

Miscellaneous research papers

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STATEMENT requested by the Executive Committee of the Laboratory of the Scottish Asylums, at Meeting held on the 5th December 1902, regarding alterations needed in the present working scheme of the Laboratory, in order to make it conform to the existing requirements of Pathological Research.

When the Laboratory was established in 1897, it was equipped exclusively for the study of pathological anatomy. In the circumstances of the time, a more comprehensive programme of work, even if its necessity could have been foreseen, would certainly have been impracticable. But what may have been expedient as a first step, and sufficiently in conformity with the state of scientific knowledge at that time, cannot be regarded as adequate provision for the prosecution of research in the pathology of insanity to-day. From the opening of the Laboratory until now, its working scheme has undergone almost no extension. Meanwhile, however, the pathology of insanity has gone forward at a rate that has been altogether phenomenal. Not only have there been important discoveries within its own sphere, but in collateral science there have been epoch-making advances, which have unmistakably indicated the path along which psychiatry must progress. There have been great advances in physiology, in general and experimental pathology and in bacteriology, many of which unquestionably have the closest bearing upon problems in the pathogenesis of insanity. In two special departments of these sciences there have been acquisitions which have a paramount importance. I refer to the recent work upon the experimental pathology of the nerve-cell, and to that upon the mechanism by which the living body defends itself against inimical forces, more especially bacteria and their toxins. The first has done much to help to make it clear that we must search in the environment of the nerve-cells, and not in these tissue-elements themselves, for the causes of those alterations that can be recognised to have taken place in them in most cases of acquired insanity. The second, out of which has arisen the modern doctrine of immunity, has enormously widened the pathologist's horizon, revealing to him the existence of active and latent protective mechanisms of the most vital importance, and doing more to explain the phenomena of diseases of bacterial origin than all previous discoveries put together. The best authorities freely recognise that the doctrine of immunity, the progressive enrichment of which continues with undiminished activity, is rapidly revolutionising general pathology, if it has not indeed already done so.

There is naturally room for much difference of opinion as to how far the facts and principles of general pathology are applicable to the special pathology of insanity. Whilst, on the one hand, there are those who altogether refuse, or are unable, to look at insanity from the standpoint of general pathology, there are, on the other, those who endeavour to explain, by the laws of general pathology, all those phenomena that we can observe or infer in our studies upon the pathology of insanity. For my own part, believing that the pathology of insanity is capable of being brought into line with general pathology, and that it is

only by investigating insanity from this standpoint that we shall ever make any important advances in its therapeutics and prophylaxis, I would endeavour to apply the principles of general pathology to the study of insanity up to the utmost logical limit, at the same time always recognising that the subject is capable of being looked at from an entirely different standpoint—namely, that of psychology. In accordance, then, with the ascertained facts and established principles of general pathology, and in essential conformity with the teaching in some of the most important Continental Schools of Psychiatry, it may be affirmed (1) That all cases of acquired insanity are dependent upon the action of inimical forces in the environment of the nervous tissues of the brain; and (2) That in by far the larger proportion of those cases the inimical forces are represented by some form of intoxication. As the class of acquired insanity is a much larger one than that of purely developmental insanity (the primary division that it is necessary to make from the standpoint of general pathology), the rôle of intoxication in the pathogenesis of insanity is a very important one. To investigate the pathogenesis of acquired insanity as thus understood is at the present moment the great object of research in this department of pathology, and the work is being prosecuted now with the most commendable industry in many foreign laboratories, and in two or three in England. The nature of the toxic actions can never be elucidated by merely studying the morbid clinical phenomena and the tissue-changes. These are not disease, but the effects of disease, and they seldom give any definite information as to their causation. In order to investigate fully the pathogenesis of any disease—in other words, to trace all the stages of the battle that is fought between some invading forces on the one hand, and the tissues of the living body on the other—it is absolutely necessary to utilise all the available resources of clinical investigation, pathological anatomy, chemical pathology and bacteriology, and sometimes also those of experimental pathology. This is recognised as an elementary proposition by every pathologist to-day. It applies to the pathology of insanity, as well as to other branches of pathology. A little further consideration of the kind of work that is waiting to be done should make this quite evident. That work is prescribed by no individual fancy, but simply by the present position of pathological science. It is to investigate the disorders of bodily nutrition that determine insanity, to trace them from their origin to their termination, in order that, through understanding them, we may haply be enabled to prevent or arrest them. The great acquisitions to knowledge to which I have referred must be applied to the elucidation of the pathogenesis of insanity, and all further advances must be watched and, if applicable, utilised in the same way. Practically this means the laborious and patient investigation of the state of the defensive mechanisms in various types of insanity and in individual cases, a search for local and general infections, a study of the degree of virulence of the pathogenic organisms that are commonly present on the internal body-surfaces, investigation of the bacterial flora of the gastro-intestinal tract, experimental serum diagnosis, chemical examination of the gastro-intestinal action, the study of the histological changes in the blood, the chemical examination of the urine, the daily observation of the altered physiological conditions in individual cases, the following of fatal cases to the *post-mortem* room, and the comparison of phenomena observed during life with those that can be recognised by bacteriological,

chemical, and anatomical methods after death. A vast and important work is thus waiting to be done in the field of the pathology of insanity, a work which, long ere it has been fully accomplished, will have resulted in the attainment of rational therapeutic and prophylactic measures for most forms of acquired insanity.

In numerous Continental asylums, the very programme I have sketched is being diligently carried out now. In two or three asylums of this country the work is now being taken up, but these instances are only exceptions to a general rule. The Laboratory of the Scottish Asylums is neither properly situated nor equipped for it.

Facts and Authorities Opinions supporting the foregoing Views.

Lest what has been said should be regarded as the expression of an extreme and merely personal view, I desire to refer to certain facts and authoritative recent expressions of opinion that corroborate my statements.

The Pathological Institute of the New York State Hospitals has lately been transferred from its original premises in New York City to the Manhattan State Hospital on Ward's Island, with the special object of bringing the work of the Laboratory into touch with clinical investigation.

The London County Council Asylums' Laboratory, and those of the Lancashire and Yorkshire Asylums, are located at asylums.

The laboratories that are turning out by far the best work in neuropathology at the present moment—namely, certain of those in Italy—are all located at asylums, and they are equipped for bacteriological and chemical investigations, as well as for anatomical.

Professor Tamburini, in his Presidential Address to the Congress of the Società Freniatrica Italiana, held at Ancona in the autumn of 1901, entitled "The Conquests of Psychiatry in the 19th Century and its Future in the 20th" (*Rivista Sperimentale di Freniatria*, 1902, f. 1), spoke of the progress that had recently been made as having brought about a true revolution in the clinical conception of the acute forms of morbid processes, the nature of which was still subject for investigation. He further said:—"For such investigation an entirely new and most profitable path has now been opened up in psychiatry by discoveries in experimental pathology, aided by bacteriology and chemistry. Researches upon the alterations that affect the viscera and metabolism, and upon infectious and intoxications in the genesis of mental diseases, to which Italian scientists have made no small contribution, have brought into view entirely new horizons, and thrown floods of brilliant light upon the intimate, mysterious pathogenic processes of psychical diseases, and upon their means of treatment." He forecasted the work that lies before psychiatry in the present century as follows:—"To obtain (1) an exact knowledge of the intimate mechanism, the pathogenic processes, of insanity, (2) rational and efficacious means of treatment of diseases of the mind, founded upon that exact knowledge, and (3) a diminution of the frequency of insanity. He also said:—"Anatomo-pathological, experimental and microbiological researches, which have already begun to reveal to us the

intimate relations that all the viscera have to the brain, and the very important part that infective and toxic processes and auto-intoxications play in the production of nervous and mental diseases, these researches, assisted by the most delicate investigations of chemistry, of which we expect a great future in our studies, will tell us what are those noxious principles that poison the blood and distort the mental functions, they will reveal to us their nature, the mode of their production and action, the modes and the paths of their elimination, and will furnish us with the arms with which to fight and conquer them."

I would also quote the closing sentences of the address, as they throw into striking contrast the relative positions of research in the pathology of insanity in Italy and in our own much richer country. After having sketched the great benefits that research in psychiatry is evidently destined to confer upon humanity, he concluded thus:—"We who tread the downward path of our life's journey shall see perhaps only the first glimmer of the dawn of this glorious day of peace. But you, young men, you shall see it advance, and perhaps you will be able also to rejoice in the approach of its triumphal meridian. And you can and ought to co-operate in its advent. Consider that in the modest and patient work of your scientific laboratories, in the daily exercise of your arduous and obscure task of asylum physicians, you can, always directing your work and your thoughts towards the two great ideals, Science and Charity, you can each moment make your contribution to this great edifice of social renovation—Bright dream of to-day, the joy and glory of the future of humanity!"

It is a striking commentary upon the position of matters in this country that, whilst this passage was spoken with perfect fitness to the persons to whom it was addressed, it could not appropriately be uttered in corresponding circumstances by the President of our Medico-Psychological Association, for here the scientific laboratories of the kind referred to (with exceptions that do not alter the general fact) do not exist, and the already overburdened asylum physician has neither the spare time nor the surplus energy to make the contribution indicated, even if he had the properly equipped laboratory in which to fabricate it.

In a recent paper, in which he gives to his own countrymen the impressions derived from a visit to some of the Scottish asylums, Professor Bianchi of Naples has expressed some opinions, which may appropriately be quoted here.

I would premise that Professor Bianchi is recognised throughout the Continent of Europe to be one of the highest living authorities upon insanity. His original contributions to neurology and psychiatry have been numerous and important. He is highly honoured, not only in his own country, but beyond its borders, as witness the important parts he has been invited to take at the Egyptian Medical Congress, and at the approaching International Medical Congress at Madrid. He is at the head of a school of neurology and psychiatry that has in recent years produced some of the best original work that has been done in these departments of science. His views upon the value of researches in the field of the pathology of insanity are therefore deserving of our most earnest consideration. No one who knows the man will for a moment entertain a suspicion that the stringent

criticisms he passes upon some of our arrangements are made in any other spirit than that of simple loyalty to science.

He says:—"Investigations into the causes of insanity and the nature of the psychopathies are of the highest social and scientific interest. I can think of no field that is more fruitful and more promising of useful applications to social hygiene, and to the prophylaxis and treatment of insanity than that of etiology and pathogenesis." "The fact that most forms of acute insanity depend either upon auto-intoxication, exogenous intoxications or infections, justifies the creation of pathological laboratories attached to asylums; for when the doctrines of the etiology and pathology of mental diseases, and of psycho-somatic degeneration, shall have been better and more firmly established, these acute forms of insanity will have their rational therapeutics and prophylaxis."

He speaks with approval of the laboratories seen at two of the asylums visited (one of these, however, was an English asylum), but chiefly on the ground of the guarantee they give of progress in the future. He devotes considerable space to the Laboratory of the Scottish Asylums, and his remarks upon it are by no means all of the nature of adverse criticism. He states, however, that though the laboratory is well organised, it is not provided with the various means of research with a liberality proportionate to the richness of the asylums. It is evident, he says, that the administrators still show timidity and hesitation in providing those means of scientific research that have the appearance of a luxury, or that seem to them not to be of immediate utility. The microscope, normal and pathological anatomy, bacteriology, chemical pathology, photography, and experiments upon animals, are not, in his opinion, scientific luxuries, but means indispensable for the attainment of the ends aimed at by all well-organised and well-managed asylums. To him asylums are not merely houses of refuge for the mentally afflicted, but also centres for investigation into the causes of mental disorders. He further says:—"Nothing, in my opinion, should be grudged to these laboratories, neither the best men nor the necessary equipment. We in Italy, with limited means, have done much more. The asylums of Italy are in great part furnished with laboratories." In order to make it possible for the Central Laboratory to fulfil its true purpose, "the director ought," he says, "to be placed in more favourable conditions, so that he can devote himself to research without preoccupation, and free from technical difficulties. For example, the system of sending to the pathologist pieces of tissues from the asylums, some of which are a long way off, is not in accord with all the requirements of research. The pathologist ought himself to do the autopsies in all cases worthy of special study. He ought himself to select the pieces that are to be investigated; he ought to be able to indicate the fixing solutions to be used immediately after the autopsy. He should have a copy of the clinical history of the patient. He ought to be allowed also to make bacteriological researches upon the blood, etc., in the living subject. He should, in a word, be placed in more favourable conditions, in order that he may be enabled to utilise the available clinical and pathological material to the best advantage."

I would add here that it is not essential to go abroad for corroboration of the views that I have put forward. There are persons in this country, though they form only a com-

paratively small number, who hold essentially similar opinions as to the important work that is waiting to be done in the fields that I have specified for the advancement of psychiatry.

The Duty of Asylums in regard to Investigation of the Pathology of Insanity.

The Boards and Medical Superintendents of the asylums of this country do not, I think, in general realise their responsibility in regard to the advancement of our knowledge of the pathology of insanity. The Law requires that the certified insane (with exceptions as regards Scotland that do not invalidate the argument) should be placed in asylums. Insanity is consequently excluded from the field of research that is so diligently cultivated in our general hospitals, supported by their own laboratories, and those of our universities and medical colleges. The responsibility of promoting the scientific study of insanity therefore rests solely upon the asylums. It is a trust forced upon them by the very circumstances of the case. It is, moreover, a solemn trust, for the whole aim and object of that scientific study is the attainment of means to alleviate human suffering, and it is certainly only through such study that more successful methods of treating cases of insanity will ever be obtained.

What would constitute an ideal Central Laboratory for the Scottish Asylums?

There are at least three distinct functions that an ideal central laboratory for any group of asylums ought to fulfil, namely, those of a centre for research in the pathology of insanity, a place at which expert opinion can be obtained by the staff of any of the asylums, and a school for the training of asylum pathologists.

To fulfil these functions, it would require to be situated at a large public asylum, or at a psychopathic hospital, or to be connected with the psychiatric wards of a general hospital. Only the first-named of these places is available in this country. The laboratory would have to be fully equipped for the necessary clinical, anatomical, bacteriological, and chemical observations. Ample access to clinical material, as well as to *post-mortem* examinations, would have to be afforded to its workers. The departments of pathological chemistry and pathological anatomy should each be in charge of a specialist. These two would meet on common ground in the department of bacteriology. Every facility should be given to others, who have the time, inclination and ability, to carry out researches in the laboratory under the supervision of the pathologists.

As a place at which expert opinion can be obtained in matters relating to the pathology of insanity, it should play an important part in the fostering of the scientific spirit in the asylums, both as regards diagnostic investigations and original research.

As a school for the training of asylum pathologists, it ought to be able to afford instruction, not only in the facts and methods of pathological anatomy, but also in those of clinical pathology, bacteriology, and chemical pathology, in so far as they are applicable to the study of insanity. In this connection, it is to be observed that the day is rapidly

approaching when every large asylum will of necessity have its own pathologist, not for research specially, but for mere purposes of accurate diagnosis. This necessity is already realised in our general hospitals and in many Continental asylums. The making of *post-mortem* examinations will be a minor duty of the asylum pathologist of the future. His chief work will, as I have indicated, be to make diagnostic investigations of various kinds upon the living subject, including bacteriological examinations, testing of serum reactions, blood examinations, investigations of the gastric functional action, chemical investigation of the urine, &c.

The day in which the services of a pathologist for mere purposes of accurate diagnosis will be needed in all our large asylums is not one that is still a long way off; it is already here if the recent advances in collateral science were applied to psychiatry as they ought to be.

It may perhaps be asked—Why have a central laboratory at all if the day is soon coming in which every large asylum will require to have its own pathologist? The reply is simply that the function of the asylum laboratory and that of the central laboratory are essentially different. The chief work of the asylum laboratory is, or at least soon will be, diagnostic investigation as an aid to successful treatment. That of the second is research, the training of men for the work of an asylum pathologist, the furnishing of expert opinion and assistance. Where are the asylum pathologists of the future to be trained, without undue expenditure of time, unless central laboratories exist, in which the special instruction they require can be given?

I admit that an ideal central laboratory such as I have sketched is, in existing circumstances, an impossible attainment in Scotland. Its establishment and maintenance would involve a much larger expenditure than can be expected of the asylums. It could only be built, equipped and maintained through the instrumentality of a large endowment, such as has not in recent years been wanting to many other—certainly no more deserving—branches of humanitarian science; but this is not likely to come in the present unenlightened position of public opinion regarding the nature of insanity.

How far can we go in existing circumstances towards the establishment of an efficient Central Laboratory for the Scottish Asylums?

Whilst the establishment of an ideal central pathological institute for the Scottish asylums may be regarded as for the present impossible, the difficulties that stand in the way of having at least an efficient one could and ought to be surmounted.

The greatest difficulty of all arises from the simple fact that the present position of the pathology of insanity is not understood in this country except by a very few. Until this state of matters becomes changed, the kind of work that is urgently requiring to be done, the sort of provision that is needed, and the services that research is capable of rendering to psychiatry, will not receive that practical recognition that they have already received in some other countries.

Another difficulty consists in the fact that, if the central laboratory were placed at

an asylum, the other asylums would, it is at least feared, withdraw their support, as it would then appear that the laboratory existed chiefly for the benefit of the asylum at which it was situated. I shall presently offer a suggestion, the adoption of which ought, it at least seems to me, entirely to obviate this ground of objection to transferring the laboratory to the only place at which it can properly do its work.

Still another difficulty arises from a fact that is frequently mentioned in palliation of the deficiencies of our asylums in the support of scientific research, namely, that whereas in foreign countries the asylums are financed by Government, those of our own are supported chiefly by local rates. It must be admitted that the difficulty is a real one, but the existence of our laboratory proves that it has already in large part been overcome. I think that much might be done to overcome it in larger measure if the facts of the situation were properly placed before the Asylum Boards by those to whom they look for guidance in scientific as distinguished from administrative matters. In any case it does not absolve the asylums of this country from the duty of doing their share in the advancement of our knowledge of insanity, but it certainly makes the need of the liberal endowment of research in this subject all the more urgent.

Failing such endowment, how much can be done in existing circumstances towards supplying the Scottish asylums with an efficient central laboratory? I can only give an individual opinion.

The present position of the pathology of insanity, the work that is waiting to be done, and the splendid promise that it gives of advances in the means of treating and preventing insanity, the responsibility that rests upon asylums to advance scientific knowledge in their special department, and the absolute necessity that now exists of bringing pathological investigations into touch with clinical observation, should all be fully explained to the Asylum Boards. If the simple facts of the situation were understood by the administrators of the asylums, it is difficult to imagine upon what reasonable grounds objection could be raised to the carrying out of the changes that the present position of knowledge so clearly requires.

The Laboratory should be transferred to one of the large Asylums. Any one of them that is somewhat centrally situated and is willing to afford the necessary accommodation, and to give facilities for clinical and anatomical observations, would do. One large asylum would furnish ample material for research. The Laboratory should be given the additional equipment necessary for bacteriological, chemical, and special clinical observations. To obviate all appearance of the central laboratory being for the special benefit of the asylum to which it is attached, that asylum should have its own pathologist, who would do its clinico-pathological work as well as the *post-mortems*. The director of the central laboratory should, however, be allowed to do *post-mortem* examinations upon cases he desires to investigate specially.

The Laboratory would be called "The Laboratory of the Scottish Asylums." All work done in it would be credited to it, and not to the asylum to which it was attached. Other asylums would have the right to ask for special reports, to send members of their medical staff for instruction or to carry out investigations, to obtain expert opinion and

advice, to have the use of the library, etc. The only respect in which the asylum to which the Laboratory was attached might benefit more than the others would be in the fuller elucidation of the pathological conditions in some of its cases. This would be a benefit the other asylums could only grudge upon grounds that must be anything but altruistic.

The present system of reporting upon tissues sent from the asylums should be modified. The function of the central laboratory in this relation should be to solve special difficulties, to furnish expert opinion upon the nature of pathological changes about which there is doubt, not to make a systematic investigation of the histological changes in individual cases. There are reasons why this kind of work can rarely do much to advance knowledge. It certainly absorbs an enormous amount of time that might be more profitably expended in systematic histological researches upon properly fixed and specially selected material, or in other kinds of research.

These changes are not such as can be regarded to be impossible, because of the expenditure they would entail. They could be effected with the present resources of the Laboratory Scheme, although additional funds are certainly urgently needed.

I would further urge that an Endowment Fund for the support of a Central Laboratory for the Scottish Asylums should be started at once. However small its beginnings might be, the fact of the existence of such a fund would be very important. It is not unreasonable to hope that if the existence of this fund was made known to the public, the Central Laboratory might, before many years had passed, become entirely independent of contributions from the various asylums. That is an object the attainment of which should be deliberately aimed at, and in a rich country like ours it should be attainable.

Finally, I would say that the Board of Lunacy should be consulted regarding the questions I have raised, and its approval obtained for any new step that may be contemplated. A Central Laboratory for the Scottish Asylums should be under the supervision of the Board of Lunacy; by its location at an asylum this would necessarily result.

W. FORD ROBERTSON.

LABORATORY OF THE SCOTTISH ASYLUMS,
7 HILL SQUARE,
EDINBURGH, 1st January 1903.

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Zonker's
method

18. Wanted, a convenient method of estimating the cranial capacity in making post mortems; and observations upon the cranial capacity in mentally sound and insane.
19. Histology of gliomata; their process of growth and changes they cause in adjacent tissues.
20. Study of the nerve end-organs of the stomach & intestines by Secler's, & other methods, in visceral melancholia.
21. Obstruction to lymph channels in brain in insanity (~~views of Pathy, Jukes & Deane Lewis~~).
- + 22. Study of the normal histology of the nerve-cell (~~Recent work of Nissl, Lugaro, Levi et al~~).
- + 23. Changes in the cerebellum in the insane.
24. Study of the brain in a series of cases of idiocy with a view to ascertaining with what frequency there is evidence of developmental arrest of nerve-cells.
25. Studies in ~~early~~ localisation of brain function by observation of symptoms in early cases of sturdiness in sheep and subsequent examination of brain.
26. Pathology of syphilitic insanity (Has not yet been thoroughly worked up).
27. Studies in the process of development of military aneurisms & in associated morbid changes in vessels; may rupture of vessels showing these take place without formation of an aneurism? (Löwenfeld's work).
28. ~~Study~~ ^{Compounds} of osmium and iron can be reduced, ^{or otherwise changed} in the tissues & subsequent oxidation & reduction gives a differential stain (Keller's method & Allenhard's method, showing medullated fibres). Probably salts of other metals might give important results if tried: e.g. - Silver, Bismuth, Palladium, etc. etc.

Mott

29. The pituitary body - normal histology & pathological anatomy (especially in relation to insanity)
30. ~~The state~~ The parathyroid of the insane (Work of Vassalli & Generali, Gley and Welsh).
31. Study of surface sections of serous membranes, such as those of pleura, pericardium, peritoneum, joints, etc.
32. Are the insane specially liable to organismal infection (eg. septic pneumonia, tubercle, abscesses etc)?
33. Therapeutic value of hot air baths (causing free perspiration) in epilepsy (Labbitt's work). ~~→~~ Shd. be tried also in mania, general paralysis etc.
34. Study of the toxicity of the urine in insanity by Pellegrini's method; i.e. estimation of amount of potassium indoxyl sulphate (by Primavera's test).
35. Study of the pineal gland. Is it anything more than a vestigial structure?
36. Study of the pacchionian granulations. in healthy & morbid conditions.
37. What is the cause of the frequent rupture of pial veins in the insane?
38. Morbid anatomical basis of ~~of the~~ delusions & hallucinations.
39. Study of the various forms of pigment found in the brain; in health & disease. Differentiation of various kinds.
40. In alcohol hardened sections stained by Massi's method vessels may be seen to be coiled upon themselves especially in the deeper portion of the cortex. Is this a normal condition, and if so what is its meaning?

41. Are any of the insanities related in their causation to organismal infection? This requires thorough investigation. (Acute mania? General paralysis?).
42. Changes in the peripheral nerves in insanity, especially in general paralysis, senile insanity & alcoholic insanity.
43. Degeneration of commissural tracts of two cerebral hemispheres in insanity (corpus callosum, etc.).
44. Loss of nerve cells in secondary dementia. What nerve-cells are specially lost? (Layers? regions of cortex? other grey-centres?)
45. Application of X rays to diagnosis of existence & site of gross lesions within cranium (work of Cicci & Bollici).
46. ^{marked} Changes affecting the nucleus of nerve-cells.
47. Vacuolation of nerve-cells. Is it a fatty change?
48. Researches with platinum method.
49. Working out of other reduction methods on similar lines.
- 50.

Subjects suggested
for Research.

Water.

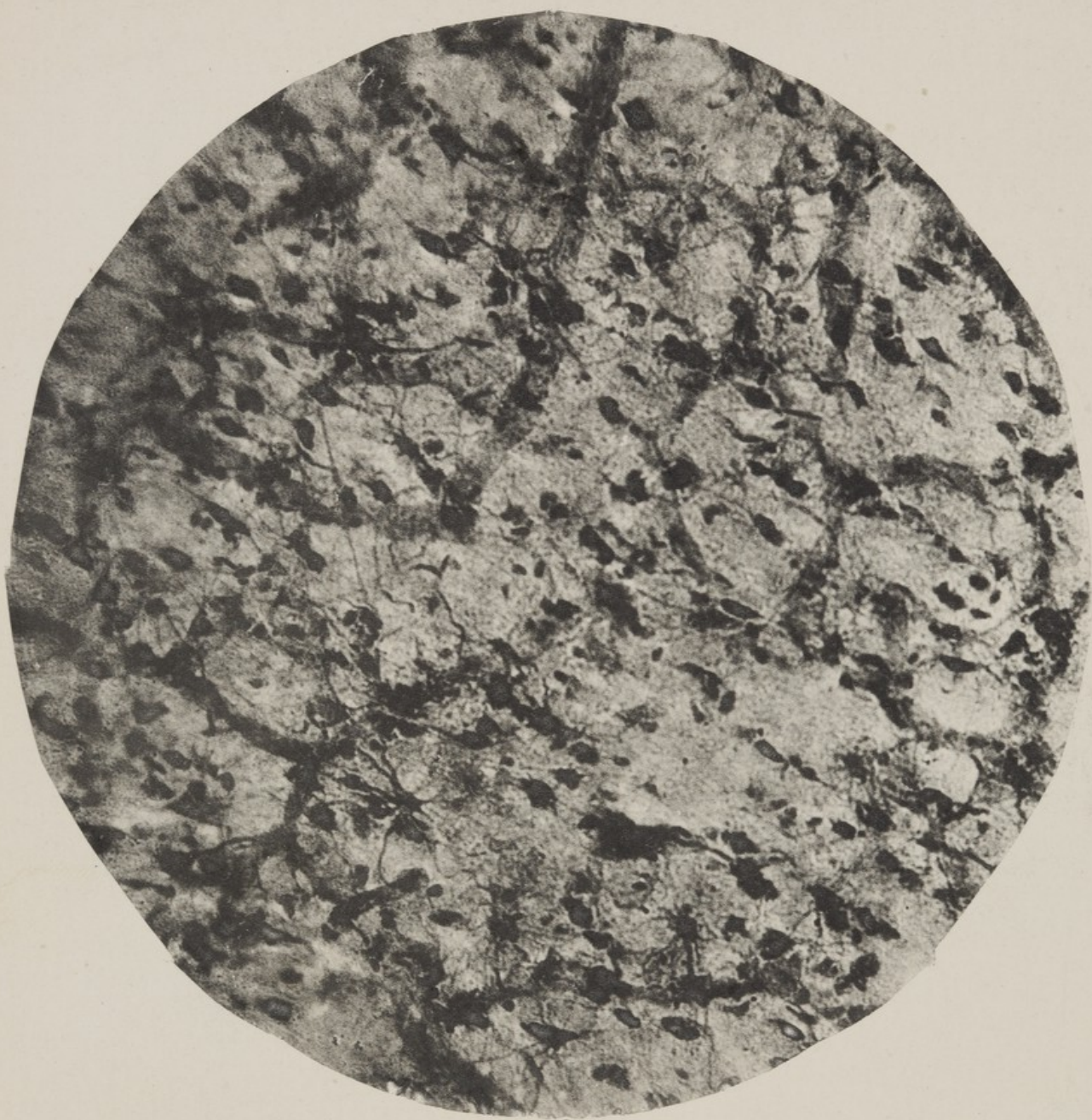


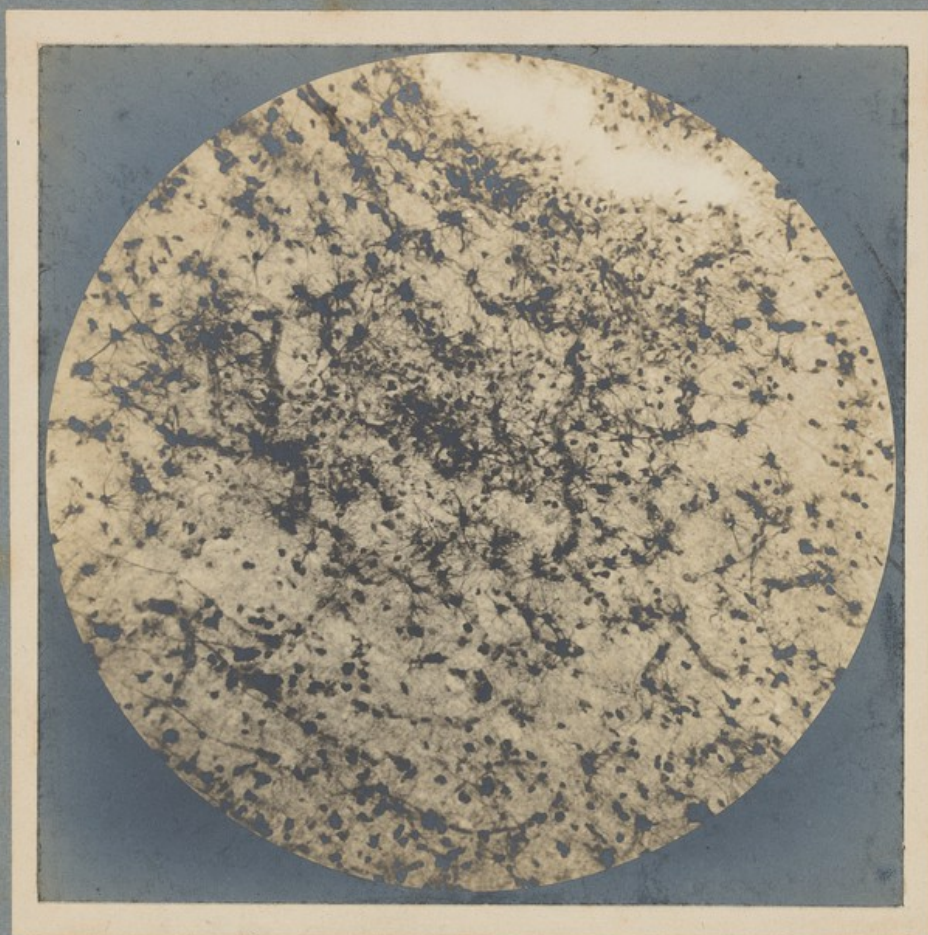


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Photographs
Mr. Bechler

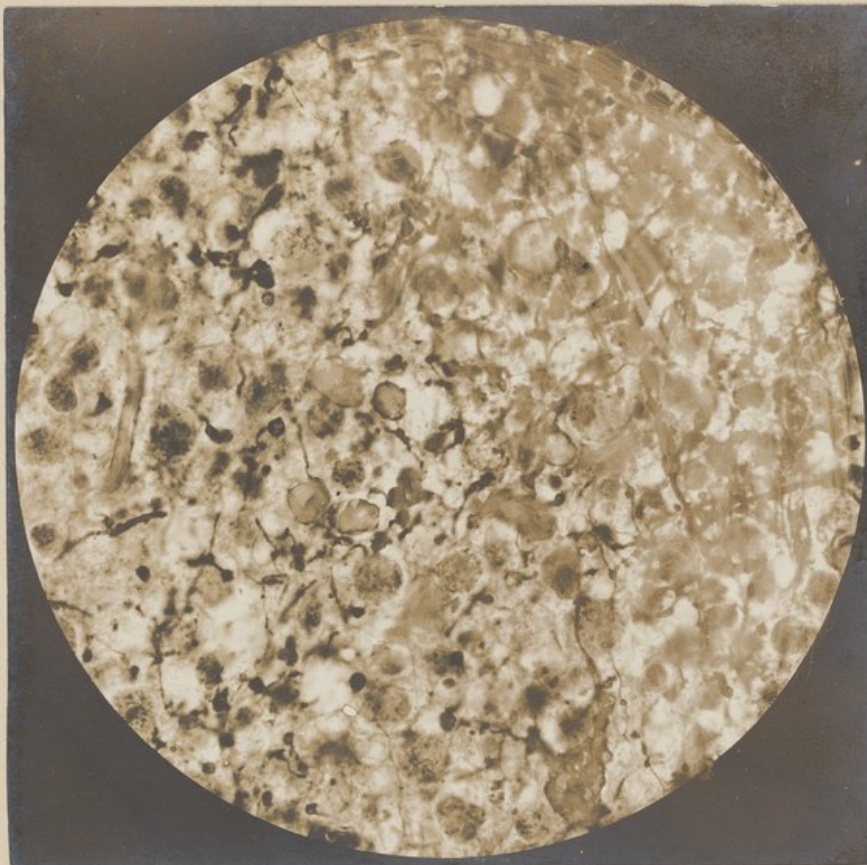




Rd. Muir.

Brain Seville insanity
Small atrophic softening

x 90 diam

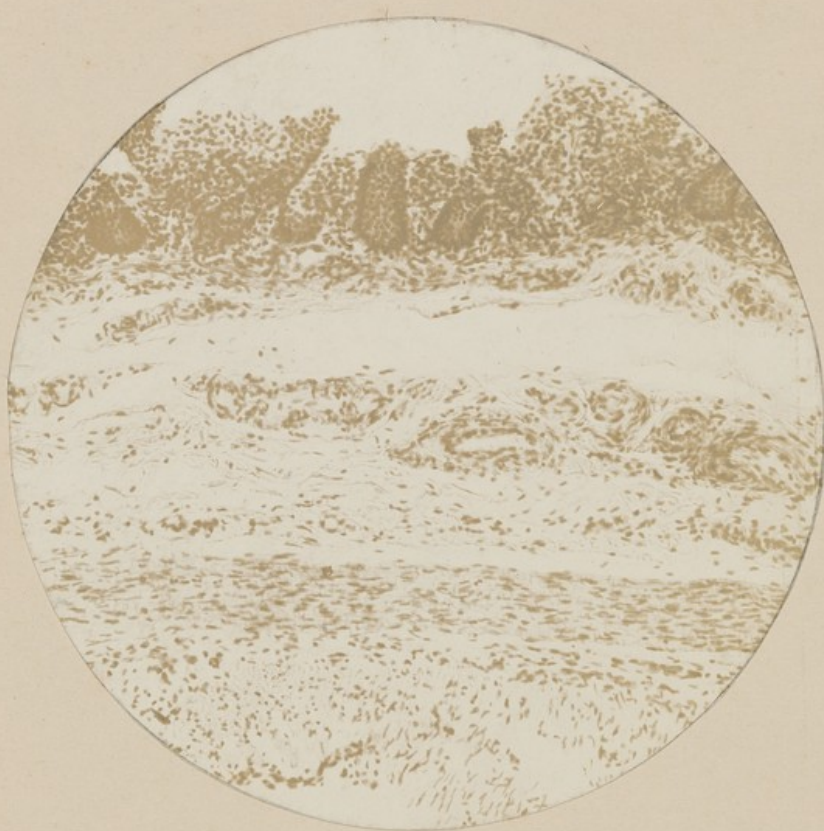


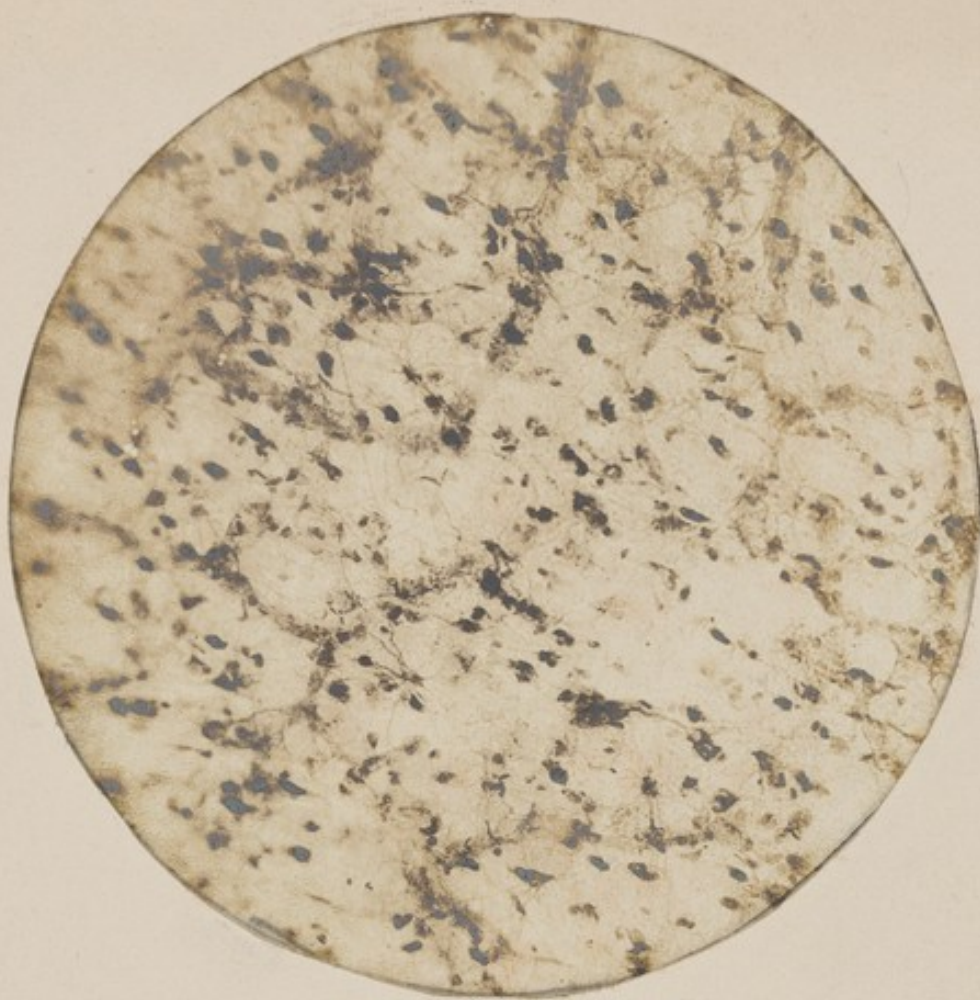
R. H. Murr.

Brain semle Gusantij

Atrophic softening - disintegrating malnourished
nerve fibres, and fat granular cells.

x 200 diam .





Cerebral cortex from a case of general paralysis. Fresh method ($\times 150$).

Shows hypertrophied and proliferated neuroglia cells, and distension of capillaries. In the normal condition the neuroglia fibres are invisible in preparations by this method.

248.



Horizontal section of pial arteriole
from a case of senile insanity,
Hampton. obs. (x 50)

Shows fibroid thickening of intima
and degeneration of muscular coat.

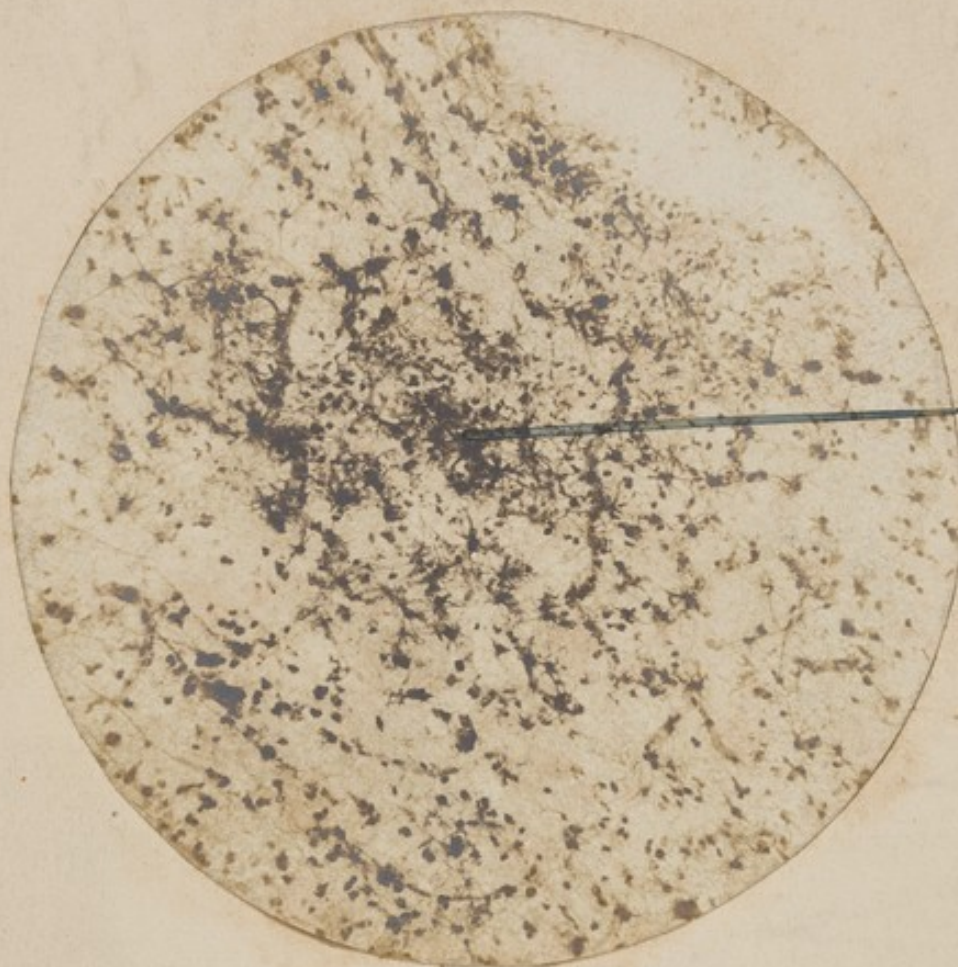


Cerebral cortex from a case of
senile insanity. Platinum method

(X 50)

Shows three miliary aneurisms,
one of which ^(a) is rupturing. The blood
 has passed through the inner portion
 of the wall and formed a sac ^(b) in
 the adventitia

245.



Centre
of atrophic
area

Cerebral cortex showing a minute
atrophic softening. From a case
of senile insanity. Fresh method
(x 100)

Shows hypertrophy and proliferation
of neuronic cells.



Pia-arachnoid from a case of
senile insanity.

H. E. (x 200)

Shows capillaries which have
been drawn out from the first layer
of the cerebral cortex. Their walls are
greatly thickened by hyaline fibroid
change. This morbid condition is constant
in senile insanity and general paralysis.
It often leads to obliteration of capillaries, especially
those of the first layer of the cortex.

259.



Section of branch of middle cerebral artery from a case of senile insanity

Haematox and Eos. (x 50).

Shows a typical example of endarteritis deformans.

Note the onesided thickening of the intima, and the fatty degeneration (atheroma) of the new tissue in the part next the internal elastic lamina.