A brush or quill should be used in lifting the sections; metal needles and sections-lifters are inadmissible. It is necessary, too, that distilled water be used throughout the entire process.

Both of these methods are easy of application and, if their details are faithfully carried out, will yield fairly constant results. It must be borne in mind, however, that the initial impregnation in Cox's fluid is somewhat capricious in its behaviour. It may be incomplete and irregular to such an extent that the individual sections cut from the same piece of tissue vary greatly in the amount of detail which they show. To ensure the ultimate production of a satisfactory permanent specimen it is therefore necessary to see that the mercurial impregnation has been successful in the first instance. It is probable, however, that these platinum methods are still capable of further improvement.

Briefly stated, the special advantages possessed by the preparations are that they are permanent under a cover-glass, that they can be readily examined with ordinary high powers and with oil immersion lenses, and that the deposit is black, or nearly so. Our special object in working out these processes has been to endeavour to render Golgi's method more serviceable than it has hitherto proved in the study of pathological changes affecting the cortical nerve-cells in cases of insanity. We shall not, however, enter upon this subject here, but reserve it for a future communication.

Morbid Changes in Dementia. By JOSEPH SHAW BOLTON, B.Sc., M.D., B.S.Lond.

THE demonstration I am about to give on the "Morbid Changes in Dementia" is a preliminary report of an investigation which I have nearly completed, and which I propose to publish in detail later.

I have during the past four years carried out a micrometer study of the cerebral cortex from the point of view of general

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histology or cortical lamination. During this investigation I have made a lengthy series of micrometer measurements of the whole of six occipital lobes, which are the parts of the brain least affected by the morbid changes occurring in mental disease, and also probably of relatively low functional activity in general mental processes, and have arrived at certain conclusions concerning the functions of the pyramidal layer of nerve-cells. The use of the least affected portions of the cerebrum during this investigation has enabled me to avoid many fallacies which would have occurred had I selected the grossly changed pre-frontal regions. I have found that the pyramidal layer of nerve-cells varies in depth according to the degree of normal amentia or dementia existing in the patient, whilst the other layers of the cortex remain, not relatively, but absolutely of the same depth as those in the normal adult brain (allowing of course for the necessary errors of measurement). The part of the pyramidal layer chiefly concerned is the layer of small pyramids, and this agrees with the extensive microscopic changes in those cells which are known to exist in general paralysis of the insane. I have also found, as would, *a priori*, be expected, that the pyramidal layer in the visuo-sensory region approximates more nearly to the normal depth, both in infants and in dements.

Lantern plates of normal "psychic" cortex, and of the "psychic" cortex of a child aged one month, and suffering from congenital anophthalmos, were then shown, and attention was drawn to the decreased depth of the layer of small pyramids in the latter compared with the other layers of the cortex, which were almost exactly of the normal depth.

The following Table was then projected on the lantern and explained (see p. 332).

I have been led by these results to make a careful study of the morbid changes occurring inside the skull-cap in a series of cases of insanity, and have found, as I shall presently show, that these morbid changes vary in degree with the amount of dementia alone, and not, as is so frequently taught, with the chronicity of the case, and quite apart from the dementia existing.

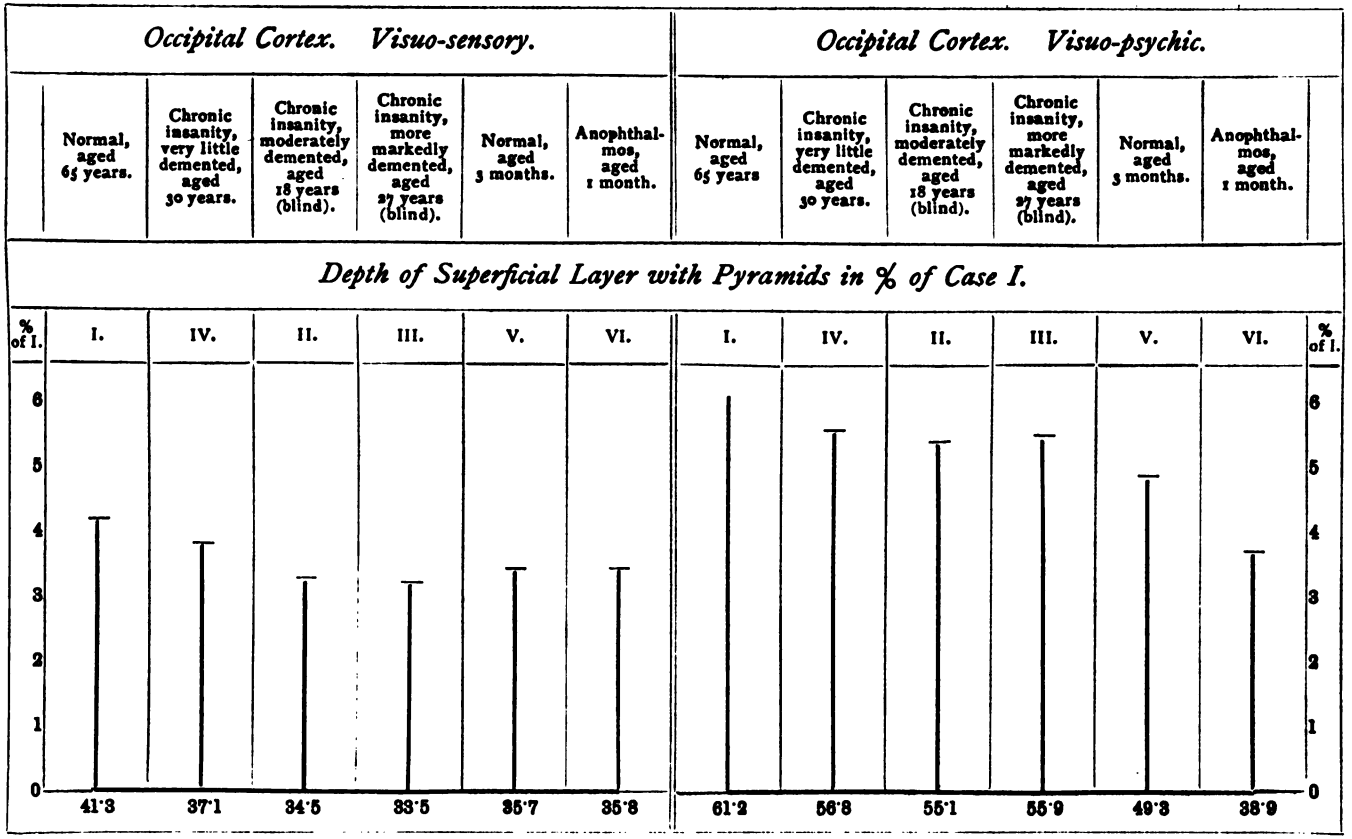
I will now lay before you an analysis of 121 cases of insanity, grouped according to the amount of dementia present at death.

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Morbid Changes in Dementia.

Group No.	Cases.	Type.	Ascertained duration.	Heredity.	Dura.	Subdural space.	Pia arachnoid.	Sub-arachnoid space.	Lateral ventricles.	Gran. lateral sacs.
I	21	No obvious dementia: 8 = Emotional or excitable; 4 = Slight imbecility; 6 = Chronic delusion cases; 2 = Vascular lesions; 1 = Cerebral abscess; 1 = Acute insanity with tuberculosis	Several years; Several years; Several weeks (1, 10 years)	9·5 %	Natural	Some excess in 28·6 %: 1 = subdural hæmorrhage; 1 = many small softenings; 4 = old persons	Slight F. or F.P. thickening in 5 cases. Stripped naturally	Slight excess in 9·5 %	Dilated slightly in 4·8 % (old focal lesion)	24 %
II	30	Mild dementia: 13 = Excited; 14 = Chronic insanity, + or − delusions; 3 = Chronic depression, + or − delusions	1—18 years	23 %	Thickened or adherent in 16·6 %	47 %	Somewhat thickened in all, chiefly F.P. Stripped rather more readily than natural	40 %	Dilated 30 %	20 %
III	33	Moderate dementia + chronic insanity	1—40 years	24 %	18 %	91 %	Moderately thickened, and in some slightly opaque, chiefly F.P. Stripped readily	91 %	57·5 %	33 %
IV	13	Marked dementia + chronic insanity	1—21 years	30 %	46 %	92 %	Opaque and considerably thickened. Strips very readily	92 %	69 %	38 %
V	24	Gross dementia	(?) 1—23 yrs. Histories very incomplete	25 %	29 %	100 %	Very thick and opaque. Strips like a glove	100 %	79 % (of those not dilated, 1 = calcar. arter. + seizures, 1 = fits)	46 %
	121									

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Other layers, excepting in the blind cases, are same actual depth as normal.

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I have investigated this point myself, so as to eliminate the personal equation which would have occurred had I made use of the reports of the several medical officers under whose charge the patients happened to be at the time of death.

Lantern plates of hemispheres were then shown to illustrate the various stages of cortical wasting associated with different grades of dementia (see p. 333).

The conclusions I draw from the facts I have laid before you are: (1) that the thickness of the pyramidal layer of nerve-cells varies with the degree of amentia or of dementia existing in the patient; and (2) that the microscopic morbid changes occurring in insanity depend on the amount of dementia alone, and are independent of the length of time during which the insanity has existed.

Discussion

At the General Meeting of the Association, Claybury Asylum, 14th February, 1901.

The President referred to the development of the embryonic brain cells, which progressed as the age and education of the individual advanced.

Dr. Wiglesworth said that Dr. Bolton's work, of which he had given the results on the screen, represented an enormous amount of labour. The results were of considerable value, and there was room for further research in the same direction. They were a little apt to neglect the chronic and work at the acute cases, but the mapping out of the cord had been done in connection with the chronic diseases, such as locomotor ataxy. The same thing had not been done with regard to the brain.

Dr. Robert Jones said that those who knew Dr. Bolton would appreciate not only the great industry, but also the accurate observation which he brings to bear upon his work. He thought they should be a little careful about using such terms as "psychic cells," which Dr. Bolton had defined as those not connected with either motion or sensation. In the chronic cases referred to they saw that there was a tremendous amount of waterlogging, and that in chronic dements the water increased even up to 100 per cent., as shown on the diagram. They knew, from Bevan Lewis's investigations, that there were lymph-connecting elements, which carried the lymph to, from, and around the pericellular spaces. They had heard nothing about them that afternoon, probably because the paper was connected with certain other definite cells, which they were told were "psychic" cells. Latterly one had heard much about the nucleus, and the influence that it has over the nutritive and functional activity of the cell. So long as the nucleus was not outside a cell—was not extruded—that cell had every chance of living, and perhaps regenerating and assuming its own definite functions. But if they considered the brain cells themselves, they would find that the large pyramidal cells—so-called motor—presented a very much smaller nutritive area than the angular cells, owing to the fact that in the latter the protoplasm was more broken up as it were, and presented a more extensive periphery in touch with the lymph; but the nuclei relatively were smaller in these larger cells than in the more superficial pyramidal ones. If they were to consider the nuclei of those cells, it seemed to him that, being in definite organisation with the larger and lower cells, they served to control the lower ones. Have we sufficient reason to consider these as the "tissue of mind"? It was not in the fourth layer of the brain that the atrophy

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should take place, as he understood Dr. Bolton to have shown; but it should occur in the superficial layer, where there was a relative increase in the size of the nucleus and the size of the nerve-cell itself, and relatively also as to circumference in relation to the nutritive perilymph. One had to be very careful in assuming that there were such things as "psychic" cells. Bain had connected mind very much with the periphery, and he thought the same author was the first psychologist to connect Will with the muscular sense. They should be very cautious about allocating definite consciousness or psychic functions to particular cells.

Dr. BOLTON, in reply, said, with reference to Dr. Fletcher Beach's remarks, in the case of a very young child, or an embryo, all the cells were what were called neuroblasts. They contained very little protoplasm and very large nuclei. If the brains of children at different ages were examined, it would be found that with increasing age more and more of those cells became true nerve-cells, and ceased to be neuroblastic in structure. In the adult they could frequently find cells in all the layers, about which there had been considerable dispute. Many of these were probably undeveloped neuroblasts. With regard to Dr. Jones's remarks, he was much indebted to Dr. Jones for having so strongly supported the points he himself had been endeavouring to impress on his hearers. In the first place he, Dr. Bolton, said psychic *areas* of the brain; he spoke of areas of the cortex as psychic which were neither sensory, on the one hand, nor motor, or chiefly subserving efferent function, on the other. That was what he meant when speaking of the psychic cortex. With regard to the cells, when he was speaking of the layer of cells which he considered psychic, owing to the fact that they were a layer which were small in depth in children and also in dementia, he was not referring to the fourth layer, but to the superficial layer of all, the very one which Dr. Jones said ought to be psychic. [Dr. JONES.—You referred to the pyramidal.] They are pyramidal, small pyramidal cells, and they lie in the superficial part of the layer of pyramids, which extends as far as the granular layer. Dr. Jones said the nucleus was larger near the surface. That was so, because the cells were more neuroblastic, and the younger the child the larger the nuclei were. They were practically neuroblasts at one month. The larger pyramids could be looked upon as the truly formed cell, with all its potentialities developed, and it had a nucleus which they could look upon as of normal size and properly developed. Very few people had attained even approximately to the absolutely perfect development of brain power, and consequently many of the cells of the layer of small pyramids remained in a more or less neuroblastic condition.

Clinical Notes and Cases.

Case of Murder, the Result of Pure Homicidal Impulse.

By J. WIGLESWORTH, M.D., F.R.C.P.

CASES of murder committed in response to a pure homicidal impulse by a person otherwise rational, and free from hallucinations and delusions, are not of very frequent occurrence, and I have thought, therefore, that a narration of the following case, which I have been unfortunate enough to have had under my immediate personal observation, might present some elements of scientific interest.

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