NORMAL LOOKING BRAINS IN PSYCHOPATHIC SUBJECTS

SECOND NOTE (WESTBOROUGH STATE HOSPITAL MATERIAL)¹

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Following is another fragment of a study bearing on the essential nature of the so-called functional psychoses. It has been thought best to publish this fragment by itself because it forms another (and presumably unbiassed) foil to the exactly similar study from the Worcester State Hospital,² 1913, in which were noted certain contrasts with material examined by one of the writers at the Danvers State Hospital and as yet largely unpublished.³

Before rehearsing those contrasts which occasioned the present study, it will be well to state briefly how we suppose the

¹ Being Contributions from the State Board of Insanity Number 32, 1914, 12. The first note on this topic was by E. E. Southard, entitled "A Series of Normal-looking Brains in Psychopathic Subjects" (from the Laboratory of the Worcester State Hospital) published as S. B. I. Contribution Number 14 (1913-14), being Article number 11 in a series offered in compliment to Dr. Hosea Mason Quinby, published in the *Am. Jour. Insanity*, 1913. (*Biographical Note*.—The previous contribution in this series was by E. E. Southard, entitled "On the Association of Hyperkinetic Symptoms with Partial Lesions of the Optic Thalamus," published in the *JOURNAL OF NERVOUS AND MENTAL DISEASE*, October, 1914.)

² Southard. A series of Normal-looking Brains in Psychopathic Subjects. Worcester State Hospital Series, 1912-13. *Am. Jour. Insanity*, Vol. 69, No. 4, April, 1913.

³ Southard. Medical Contributions of the State Board of Insanity of Massachusetts: Introductory Note. *Boston Med. and Surg. Jour.*, Vol. CLXIX, No. 15, pp. 537-540, October 9, 1913.

problem of the functional psychoses can be attacked by a study of brains.^{4, 5} Most studies of functional psychoses directly concern themselves with living concrete cases (if they do not merely content themselves with atmospheric or special theoretical statements); yet of these living concrete cases we are not always sure that post mortem examinations would not destroy their "functionality" by providing brain lesions which would either explain or hopelessly complicate the supposedly functional phenomena in question.

Accordingly we have turned the problem about and are seeking what can be learned of the history and various factors (including somatic lesions) in cases having normal brains. In the absence of conclusive proof that any autopsied human brain is ever normal, we lean on the hypothesis that every brain should be considered normal until proved abnormal. We further hold that a normal-looking brain is more likely to be really normal than an abnormal-looking brain. We hope therefore to catch some true examples of the functional psychoses by scrutinizing the list of the normal-looking brain cases. By eventual microscopic examination of suitable cases we shall be able to approach closer and closer to the desired aim.

The material of 500 protocols from the Westborough State Hospital, we owe to the courtesy of the pathologist, Dr. Solomon C. Fuller, who personally made almost every autopsy included in this random and representative collection.

The Danvers and Worcester results with which we have chosen to compare the Westborough results may be summarized as follows:

1. Danvers yielded approximately one normal-looking brain in four; Worcester one in three.
2. Danvers yielded a little more than three normal-looking brains in ten victims of dementia præcox;⁶ all of the Worcester series of dementia præcox cases (42 in number) yielded no gross lesions.

⁴ Southard. The Mind Twist and Brain Spot Hypotheses in Psychopathology and Neuropathology. Psychopathic Hospital Contributions 1914. 8. Psychological Bulletin, April, 1914, Vol. XI, No. 4.

⁵ Southard. Psychopathology and Neuropathology: the problems of Teaching and Research Contrasted. Am. Jour. Psychology, 23, April, 1912.

⁶ Southard. A study of the Dementia Præcox Group in the Light of Certain Cases Showing Anomalies or Sclerosis in Particular Brain Regions. Am. Jour. Insanity, Vol. 67, p. 1, July, 1910.

These differences, of much importance in assuming a point of view toward the functional psychoses, were attributed in the former study in part to differences in anatomical standards in the Danvers and Worcester laboratories. The pathologists in each institution were of a highly critical nature. But, as it happened, the Danvers pathologists were suspicious of a brain's normality, whereas the Worcester suspicions were perhaps levelled more at a brain proclaiming itself abnormal. We should be inclined to concede the better logic to the Worcester standards on our own principle that a brain should be considered normal until proved abnormal. But it is certainly well that both standards should be used for comparative purposes with large materials.

Moreover it seemed certain that the Worcester standards had leaned over backwards in permitting every one of 42 dementia præcox brains to be let go as of normal appearance. And there was also the surprising result in the Worcester analysis that there was actually a higher proportion of senile psychoses in the normal-looking moiety of the series (32 per cent.) than in the abnormal moiety (20 per cent.).

By way of comment upon the present analysis, it should be said that we have learned from Dr. Fuller that he may have had more of the Danvers bias⁷ than of the Worcester tendency, since it appears that his attention was early attracted to the numerous arteriosclerotic lesions of his cases and he accordingly dissected all brains with unusual detail—partly also to meet the formerly current view that the vast majority of brains in psychopathic subjects “show nothing” grossly. So that once more we may be viewing the effects of the *esprit de détail* rather than of the *esprit de l'ensemble*.

A word may be required to assure the reader that the abnormal-looking majority among psychopathic brains is not to be taken as proof positive that the causes of psychopathy have been discovered even for that majority. It is a far cry from the brain abnormality at autopsy backward to the clinical symptoms in life. We seek our normal-looking brains, not because the clinical correlations of abnormal brains are established, but because we wish to discover at last some functional cases which shall be above reproach.

⁷ Bias perhaps, but not training, since Dr. Fuller's point of view developed independently.

Westborough Normal-looking Brain cases classified by Diagnosis

Of 74 cases in which autopsy showed brains of a normal appearance (data of Dr. Solomon C. Fuller) drawn from a total series of 500 autopsied cases, there was (to judge by the assigned clinical diagnoses) a clinical grouping as follows:

Senile dementia.....	7
Secondary dementia	2
Organic dementia	2
General paresis	4
Total senile and organic psychoses	15
Manic depressive psychoses	9
Chronic melancholia	1
Involution melancholia	5
Total manic-depressive group.....	15
Dementia præcox	17
Paranoia	6
Total	23

Adhering to Kræpelinian lines, we find accordingly:

Endogenous deteriorations	23
Manic-depressive group (melancholia included).....	15
Senile and organic psychoses	15
Symptomatic psychoses	7
Epileptic psychoses	6
Alcoholic psychoses	4
Psychoses of unknown nature	4
Total	74

The following table shows the comparative numbers of normal-looking brains in the two series:

	Worcester	Westborough
Total brains	741	500
Abnormal-looking	492	427
Normal-looking	249	74
Per cent. normal-looking	34%	15%

The following table tests the standards as applied to dementia præcox:

	Worcester	Westborough
Total brains	741	500
Dementia præcox	42	35
Abnormal-looking	0	18
Normal-looking	32	17

The scant majority of abnormal-looking brains in the Westborough dementia præcox series is of course by no means so strik-

ing as the 68 per cent. found in the first Danvers series or the 92 per cent. found in a more recent Danvers series about to be published;⁸ but the figures are strikingly different from those at Worcester.

The results in the senile psychoses are instructive:

	Worcester	Westborough
Total brains	741	500
Senile psychoses	176 24%	109 22%
Abnormal-looking brains	96	102
Normal-looking brains	80	7

Thus, whereas about 45 per cent. of the Worcester seniles are recorded as having normal-looking brains, only about 6 per cent. of the Westborough seniles are so recorded. This disparity is perhaps due to the unusually careful dissections made by Dr. Fuller in all cases suspected of arteriosclerosis. The Westborough data give a much higher percentage of abnormalities than did certain selected series of Danvers cases. By consequence, some conclusions formerly drawn concerning the possible functionality of many senile cases must remain *suspect*.^{9, 10}

In connection with any study of functional psychoses, manic-depressive psychoses are of interest. A table shows comparisons:

	Worcester	Westborough
Total brains	741	500
Manic-depressive psychoses	36	34
Abnormal-looking brains	9	25
Normal-looking brains	27	9

Here is a disparity worth examining farther. Of course the standards of clinical diagnosis may vary. Then the tendency to arteriosclerosis on the part of manic-depressives may swell the percentage of abnormal-looking brains.

⁸ Southard. On the Topographical Distribution of Cortex Lesions and Anomalies in Dementia Præcox, with some Account of their Functional Significance (submitted to Am. Jour. Insanity, amplified from paper read at Washington (before Am. Neurol. Assn., 1913)).

⁹ Southard. The Margin of Error in the Diagnosis of Mental Disease: Based on a Clinical and Anatomical Review of 250 Cases Examined at the Danvers State Hospital, Massachusetts, 1904-8. Charles Whitney Page Series (1910. 2), Boston Med. and Surg. Jour., Vol. 63, No. 5, August, 1910.

¹⁰ Southard. Anatomical Findings in Senile Dementia: A Diagnostic Study Bearing Especially on the Group of Cerebral Atrophies. Am. Jour. Insanity, Vol. 66, No. 4, April, 1910.

Table of Durations

Duration	Cases
Under 3 months	12
3-12 months	12
1-2 years	5
2-3 years	9
3 years	4
4 years	3
5 years	7
6 years	3
7 years	2
8 years	1
9 years	1
10 years	3
11 years	2
12 years	1
13 years	1
15 years	1
16 years	3
17 years	2
19 years	1
55 years	1

24	} 29
5	
13	} 42
4	
3	} 20
7	
3	} 31
2	
1	} 11
1	
3	} 11
2	
1	} 11
1	
3	} 11
2	
1	} 11
1	

From the above table of duration it appears that 58 per cent. of the normal-looking brain cases were 3 years or less in duration of symptoms from onset to death, that 33 per cent. lasted but a year or less, and that 10 per cent. lasted less than 3 months from onset.

Following is a table of comparisons:

	Worcester	Westborough
Total normal-looking brains....	248	73
Duration 3 years or less.....	132 53%	42 58%
Duration 1 year or less.....	36 15%	24 33%
Duration 3 months or less.....	26 11%	12 16%

The Westborough series clearly contains a better representation of very acute cases.

Conclusions

1. The writers have tested former issues concerning the functionality of mental disease (derived from a comparison of Worcester autopsy material with that from Danvers) by a study of Westborough material in which neither a bias towards functionality nor a bias towards structurality ("organic nature") was likely.

2. The Worcester proportion of normal-looking brains in a series of psychopathic subjects was about one in three, the Danvers proportion about one in four; the Westborough proportion proves to be about one in seven.

3. The Westborough standards tend to overthrow the idea of the essential functionality of various senile cases, an idea that was suggested both by the Danvers and the Worcester series of autopsies.

4. As to the moot question of dementia præcox, the Westborough results stand nearer the Danvers results, exhibiting a scant majority of gross-lesion cases as against the long entirely negative series at Worcester and the high percentages of gross lesion found at Danvers.

5. In a previous study use was made of a principle that extensive microscopic changes may be wholly consistent with a grossly normal brain appearance up to a period not yet accurately established (say three months): in point of fact 11 per cent. of the Worcester series (26 cases) and 16 per cent. of the Westborough series (12 cases) had a total duration of symptoms of three months or less.

6. Practically it is often a year or more before visible and tangible changes in the brain of an undoubted character set in; and 15 per cent. of the Worcester series (36 cases) and 33 per cent. of the Westborough series (24 cases) had durations of a year or less.

7. Perhaps it is too much to ask the anatomist at the autopsy table to diagnosticate the results of finer diffuse destructive changes (non-globar, not affecting the projection system) which have lasted but a year or less.

8. Practically we look for recoveries up to three years more or less: 53 per cent. of the Worcester series (132 cases) and 58 per cent. of the Westborough series (42) had lasted but three years or less. Such cases may well show (and many of them have shown, though it is not our design to describe them) microscopic changes of an important reversible or non-destructive character.

9. Research should accordingly be bent upon those long-standing cases which nevertheless show no gross effects of their disease in the brain: The microscope may discover in this group either (*a*) evidences of reversible brain-cell changes such that they never produce any gross effects (physical or chemical changes not interfering with cell-nuclei or other vegetative mechanisms) or (*b*) no evidences of morbid brain changes whatever, but merely such appearances as are consistent with the brain's reacting normally to influences *ab extra*.

10. These orientation studies show how seldom are all the conditions right for testing such an hypothesis as that of the intrinsic normality of brain mechanisms whose reactions are taking effect in extrinsic abnormality, *i. e.*, the hypothesis that mental disease may be entirely functional so far as the brain is concerned.

11. Accordingly we seem still farther away from a strict proof that "the whole cortex, or even the whole nervous system, might be intrinsically normal but extrinsically abnormal in its reactions to a given chemical, physical, or other condition."