 140 cases of *General Paralysis* (40 per cent.) :—	
Right and left frontal were found of equal weight 17 times	= 12·1
Right and left frontal of unequal weight 123 times ...	= 87·9
Namely, right frontal heavier than left frontal 61 times ...	= 43·5
Left frontal heavier than right frontal 62 times	= 44·4
(2°) In 70 cases of *Atrophy* (20 per cent.) :—	
Right and left frontal were found of equal weight 14 times	= 20
Right and left frontal of unequal weight 56 times	= 80
Namely, right frontal heavier than left frontal 24 times ...	= 34·3
Left frontal heavier than right frontal 32 times	= 45·7
(3°) In 140 cases of *other causes* (40 per cent.) :—	
Right and left frontal were found of equal weight 71 times	= 50·7
Right and left frontal of unequal weight 69 times... ...	= 49·3
Namely, right frontal heavier than left frontal 39 times ...	= 27·8
Left frontal heavier than right frontal 30 times	= 21·5

TABLE III.—350 cases—*Frontal Lobes.*—Of these weighings :—

a. 140 cases of General Paralysis.

b. 140 cases of " other causes."

[70 cases of Atrophy are not mentioned.]

TABLE IV.—*Right Occipital Lobe and Left Occipital Lobe** (each weighed separately). Of 350 cases, all included :—

Right occipital and left occipital were found of equal weight 95 times	= 27·2
Right occipital and left occipital of unequal weight 255 times	= 72·8
Namely, right occipital heavier than left occipital 154 times	= 44
Left occipital heavier than right occipital 101 times ...	= 28·8
And further (1°) In 140 cases of *General Paralysis* (40 per cent.) :—	
Right and left occipital were found of equal weight 21 times	= 15
Right occipital and left occipital of unequal weight 119 times	= 85
Namely, right occipital heavier than left occipital 70 times	= 50
Left occipital heavier than right occipital 49 times ...	= 35
(2°) In 70 cases of *Atrophy* (20 per cent.) :—	
Right and left occipital were found of equal weight 16 times	= 22·8
Right occipital and left occipital of unequal weight 54 times	= 77·2
Namely, right occipital heavier than left occipital 33 times	= 47·1
Left occipital heavier than right occipital 21 times ...	= 30·1

* By " Occipital lobe " is meant the Brain-mantle exclusive of the " Frontal lobe."—A. R. U.

per cent.

(3°) In 140 cases of *other causes* (40 per cent.) : —
Right occipital and left occipital were found of equal weight 58 times ... ... = 41·3
Right occipital and left occipital of unequal weight 82 times = 58·7
Namely, right occipital heavier than left occipital 51 times = 36·4
Left occipital heavier than right occipital 31 times ... = 22·3

TABLE V.—*Hemispheres.* Of 350 cases (all included) :—
The two hemispheres were found of equal weight 62 times = 17·7
The two hemispheres of unequal weight 288 times ... = 82·2
Namely, the right hemisphere heavier 177 times ... ... = 50·5
The left hemisphere heavier 111 times ... ... = 31·7
And further (1°) in 140 cases of *General Paralysis* (40 per cent.):—
The two hemispheres were found of equal weight 16 times = 11·4
The two hemispheres of unequal weight 124 times... ... = 88·5
Namely, the right hemisphere heavier 72 times ... ... = 51·4
The left hemisphere heavier 52 times ... ... = 37·1
(2°) In 70 cases of *Atrophy* (Dementia Senilis, organic diseases of the Brain, &c.) (20 per cent.) :—
The two hemispheres were found of equal weight 20 times = 28·5
The two hemispheres of unequal weight 50 times... ... = 71·4
Namely, the right hemisphere heavier 27 times ... ... = 38·5
The left hemisphere heavier 23 times ... ... = 32·8
(3°) In 140 cases of *other causes* (40 per cent.) :—
The two hemispheres were found of equal size 26 times ... = 18·5
The two hemispheres of unequal weight 114 times... ... = 81·5
Namely, the right hemisphere heavier 78 times ... ... = 55·7
The left hemisphere heavier 36 times ... ... = 25·7

TABLE VI.—*The Brain-Mantle. The Frontal and Occipital Lobes.*

TABLE VII.—*Weights of* 330 *Brains* (without atrophy) :—

126 cases of Paralysis } of males.
108 other causes }
24 cases of Paralysis } of females.
72 other causes }
Together—150 cases of Paralysis } dotted (...) line.
180 other causes } continued (—) line.

The tables for the "whole brain—males and females" have not been made, as it completely alters the percentage. Generally, in such weighings, the difference between females and males is so sharply marked that the headings "males" and "females" should always be kept separate.