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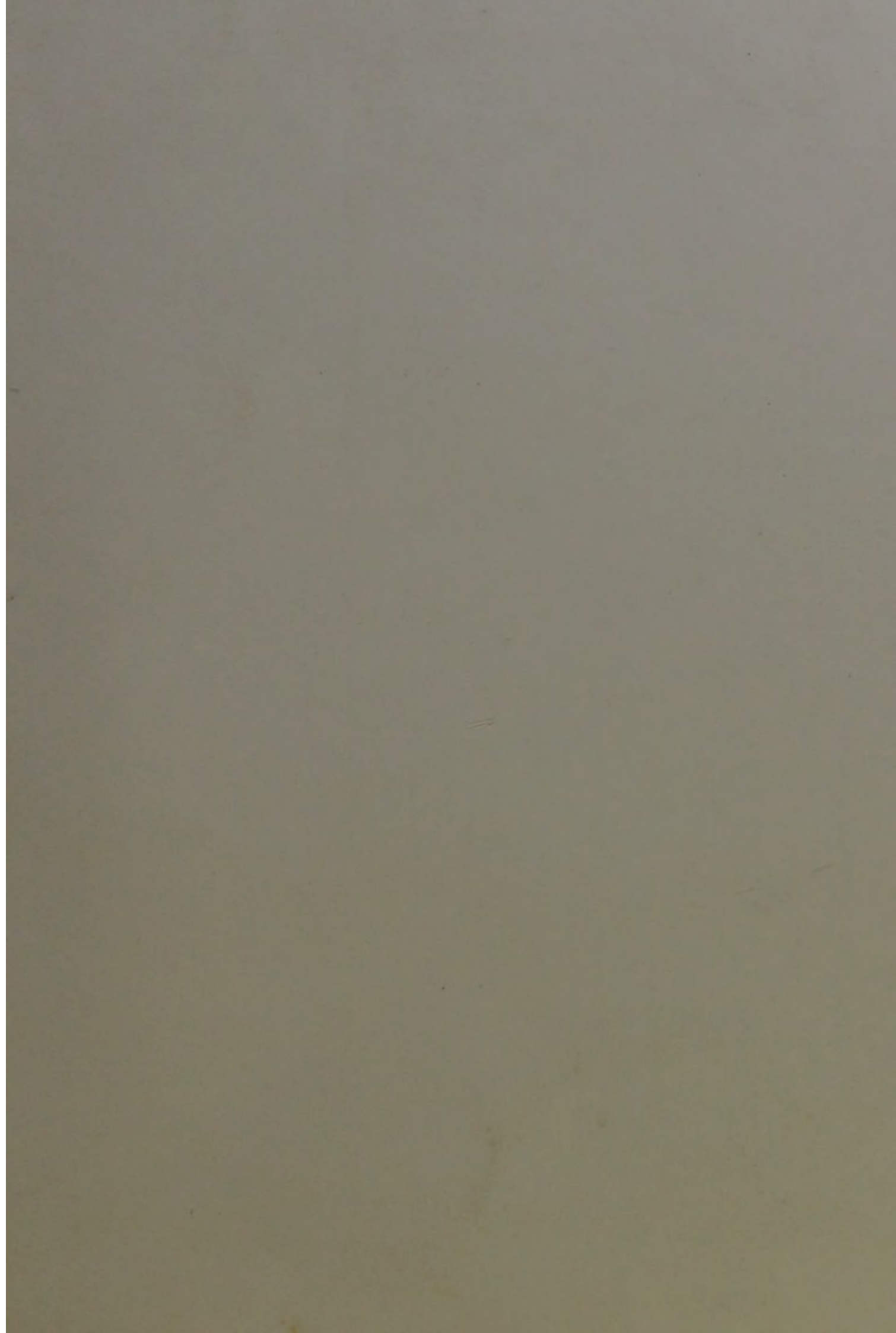
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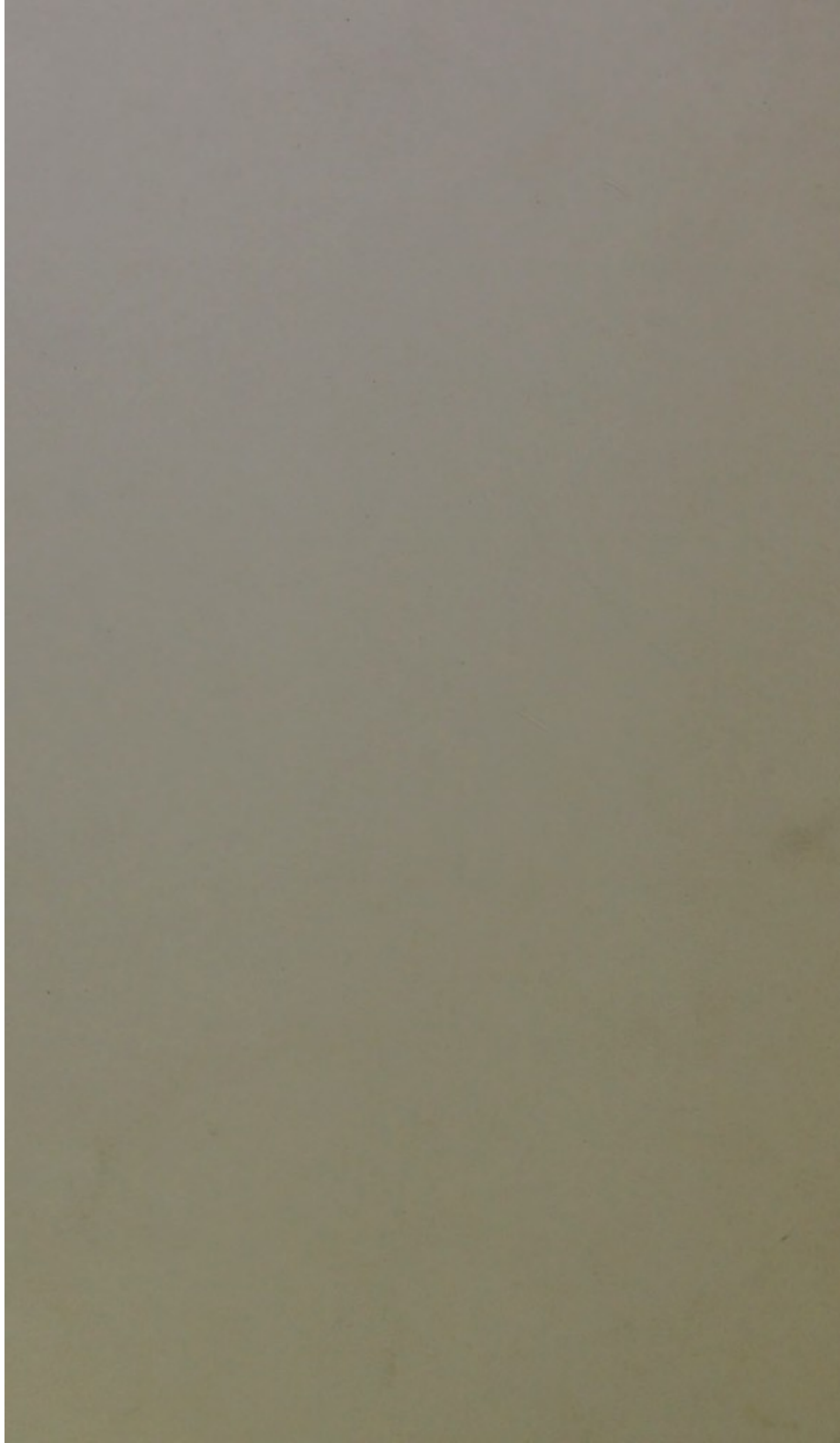
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THE CONNECTION

BETWEEN

TUBERCULOSIS AND INSANITY.

BY

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SOCIETY, 1860-61, 1861-62.

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FROM the time of Hippocrates downwards a special connection has been assumed to exist between certain forms of insanity and diseases of the abdominal organs, but it is only recently that diseases of the lungs have been ascertained to have any relation to mental derangement. Arnold,* who epitomised everything known about insanity before his time, does not mention any disease of the lungs among even the "remote causes" of insanity, although he includes among these, diseases of almost every other organ of the body. Esquirol† and Georget‡ were the first to show the frequency of lung disease among the insane. Burrows§ and Ellis|| were the first to refer to the frequency of phthisis pulmonalis among the insane in this country; but the subject has scarcely received that attention from the profession which its importance and interest demand. Dr. McKinnon¶, the first Medical Superintendent of the Royal Edinburgh Asylum, came to the conclusion that "the scrofulous and insane constitutions are nearly allied." Dr. Skae, in his annual report for 1847, remarked the great frequency of tubercular deposits in the bodies of those dying insane. Dr. Hitchman** estimated that 20 per cent. of the deaths among the females in Hanwell Asylum were from phthisis, and Sir Alexander Morrison says that, out of 1428 deaths that occurred in patients who had

* Arnold, 'On Insanity,' vol. ii.

† Esquirol, 'Des Maladies Mentales,' tom. ii.

‡ Georget, 'De la Folie.'

§ Burrows' 'Commentaries on Insanity.'

|| Ellis, 'On Insanity.'

¶ 'Annual Report of the Royal Edinburgh Asylum,' 1845.

** 'Psychological Journal,' vol. iii.

been under his charge, 164, or 11·5 per cent., were from pulmonary consumption, and 4·7 per cent. from other allied lung diseases. According to the Registrar-General's returns, the proportion of deaths from tubercular diseases in this country is between 16 and 17 per cent. of the total number of deaths at all ages, and phthisis pulmonalis alone is the assigned cause of death in about 12 per cent. No fair comparison can be instituted between this rate of mortality and that among the insane, because the Registrar-General's returns include the deaths among children, while the insane, as a general rule, have attained the adult age. Taking the returns from the eight principal towns in Scotland for the year 1861, where the Registrar gives the number of deaths at four periods of life, we find that phthisis pulmonalis was the assigned cause in 21 per cent. of all the deaths above five years of age, and in about 20 per cent. of all those above twenty. The deaths among the insane under twenty are so rare that the latter per-centage forms the best standard of comparison. There have been 1082 deaths in the Royal Edinburgh Asylum between the years 1842 and 1861 included, and phthisis pulmonalis was the assigned cause in 315 of them, or in nearly one third. There were 591 deaths among the men, and 136 of these were from this cause; and 491 deaths among the women, of whom 179 were from phthisis; being 23 per cent. of the males and 36 per cent. of the females. I have gone over the obituaries attached to the reports of most of the English county asylums for the last five years, and I find that phthisis is the assigned cause of death in only 13 per cent. of the males and in 18·6 per cent. of the females. In the asylums, however, in which the causes of death are determined to any extent from post-mortem examinations, phthisis stands as a much more frequent cause of mortality than in others where this is not the case. When such expressions as "exhaustion," "general decay," "natural decay," "marasmus," are put down as the "causes of death," in 10, 15, and in one as high as 60 per cent. of the cases, we cannot arrive at any correct idea of the true causes of mortality in asylums. "Consumption and lung diseases" are the causes of death in 22·5 per cent. of the males and 32 per cent. of the females who have died in all the public asylums of Scotland for the last four years, according to the reports of the Commissioners in Lunacy.

In eight of the North American asylums the deaths from consumption amount to 27 per cent. of the whole, according to Dr. Workman.* He remarks that the deaths from consumption in the New York city asylum are twice the rate per cent. of any of the others, except his own at Toronto, and says, "I am strongly inclined to the belief that the New York city asylum records of

* 'American Journal of Insanity,' July, 1862.

mortality have been based, to a large extent, on post-mortem evidences rather than on ante-mortem suppositions."

In the time of Georget* phthisis was the cause of death in more than one half the cases in the Salpêtrière. He also states that in three fourths of the bodies of the insane examined by him he found thoracic diseases. Esquirol says that two cases of insanity out of eight are affected with thoracic disease. He also mentions scrofula as one of the causes that predispose to insanity. There is but little reference made to this subject in recent French psychological literature.

In the asylum at Prague we shall see how frequently tuberculosis occurs among the patients. Leidesdorf† remarks the frequency of phthisis among the insane in Vienna. Dr. Geerds seems to think that phthisis is not more common among the insane, than among the sane.‡ In Holland Schroeder van der Kolk§ noticed the frequency of phthisis among the insane, and the relationship between the two diseases.

The following is a tabular view of the *assigned* frequency of phthisis as a cause of death.

TABLE I.

	Per Cent.		
	Male.	Female.	Both sexes.
Royal Edinburgh Asylum since 1842 .	23	36	29
English county asylums for last five years	13	18·6	15·5
Hanwell (Hitchman)	—	20	—
Sir A. Morrison's, 1428 cases	—	—	11·5
Scottish public asylums since 1858 .	25	32	26·7
Bethlem Hospital from 1846 to 1860 (Hood)	11·7	18·3	15·3
Seven North American asylums (Workman)	—	—	27
Salpêtrière (Georget)	—	—	50

But to arrive at anything like correct conclusions as to the extent to which tuberculosis prevails among the insane, we must examine carefully the records of a sufficient number of post-mortem examinations, and not trust at all to the *apparent* death-rate from phthisis and tubercular diseases. Among the majority of the insane, the

* Georget, 'De la Folie.'

† Leidesdorf, 'Pathologie und Therapie der Psychischen Krankheiten.'

‡ 'Allgemeine Zeitschrift für Psychiatrie,' 1861.

§ A case of atrophy of left hemisphere of brain (Syd. Soc. Trans.).

diagnosis of disease is a matter of uncertainty and doubt, the precise causes of death cannot be definitely known without post-mortem examinations—frequently not even by this means—and nothing but an exact statement of the frequency of tubercular deposit in the body, and a comparison of this with its frequency among the sane, can give us satisfactory results. Even when this has been done we have only got a few simple pathological facts, and must examine into the history of each case during life—the history of the insanity, and the history of the tuberculosis—before we can attempt to determine what relation they had to each other, and which of them was first developed.

Dr. Skae has kindly allowed me to go over the records of 463 post-mortem examinations that have been made, under his own superintendence, in the Royal Edinburgh Asylum since 1851, and from the case-books of the institution I have been able to get a tolerably complete history of each of these cases, both before their admission into the asylum and afterwards. I tabulated as much of the information thus obtained as I could, and made a separate record of what could not be so systematically arranged. From the 'Pathological Register' I was able to discover in how many cases there was tubercular deposit in each lung, the peritoneum, the other abdominal organs, and the brain; and in how many of those cases the brain was diseased. I divided the cases into those in which there was slight tubercular deposit and those in which there was much, including among the former all the cases of calcareous deposit that had evidently been tubercular, but not those where there were only cicatrices of tubercular ulcers that had fully healed. The cases in which there was "much deposit" included all those in which the quantity of the deposit was really large, or those in which the tubercle was evidently in an active state of deposition or disintegration. Had I been able to classify them into old tubercular deposits and recent deposits, it would have been still more satisfactory; but this I found to be impossible. In a few cases there were evidences of its having been deposited for a long time, from there being old cavities lined by condensed tissue, or from chalky deposits, and in other cases there were unmistakable signs of its being newly deposited; but the majority did not present characters so decided as to enable one to tell the date of the deposition; frequently there was both old and recent tubercle in the same lung. From the case-books I ascertained the age, the duration and the form of the insanity, the number of cases in which there had been previous attacks or hereditary predisposition, the existence in each case of suspicions, hallucinations, or suicidal tendency, the history of the tuberculosis during life if there were any signs of its existence then, the length of time in the asylum, and the form of insanity at death. In addition to the foregoing information, which I could

tabulate, I arranged the cases into such natural groups as were suggested to me by their resemblance to each other.

Taking the 463 cases, tubercular deposit was found in 282, or 60·9 per cent. There were 263 males, and tubercular deposit was found in 136, or 51·7 per cent. In the 200 females it was found 146 times, being 73 per cent. The distribution of the deposit among the organs of the body is seen in the following table.

TABLE II.

	Males.	Females.	Total.
Total number of cases found tubercular .	136	146	282
Lungs	133	144	277
„ much deposit	108	105	213
„ slight deposit	25	39	64
Deposit in right lung	115	130	245
„ left lung	124	131	255
Peritoneum	9	18	27
Nervous centres	6	2	8
Other organs (not including intestines) .	13	9	22

The frequency of this deposit seems at first startling, and we naturally ask if the number of cases here stated is not above the average, even among the insane. That nearly two thirds of all those who die in asylums should be affected with this one pathological lesion would indicate, without doubt, a special connection between it and insanity. Unfortunately I have no means of comparison with the statistics of the post-mortem appearances in any considerable number of the insane elsewhere in this country. Dr. Webster has described the post-mortem appearances in 115 cases that had died in Bethlem Hospital.* He found that in 49 of these there was tubercular deposit in considerable amount, but he does not seem to include those cases in which there were only slight deposits of tubercle in the lungs. These latter, although unimportant in themselves, indicate that a tendency to tuberculization exists. The same remark applies to the summary of post-mortem appearances given in the "Obituaries" of Dr. Boyd's admirable reports of the Somerset County Asylum. He found that tuberculization existed as a *cause of death* in 16 per cent. of the 539 cases in which autopsies had been performed.† As Dr. Boyd attributes the extraordinary proportion of 27½ per cent. of those cases to pneumonia as a cause of death, we can scarcely help concluding that many of these

* 'Psychological Journal,' vol. viii.

† 'Annual Report of Somerset County Asylum,' 1861.

must have been cases of tubercular pneumonia. Dr. R. Fischer* gives the details of 314 autopsies performed under the superintendence of Prof. Engel at the asylum at Prague. The following abstract of his observations, which I have made, shows the frequency of tubercular deposit.

TABLE III.

Total cases examined	314
Lungs tubercular	151
Of which the tubercle was obsolete in	62
Right lung	143
Left lung	119
Peritoneum	10
Abdominal organs	6
Nervous centres	2

About one half of the cases are thus seen to have presented tubercular deposits.

We shall now compare those results with the frequency of tubercular deposits among the general population. Louis says that, of 358 cases that died in La Charité, 127 died of phthisis, and in 40 more tubercles were found in the lungs, so that in nearly one half there was tuberculization. Dr. T. K. Chambers has published the results of 2161 carefully performed and recorded autopsies at St. George's Hospital.† He found tubercular deposit in 550 of those, or in about a fourth of the whole. His results as to the frequency of tubercle in the two sexes were remarkable, for he found it in about 27 per cent. of the men and only in about 22 per cent. of the women. The disease is more common in females among the general population, as is the case among the insane.

Whether, therefore, we take phthisis as the assigned cause of death, or tubercular deposition in the body, tuberculosis is much more common among the insane than among the sane. Three persons die of phthisis in the Royal Edinburgh Asylum for every two who die in the eight principal towns of Scotland above twenty years of age. For every five bodies in which tubercular deposit was found in St. George's Hospital with tubercular deposition in them, twelve were found in the dissections made in the Royal Edinburgh Asylum. For every two persons dying of phthisis in La Charité, there were three in Salpêtrière.

Phthisis was the "*assigned cause of death*" in only 73 of the 136 men, and in 97 of the 146 women in whose bodies tuberculosis was found. This shows better than anything else how inadequate and erroneous an idea we should have if we estimated the prevalence of the pathological lesion according to the assigned frequency of its

* 'Pathologisch-Anatomische Befunde in Leichen von Geistes kranken,' R. Fischer.

† 'Med. Times and Gazette,' 1852.

principal symptoms. All the cases in which *lung diseases* are the assigned causes of death only amount to 189 out of the 282 with tubercular deposit. For the sake of showing how many diseases may be associated with tuberculosis, I have given in the following table the assigned causes of death in all the cases.

TABLE IV.

Assigned causes of death.	Male.	Fem.	Total.	Assigned causes of death.	Male.	Fem.	Total.
Abscess of liver	0	1	1	Brought up	20	26	46
Abscess of lung	0	1	1	General paralysis	24	6	30
Apoplexy	1	7	8	Hanging	1	1	2
Arachnitis	3	1	4	Hydrothorax	1	1	2
Ascitis	0	1	1	Morbus cordis	2	1	3
Bright's disease	1	4	5	Paraplegia	1	0	1
Cancer of bladder ...	1	0	1	Peritonitis	2	3	5
Cancer of lip	1	0	1	Phlebitis.....	2	0	2
Cancer of stomach ...	1	0	1	Phthisis	73	97	170
Cancer of peritoneum...	0	1	1	Pleurisy.....	2	2	4
Chronic bronchitis ...	1	3	4	Pneumonia.....	4	1	5
Chronic gastritis	1	1	2	Ramollissement	2	1	3
Cirrhosis of liver	0	1	1	Scrofula ..	1	0	1
Diarrhœa	3	2	5	Strangulation of bowels	1	0	1
Dysentery	2	1	3	Suppuration of kidney	0	1	1
Empyema	0	1	1	Tubercular meningitis	0	1	1
Epilepsy	3	0	3	Tubercular peritonitis	0	4	4
Erysipelas of leg	1	0	1	Ulceration of intestine	0	1	1
Gangrene of lung	1	1	2				
	20	26	46		136	146	282

Pathology of the brain among the tubercular.—In the majority of the cases the brain did not present any very well-marked pathological lesion. By well-marked I mean a decided change of structure that could in any way be directly connected with the tuberculosis, or sufficient to account for the insanity. In eight of the cases there was tubercle in the nervous centres, and in ninety more of them, including the general paralytics, there were organic changes in the brain. Ramollissement, thickening, and morbid adhesions of the membranes, granular ventricles, and intense hyperæmia, were the chief of these well-marked deviations from the normal standard. But in addition to these, there was in nearly all the others a state of the brain which, although often found in cases of dementia without tuberculosis, yet seems to me to be more common in phthisical cases than in any others. There was great anæmia of the gray substance, with more or less atrophy of the convolutions and dropsy of the membranes and of the brain itself, while the white substance was soft and pale generally, with irregular patches where the punctæ vasculosæ were more numerous than usual. The white substance was especially softened in the fornix and its neighbourhood; sometimes, indeed, being quite diffuent at that part. Louis notices this softening

of the fornix in many of his cases of phthisis who were not insane, and associates the lesion with the tuberculosis.* Louis did not find the brain diseased more frequently among the phthisical than among those who had died of other diseases, and Dr. Chambers confirms his observations on this point by larger statistics. The state of the brain I have described gives much more the impression of an ill-nourished than of a diseased brain. The unequal vascularity of the white substance seems like the local congestions that occur in organs whose circulation is feeble. The arachnoid is frequently thickened; but as this is such a common condition in brains whose functions during life have been unimpaired, not much importance is to be attached to it.

In the appendix to the report of the Royal Edinburgh Asylum for 1854, Dr. Skae, when speaking of the specific gravity of the brain, says,—“On examining my cases in detail, I find that in most of those cases where the specific gravity of the gray matter was considerably below the mean, the patients had died of phthisis.” This observation was made quite independently of any theory as to the relation between phthisis and insanity, and is a very important confirmation of the conclusions at which I have arrived from an investigation into the clinical history and pathological lesions of the cases of tuberculosis among the insane.

Tubercle in the nervous centres.—In eight of the cases there was tubercular deposit in the brain or its membranes or the cerebellum. This is, as nearly as possible, the same per-centage as Chambers found in the sane, taking all the cases examined; but taking the tubercular only, nearly 6 per cent. of Chambers's cases had the deposit in the nervous centres, while scarcely 3 per cent. of the cases examined in the asylum had tubercular deposit there. Ancell's per-centage is only 1.5 in 647 cases of tuberculosis in the adult collected by him. Of the eight cases, six were men and two women, and this more frequent occurrence of tubercle in the nervous system among males agrees with Chambers's observations. It might be supposed, *à priori*, that brain diseases being more common among the insane than among the sane, and tubercular deposition also more common, tubercle in the brain would be more frequent in the former. Such, however, we have seen not to be the case. Nerve-tissue seems to be almost exempt from tubercular deposition, for of the eight cases there were only two in which the tubercular deposition had not evidently commenced in the membranes. In those two cases there were large masses of tubercle in the cerebellum. The depth to which the convolutions extend in the cerebellum makes,

* Dr. Chambers found “idiopathic inflammation of the membranes of the brain,” a condition which he thinks is almost peculiar to the tubercular, in 2.7 per cent. of his cases. The expression is so vague, and the brain so frequently diseased among the insane, that it is impossible to confirm his observations on this point in any way.

it probable that even in these the original nucleus of tubercular matter had been deposited in the pia mater at the bottom of the sulci, and had extended towards the centre of the organ, encroaching on the white substance and corpus denticulare. In two other cases there were masses of tubercle extending inwards among the cerebral convolutions, but they were in contact externally with the membranes. This is quite in accordance with the view of the origin of tubercle propounded by Virchow, and now so generally held by histologists of eminence. He believes, and indeed professes to have demonstrated, that tubercle is the result of an altered and increased development of the nucleated cells which exist in the ordinary connective tissue, or of the epithelium-cells. Now, although connective tissue has been demonstrated to exist among the nerve-fibres and nerve-cells of the brain and spinal cord, yet it is in such small quantity and of such a kind that its nuclei do not readily undergo the altered development into tubercle. In the pia mater and arachnoid, on the contrary, both connective tissue-corpuscles and epithelium-cells abound, and the tubercle is developed in them accordingly. In one of the cases the only parts tubercular were the choroid plexuses of the lateral ventricles. The most frequent site of the tubercular deposition was on the membranes over the hemispheres, or between the brain and cerebellum.

In only one case was the tubercular meningitis at the base of the brain, and it was not confined to the anterior part, but extended to the pons and medulla. In no case, therefore, was there any analogy to the ordinary tubercular meningitis of the child.

I am not to be understood as saying that tubercle cannot be developed in the cerebral substance. Such high authorities are in favour of that view that it would be presumption in me to do so. Guislain* expresses his decided conviction that it may be developed in the medullary brain-substance. Rokitsansky holds the same view. Ancell says that tubercle of the brain rarely coincides with tubercle of the membranes; but if he means by this that tubercular masses extending into the cerebral substance are rarely associated with deposit in the membranes, his observation is very decidedly contradicted by the cases of which I have given a summary. Of fifty cases in which Dr. Chambers found tubercle in the nerve-centres, only eight were of the membranes. We cannot help thinking that he has included with tubercle of the membranes merely those cases in which they were covered with small, gray granulations, and has enumerated every example of soft, yellow tubercle, as in the brain, even though it was in contact externally with the membranes.

In every one of the eight cases there was tubercle in the lungs. In three of the cases there was tubercle of the peritoneum and of nearly all the abdominal organs, and in two of them, tubercular

* 'Leçons Orales sur les Phrenopathies,' tome ii.

caries of the bones. In three of the cases the tubercles in the lungs were in small quantity, and apparently stationary, and in one, the only evidences of tuberculosis in the body elsewhere were cretaceous masses in one lung.

In five of the cases the age was between twenty and thirty, in two between sixty and seventy, and in one sixteen. Four of the cases were demented, and had been for a considerable time in the asylum; two were cases of epilepsy, in only one of which, however—a boy of sixteen, in whom the fits came on a month before death—the disease could be ascribed to the tubercular deposition within the cranium; one was a case of general paralysis, and one monomania of suspicion.

Dr. Chapin * has collated seventy-four cases of tubercle of the brain, only sixteen of which, however, were above the age of twenty; so that the symptoms which he connects with the disease must be held to indicate more the acute hydrocephalus of the child than the disease in the adult. The symptoms he mentions as being generally present are convulsions, paralysis, cephalalgia, and mental impairment. He says that the cases occur in the scrofulous diathesis most frequently. In three only of the eight cases to which I have referred were there any cerebral symptoms that could be ascribed to the tubercular deposit. One of these was the boy of sixteen who had epileptic fits for a month before death, and for the last few days laboured under the ordinary symptoms of inflammation of the membranes of the brain, viz., squinting, paralysis, and coma. Another man had hemiplegia for fourteen days before death, and a woman who had laboured under monomania of unseen agency, was seized ten days before death with weakness, inclination to roll over on one side, and paralysis, which passed into coma. It was in this case that there was found tubercular meningitis over the whole base of the brain, medulla, and cerebellum. In the other five cases there were no symptoms whatever during life that could be ascribed to the pathological lesion, although in one of them there was a large tubercular mass occupying the greater part of the medullary substance of the cerebellum, in another the pia mater over part of both hemispheres and in the fissure of Sylvius was covered with small nodules of tubercle that were partly imbedded in the cortical substance, in another there were large masses of tubercle in the cerebellum and posterior hemispheres of brain. In only one third of Dr. Chapin's cases was there tubercular deposition in other organs; but in this, as in other respects, he lessens the value of his memoir by not distinguishing between the disease in the child and adult. He believes that in those cases in which the tubercle is found in the substance of the brain it must have commenced in the pia mater.

Tuberculosis of the peritoneum.—Tubercular deposit was found in the peritoneum in eighteen females and nine males. This is

* 'American Journal of Insanity,' Jan., 1862.

nearly 6 per cent. of the total cases examined, and $9\frac{1}{2}$ per cent. of the cases of tuberculosis. Dr. Chambers found tubercle of the peritoneum to exist in 2·3 per cent. of all his cases, and in 9 per cent. of those in which tubercle existed. Of 647 cases of tuberculosis in the adult, Ancell gives only nine as having had tubercular peritoneum, or about 1·3 per cent. Both in the Royal Edinburgh Asylum and St. George's Hospital, it was nearly twice as frequent among the females as the males. In almost all the cases the tubercle was deposited in granular masses, of varying size, according to the stage of the disease. In a few of them it presented the appearance of large, yellow, soft masses, underneath the membrane. In the majority of the cases the tubercular depositions occurred all over the membrane, both visceral and parietal; and when it was limited, the peritoneal coats of the intestines, liver, and spleen, were its most frequent sites. Generally there were adhesions, soft and easily broken down, and frequently a purulent deposit. In all the cases, except one of the females, there was tubercular deposit in other parts of the body, and there were only three of them in which the tubercular deposit elsewhere was not extensive. In three of the cases there was tubercular deposit in the brain as well as in other organs, showing that in them the tendency to tuberculization was so strong that almost every organ was affected.

The following tables exhibit the form of insanity, and the length of time it had existed:

TABLE V.

	Male.	Female.	Total.
Dementia . . .	3	6	9
Epileptic ditto . .	1	0	1
Melancholia . . .	1	6	7
Monomania of suspicion	2	3	5
Mania	2	2	4
General paralysis . .	0	1	1
Totals	9	18	27

TABLE VI.

Years insane be- fore death	Number of cases.
1	4
2	5
3	6
4	1
5	1
6	2
9	2
11	2
12	2
14	1
15	1
Totals	27

The object of this is to show the large proportion of cases of melancholia and monomania of suspicion—a larger proportion

than exists even among the cases of tuberculosis of other organs, and much larger than among the general population of asylums. This might have been expected from the intimate relationship between melancholia and disorder of the functions of the abdominal organs. It will be seen that more than one half the cases had been under three years insane.

Besides those cases of actual tubercular deposit in the peritoneum, there were among the tubercular five cases of ordinary peritonitis. Louis and Ancell attribute to the peritonitis a tubercular origin in similar cases.

Age.—The ages of the 282 tubercular patients at death are given in the following table :

TABLE VII.

	Male.	Female.	Total.
Between 10 and 20 .	7	4	11
„ 20 „ 30 .	33	23	56
„ 30 „ 40 .	43	45	88
„ 40 „ 50 .	20	36	56
„ 50 „ 60 .	23	18	41
„ 60 „ 70 .	8	14	22
„ 70 „ 80 .	2	6	8
	136	146	282

It will be seen from this that nearly one fourth of the cases were under thirty years of age ; whereas I find that not more than one sixth of all the cases, taking the total number of deaths in the asylum, are under thirty. The average age at death was for males forty, and for females forty-two ; whereas the average age, taking the whole number of deaths in the asylum since 1857, has been forty-three and a half for men and forty-four and a half for women. The average age at death in those with much tubercular deposit was thirty-seven for the men and forty for the women.

Previous attacks.—In 14·7 per cent. of the men and in 23 per cent. of the women they had had attacks of insanity previous to the one during which they died. Taking the ordinary admissions of the asylum since 1854, there were 18 per cent. of the men who had been insane on previous occasions, and 23 per cent. of the women. Dr. Boyd found that, of 1000 male and as many female patients admitted into the Somerset Asylum, 17·6 of each sex had had previous attacks. The difference between the per-centage of previous attacks among the males who were tubercular and those who were not is so small that nothing can be deduced from it.

Hereditary predisposition.—Van der Kolk thinks that a hereditary predisposition to phthisis may develop into or towards insanity, and *vice versâ*. There were more than two or three examples among the cases I have examined of a predisposition to both phthisis and insanity in the same individual, and three instances of members of the same family dying of phthisis in the asylum at the same length of time from the commencement of the insanity in each. Two sisters came into the asylum within a year of each other, labouring under the same form of insanity, and both died of phthisis within a year after their admission. The hereditary predisposition to phthisis being seldom inquired into when the patients come into the asylum, anything like its real frequency could not be ascertained.

Some near relatives of the patients, were insane in 28 per cent. of the men and in 25 per cent. of the women who were tubercular, while the per-centage of hereditary predisposition among the admissions since 1840 has been 19 per cent. for both males and females. This may show either that phthisis is most frequent among those with a hereditary tendency to insanity, or that insanity is apt to appear in more than one member of families with a phthisical predisposition.

Those general statistics of tuberculosis among the insane are only the first step of the inquiry we propose to make, however.

The questions that next arise are—How is tuberculosis more common in asylums than among the general population? Is insanity a predisposing cause of tuberculosis? or, do the conditions of life in asylums determine this frequency? or, does the tuberculosis predispose to insanity? Those questions can only be answered by a careful examination of the clinical history of a sufficient number of cases. They are not mere curiosities of vital statistics, for they involve a consideration of the conditions of life among the insane, the etiology of disease among them, and the causes of the insanity itself. They are more complicated questions than most others in medicine, for in addition to the vital forces that govern the bodily functions, to the derangement of which we endeavour to trace diseased structure and disordered action, we have here to deal with psychical and moral causes of disease, operating on individuals of enfeebled constitutions and impaired nervous energy. We shall best arrive at definite conclusions by examining the *facts* in the histories of the cases that show—

1st. The influence of the tuberculosis on the insanity; and—

2nd. The effect of the insanity on the tuberculosis.

The forms of insanity assumed by the 282 cases of tuberculosis are shown in the following table. As the form of insanity changes in most cases, I have given the form of insanity on admission and at death; and as many of the cases had been insane for long periods before their admission into the asylum, I have given the forms of insanity in 103 of them who had been under three months insane before they were admitted. In the latter cases we see the forms first

assumed by the insanity, and the changes that took place before death, and we have therefore their complete history in a tabular form.

TABLE VIII.

	All the cases of tuberculosis examined.						Cases that had been under three months insane before admission.					
	On admission.			At death.			On admission.			At death.		
	Male.	Fem.	Total.	Male.	Fem.	Total.	Male.	Fem.	Total.	Male.	Fem.	Total.
Acute mania	13	21	34	5	7	12	12	18	30	5	4	9
Mania	16	24	40	4	11	15	4	12	16	1	7	8
Monomania	26	28	54	25	14	39	3	9	12	5	6	11
Melancholia	19	32	51	13	16	29	10	17	27	7	11	18
Dementia	36	35	71	61	92	153	3	6	9	13	34	47
General paralysis	26	6	32	28	6	34	8	1	9	9	1	10
Totals	136	146	282	136	146	282	40	63	103	40	63	103
Epileptics .....	...	...	...	12	5	17	...	...	...	...	...	...

Every form of insanity is thus seen to tend towards dementia before death, but the tendency in mania is twice as strong as in melancholia, and the majority of monomaniacs die unchanged.

In order that a comparison may be made, I have in the following table given the forms of insanity at death of the 181 cases examined, in whom no evidences of tuberculosis were found.

TABLE IX.

	Male.	Female.	Total.
Acute mania . . .	11	9	20
Mania	13	6	19
Monomania . . .	13	7	20
Melancholia . . .	8	7	15
Dementia	26	23	49
General paralysis . .	56	2	58
Totals	127	54	181
Epileptics	9	3	12

Half the tubercular cases were demented, only one fourth of the non-tubercular were so; one tenth of the former died maniacal, one fifth of the latter; one tenth of the former were melancholiacs, only one twelfth of the latter; one seventh of the former were monomaniacs, only

one ninth of the latter; and only one eighth the former were general paralytics, while one third of the latter laboured under this disease. I have associated all the forms of monomania together in those tables, but if one form, viz., monomania of suspicion, be taken separately, a striking difference results. All the females with this form of insanity except one, were found to have tubercular deposit after death, while only six of the males were exempt. General paralysis is the form of insanity most exempt from tuberculosis, and the relations between those two diseases, demands a more careful consideration.

Tuberculosis in General Paralysis.—Since 1851 there have been recorded in the 'Pathological Register' of the Royal Edin. Asylum accounts of the post-mortem appearances in 92 general paralytics, eight of whom were females, and the rest men. In twenty-seven of the males and in six of the females tubercular deposit was found in the lungs. In going over the histories of those thirty-three cases I remarked how constantly they had commenced with melancholia, and how many of them had been suicidal and had refused food at first; but I was scarcely prepared for the result, when at the end I found that in nearly all of them the insanity had commenced with depression. There were seven men and one woman in whom the disease had advanced considerably before their admission into the asylum, whose previous history could not be ascertained; but of the others there were only two males who did not at first exhibit symptoms of melancholia, and the tubercles in those was nearly obsolete. Many of the others were suicidal, and many of them laboured under that deep and intense form of melancholia in which food is refused, while in others the symptoms of depression were not so great. Many of the cases in a subsequent stage of the disease exhibited the excitement and ambitious delusions that more generally characterise general paralysis, but even in those cases they seldom seem to have been so extravagant in their character as they generally are. There are very few examples of the disease to be found where excitement and extravagant delusions are altogether absent in all its stages, and those few will be chiefly found among the phthisical. There are three well-marked cases of general paralysis in which the disease commenced with deep melancholia in the asylum at present, and physical examination demonstrates tubercular deposition in them all.

This intimate relationship between the general paralysis with depression and tuberculosis has never before, so far as I am aware, been pointed out. The number of cases I have adduced are not sufficient to establish a general law that such a connection always exists, but they are sufficiently numerous to show that the one is very frequently related to the other. The tuberculosis was not the effect of the refusal of food or the deranged nutrition that frequently exists in melancholic general paralytics, for in many of the cases there was neither. Many of them, although depressed at first, took their food well, and

appeared to be in good bodily health. In the majority of them the phthisis caused but little inconvenience, and was not even detected till after death. The latency of the pulmonary affection was more marked than in any other form of mental disorder, both from the absence of the usual symptoms, such as cough, expectoration, &c., and from the infrequent occurrence of marked emaciation or feverishness. In this disease, more than in any other, do we see purely vegetative and nutritive functions so independent of all nervous and animal influence, that a man with extensive lung disease may be fat and feverless until the excito-motor centres lose entirely their irritability, the involuntary muscles cease to act, and he ceases to live. It will be said that this results from the stagnation of the pulmonary disease, and that when a man with lung disease becomes affected by general paralysis, the former remains thereafter in *statu quo*, and whatever parts of the lungs are then healthy, remain so, and do the work of respiration. Doubtless this is partly true, but not by any means wholly so. In many of the cases I have referred to, the lung disease was so extensive that it could not have existed before the cerebral mischief without showing well-marked symptoms; and at the autopsies the pulmonary lesions showed distinct indications that they had not been stationary long before death. There are exceptions to the latency of the symptoms of phthisis even in general paralysis, for in five of the cases the tuberculosis was detected during life by the symptoms it produced, viz., cough, hectic, and exhaustion. The average duration of life, after general paralysis has manifested itself, is too short for the development of phthisis from such a cause as want of nourishment. The average duration of life, after the first symptoms of general paralysis had shown themselves in those cases in which there was a large amount of tubercular deposit in the lungs, was two years.* Now as this is not much different from the duration of the disease in ordinary cases, we must conclude that phthisis does not tend much to shorten the lives of the general paralytics in whom it exists; or I should rather be inclined to put it thus: the tendency to death from the cerebral affection is so strong, and certain, and rapid, that the pulmonary affection does little to accelerate it. In fact, the intra-cranial lesion diminishing the excito-motor irritability of the centres from which the fibres of the pneumogastric nerve arise, deprives the lung lesion of more than half its wasting and exhausting effects. The cough and wakefulness and want of appetite of consumption do not exist.

M. Baillarger has described the depression that precedes and accompanies some cases of general paralysis,† but does not attempt

* Austin gives two years and a half as the average term of life among general paralytics.

† 'Annales Médico-Psychologiques,' 1860.

to explain why this should exist in some cases, and exaltation in others. Austin attributes the symptoms of depression to lesion of the right optic thalamus, but this has been sufficiently disproved by Dr. Skae.* Dr. Skae found that, of 108 cases, 28 were depressed or suspicious. This is nearly the same proportion as the tubercular bear to the whole number of general paralytics examined. Austin gives a somewhat different proportion, for out of 135 cases seen by him there were 57 with melancholic delusions.

Both Austin and Baillarger mention—the latter more particularly dwells on it—that the melancholic delusions of general paralytics are characterised by their extravagance. He says that they imagine they have no stomachs or hearts, that their organs are changed, and that they frequently have hallucinations of smell. Among the cases that have come under my own observation, or whose records I have perused, delusions of this character have not been more frequent than among melancholics generally. The majority of the cases of tubercular general paralytics were characterised by great intensity of depression, frequently of a vague, undefined character, the patient being stupid and confused, with sudden and unaccountable suicidal impulses, and not always with delusions of any kind. In some cases the patients attempted suicide in the coolest possible manner, without manifesting any unusual depression at the time, and evinced no disappointment when their attempts were frustrated. One man told me, when I asked him why he had attempted to hang himself, that it was “for fun.” Those who refused food did not do so because they imagined they had no stomach or belly, in any of the cases in the Royal Edin. Asylum. In some cases the depression passed gradually into dementia as the paralytic symptoms advanced, but in fully an equal number there was more or less excitement during some part of the second stage of the disease.

In only one case was there a distinct history of phthisis before the paralytic symptoms commenced; but as, in sixteen of the cases, death occurred within a year of the first manifestation of insanity, it is almost certain that in them the tuberculosis preceded the insanity. It is highly probable that in all of them the tuberculosis had begun before the brain disease; and it is certain that if it had not begun in any of them, the tendency to it must have been very strong. Two such diseases as tuberculosis and general paralysis seldom originate simultaneously in the human body; and as we have seen that the former state did not in many of the cases exhibit its usual symptoms, and did not even produce emaciation, which, whether there are any other signs of it or not, is its most frequent concomitant in other cases, we conclude that the brain lesion must have been engrafted on the other soon after its commencement, obscuring its symptoms

* ‘Edin. Med. Journ.’ for April, 1860.

and counteracting its effects, although not altogether staying the progress of the local tuberculization.

Taking all the cases of general paralysis in the men, tuberculosis was less frequent than in any other form of insanity. It was present in less than one third of them. Among the women exactly the reverse was the case, three fourths of them all having tubercular deposition; but the number of women being so small, we cannot found any conclusion on the data.

But the influence of the tuberculosis on the insanity is not to be determined accurately merely by ascertaining its frequency in the various forms of insanity. The ordinary classification, although to a certain extent a natural one, is not so complete that we may not have well-marked types of brain disease embracing many cases of each form. We have maniacal melancholic, and demented general paralytics, yet no one would venture to affirm that general paralysis is not a more distinctive and separate form of insanity than either mania or melancholia. Dr. Skae, than whom few physicians have had more experience, or are better qualified to form an opinion on such a matter, considers that every case of insanity comes much more under some natural group than under any of the divisions of Pinel, Esquirol, and Pritchard. I have observed that there are certain cases of which, from their mental symptoms alone, I could predict that they were likely to die of phthisis. They are not all cases of mania, nor of melancholia, nor of monomania, but some of them would come under one of these divisions and some under another. There is no one symptom they have in common, and no well-defined line of demarcation separating them from other cases. There is no diathetic mark or physical sign to distinguish them, yet they take their place in one's mind as a natural group notwithstanding. If they have been acute at first—either acutely maniacal or acutely melancholic—the acute stage is of very short duration, and passes neither into a chronic stage nor into deep dementia, but into an irritable, excitable, sullen, and suspicious state. There is a want of fixity in their mental condition. The intellect is not at first so much obscured as there is a great disinclination to exert it; and there are occasional, unaccountable little attacks of excitement, lasting only a very short time—unprovoked paroxysms of irritability and passion in a subdued form. There is a disinclination to enter into any kind of amusement or continuous work; and if this is overcome, there is no interest manifested in the employment. It might be called a mixture of sub-acute mania and dementia, being sometimes like the one and sometimes like the other. As the case advances the symptoms of dementia come to predominate; but it is seldom of that kind in which the mental faculties are entirely obscured, with no gleam of intelligence or any tendency to excitement. If there is any tendency to periodicity in the symptoms at

all, the remissions are not so regular, nor so complete, nor so long, as in ordinary periodic insanity. If there is depression, it is accompanied with an irritability and the want of any fixed depressing idea or delusion. If there is any single tendency that characterises these cases, it is to be suspicious. I found that, of the 136 men with tuberculosis, 56 manifested suspicious; and 64 of the 146 women did so.* The state I have described may, I think, be called "phthisical mania." The patients are not so apt to get stout as in ordinary dementia, and frequently the appetite is capricious. The pulse is generally weak, and frequently more rapid than usual. There is a want of tone and energy about the system that is very noticeable. There is a want of interest in anything that goes on, and an absence of sympathy where there is not positive suspicion of every one around. In many of the cases the suspicious are the chief symptoms. We have seen that nearly all the cases of pure monomania of suspicion were phthisical. In many of the cases the insanity commenced insidiously, and showed itself by an alteration of conduct and affection, an increased irritability and waywardness, and a progressive weakening of the intellect, without any great excitement or depression. Some cases of the so-called moral insanity die of phthisis very soon. However demented these cases of phthisical mania may seem to be, there are fitful flashes of intelligence; and in them, perhaps more frequently than in any other class of cases, there is increased intelligence, and as it were, a slight unveiling of the mental faculties immediately before death.

Under the term "phthisical mania" I should include only those cases which died within five or six years after becoming insane, and in which the development of the two diseases was somewhat contemporaneous. All the old chronic cases in which the tuberculosis was developed after many years' insanity I should exclude, because in them the tuberculosis might be the result of the conditions of life after becoming insane. All the cases of melancholia with refusal of food I should exclude, because in them we have a cause for the development of tuberculosis apart from the insanity. I found that there were 23 such cases of typical "phthisical mania" among the whole number of men with much tubercular deposit, and 42 among the women. In those 75 cases there were symptoms of phthisis within five years of the commencement of the insanity, and in the majority of them within two years. In those cases (26 per cent. of the tubercular and 16 per cent. of the whole) I regard the insanity to have been a direct result of a strong tubercular diathesis or tendency which was then being developed, or about to be developed, into direct tuberculosis, for the following

* Twenty per cent. of all the cases had hallucinations of the senses, the order of frequency being hearing, seeing, smelling. Hallucinations were twice as frequent among the women as the men.

reasons:—1st. The symptoms of tuberculosis, where they did not precede the insanity as they did in a few cases, appeared so soon after it that, considering their usual latency in insanity, and the known average duration of the disease in the sane, the two disorders must have been developed nearly contemporaneously. 2nd. The insanity was of a type so uniform, so seldom seen in cases which did not die of tuberculosis, all the cases had so much in common, whether there was depression or excitement, and being too numerous to be mere coincidences, the tuberculosis must have been the cause. 3rd. The age at which the insanity was developed in those cases was generally less than the age at which insanity is ordinarily developed, approaching, therefore, more the phthisical than the insane age.

But it will be said that the so-called distinctive and typical cases of phthisical mania form but a small part after all of the phthisical insane. They are not much more than half the cases in which phthisis was the assigned cause of death. What connection has the phthisis with insanity in the other cases? In 21 of the men and in 38 of the women who had much tubercular deposit, the insanity had existed for seven years and upwards before the tuberculosis appeared; and in them therefore the connection must have been either accidental, or some may think the diminished innervation affected the nutritive processes secondarily, and induced the phthisis. The diet of those patients had been quite as good as most of them had been accustomed to, they had plenty of fresh air and out-door exercise, and their clothing had been comfortable, so that the hygienic conditions were favorable.

About 12 men and 30 women had been ordinary cases of acute mania, passing into dementia or chronic mania, with nothing characteristic in the type of the insanity or the advent of the phthisis, and in these therefore we may assume the association of the two diseases to have been accidental.

A suicidal tendency I found to be more common among the tubercular than among the general inmates of the asylum. Twenty-five per cent. of the cases of tuberculosis manifested suicidal tendencies, while the proportion of such cases among the general admissions since 1852 has scarcely been 21 per cent. This is partly accounted for by the greater number of cases of melancholia among the tubercular; but I believe that in the class of deeply melancholic, intensely suicidal patients who refuse food, and in whom this state is chronic, the tuberculosis has a more intimate relationship to the insanity. Such cases generally die of phthisis in no very long time. It is amongst them that we see gangrene of the lung so frequently, and it seems to me that this is only a stronger manifestation of a tendency that exists in those cases to impaired nutrition of the lungs. There were nine men and seven women well-marked examples of this condition among those who died of phthisis, and in one or two

the lungs were partly gangrened and partly tubercular. Gangrene sometimes occurs in those cases in spite of a sufficient quantity of food and stimulants being given. Complete latency of the lung disease, whether it be gangrene or tubercular, is nearly as common in those cases as among general paralytics.

There was a distinct history of phthisis preceding the insanity in eight men and six women. Doubtless there were very many more in whom the lungs were diseased, or beginning to be diseased, before they became insane, for in many of those who died a few months after, there were the evidences of old tubercles. In those fourteen persons the phthisical symptoms had been so long continued and prominent as to be included in the history of their cases. In three or four of them the insanity had been merely a temporary excitement, soon passing off and leaving the patients almost quite well, and therefore very much allied to the delirium of fever or starvation. Morel* mentions this form of insanity as the chief concomitant of phthisis. He says—"From the observation of other writers, as well as from my own experience, I should conclude that if depression usually accompanies the commencement of tuberculization, maniacal paroxysms usually characterise its latter stages. We can to a certain extent explain these phenomena by ascribing them to the disturbance which imperfect respiration occasions in the circulation and nutrition of the brain. In other cases, doubtless, pathological investigation sufficiently proves that the derangement depends on tubercular meningitis in an insidious form." The few cases of this kind compared to the whole number of the tubercular shows how comparatively unimportant they are, and how erroneous an idea Morel's statement gives of the connection between tuberculosis and insanity, by representing that, owing to a temporary and accidental disturbance of the cerebral circulation in the latter stages of consumption, the mental faculties are affected. Tubercular meningitis we have seen to be as rare as this temporary delirium, and not invariably producing any symptoms when present.

Such being the influence of the tuberculosis on the form of the insanity, how does it influence the prognosis? Most unfavorably, we answer. There are very few cases indeed who ever recover their soundness of mind if phthisical symptoms have shown themselves or tubercular deposit has taken place to any extent in the chest after the commencement of the insanity. Some of the few cases do recover in whom the insanity has come on after the phthisis has become chronic, but scarcely any case of "phthisical mania" ever recovers. There may be apparent recoveries, but they are mere slight remissions. This almost universal incurability is a strong argument in favour of my view, that in those cases the insanity is the

* Morel, 'Traité des Maladies Mentales.'

result of the imperfect nutrition of the nervous system in the pre-tubercular, or the beginning of the tubercular stage of tuberculosis.

But it will be said, Why are not all phthisical patients insane, if this be the cause of the insanity in those cases? Some brains have a much stronger tendency to derangement of their functions than others, and it is in them that the impaired nutrition of tuberculosis acts as an exciting cause of insanity. The greater frequency of hereditary predisposition to insanity among the tubercular than among the non-tubercular shows that tuberculosis more than any other cause develops such a predisposition into an actual disease. And in how many ordinary phthisical patients do we find an irritability, lassitude, fancifulness, and fickleness of purpose, that borders on an unhealthy state of mind? It has been my experience that phthisical patients can seldom apply themselves to any continuous mental exertion; but on this point I speak with diffidence. Their intellects may be clear and unclouded to a preternatural degree, but their efforts resemble more the brilliant flashings of an ill-supplied lamp than the continuous steady light of a healthy mind. Ask any one who has watched closely two or three phthisical relatives during their illness, and they will tell you of the absurd fancies, amounting almost to delusions, of the sudden and causeless changes from hope to despondency, from cheerfulness to irritability, of the whims and wanderings of mind, and transitory moments of delirium, that accompanied the disease. All these symptoms have a cause in an ill-nourished brain, and when they are more developed they become insanity. Those four cases of temporary delirium in patients with phthisis which I mentioned as having got quite well in a day or two after coming into the asylum, are the connecting links between phthisical irritability and phthisical mania.

Dr. Sibbald tells me of a case that came under his observation, which I think illustrates very well the connection between an ill-nourished brain and insanity. It was that of a man far advanced in phthisis, much emaciated, and much troubled with cough, hectic, and laryngeal ulceration. He suddenly became subject to the hallucination that he saw a man who always kept his face averted from him, and whom consequently he could not recognise, but who accompanied him wherever he went, walked with him, sat down on the same seat with him, and lay in the bed with him. He felt he was unable to act in any way except as impelled by his strange companion. This was becoming quite unbearable. Dr. Sibbald prescribed an opiate for him to allay the cough, and half an hour after taking the medicine he ceased to have the hallucination. It seemed as if the brain was ill-nourished and ill-supplied with blood, and that the hallucination was the result of its impaired and perverted action. When the opium determined more blood to the

head, the brain resumed something like its healthy functions, and the hallucination ceased.

We shall now address ourselves to the second question, viz., What is the effect of the insanity on the tuberculosis?

The duration of life in the cases of tuberculosis, after they had become insane, is shown in the following table. Let it be observed that this table does not show the duration of life after their admission into the asylum, but from the first commencement of the insanity, except in the few cases in which the duration of the insanity before admission into the asylum is not recorded, when the length of time in the asylum is taken.

TABLE X.

	Males.	Female.	Total.
Died within 1 year after becoming insane	34	32	66
" 2 " "	24	18	42
" 3 " "	11	22	33
" 4 " "	12	16	28
" 6 " "	12	19	31
" 10 " "	20	16	36
" 20 " "	13	15	28
over 20 " "	10	8	18
Totals	136	146	282

It is seen from this that exactly one half of all the cases died within the first three years, about one fourth of them dying within the first year. It is extremely improbable that a predisposition to tuberculosis should have been engendered within three years in those cases, and still less likely that a predisposition and a large actual deposit could have taken place during that time. Allowing that, in a certain number of cases, the deposit of the tubercle, and the commencement of the insanity, were mere coincidences, yet it is impossible that this could have happened in one half the number. We have already seen that there were 75 cases in whom the insanity was *sui generis*, and only to be accounted for by the tuberculosis, which manifested itself in them all within five years of their admission into the asylum; but the foregoing table would seem to indicate that in even more than those cases of phthisical mania was the tuberculosis connected directly with the insanity. About two thirds of all the cases of tuberculosis had died before they were six years insane.

Many continental physiologists and pathologists, among whom may be reckoned Van der Kolk, Durand Fardel, Engel of Prague, Schiff, and Brown-Séquard,* attribute much importance, in the

* See Van der Kolk's "Case of Atrophy of Left Hemisphere of Brain," 'Syden. Soc. Trans.,' p. 170.

causation of lung disease, to the morbid influence of the pneumogastric nerve. Guislain* also mentions this among the predisposing causes of phthisis among the insane. That the pneumogastric, when cut, or its ganglia irritated or diseased, may exercise a morbid influence on the lungs, cannot be denied, but I think it is extremely open to doubt, notwithstanding the experiments of Schiff, whether in an otherwise healthy subject any such influence of the pneumogastric could produce tubercular deposition. Few in this country believe that tuberculization is ever the result of such a purely local cause, when there is not also a strong predisposition to it; and even if it were so, there is not the slightest particle of evidence to show that either the pneumogastric or its ganglion, or even the part of the medulla from which its roots arise, is more frequently diseased in those who die of phthisis than in other cases of insanity. The most marked organic changes in the brain are not so frequent among the phthisical as among other insane patients; and we have seen that, in general paralysis, in which the pneumogastric roots are so much involved that in its latter stages the power of swallowing is interfered with and frequently destroyed, phthisis is less common than in any other form of insanity. In epilepsy, too, the seat of which is probably in close proximity to the origin of the pneumogastric, phthisis is not so frequent as in ordinary cases (see Tables VIII and IX), according to the statistics of the Royal Edinburgh Asylum, although Van der Kolk found that "all the epileptic patients who had bitten the tongue died of phthisis, pneumonia, or marasmus," and Brown-Séguard found either tubercular deposit in the lung or pneumonia of the opposite lung from the disease of the medulla in four cases of epilepsy. I have met with one such case of unilateral softening of the medulla oblongata from the pressure of an enlarged odontoid process of the axis; but unfortunately I had no permission to examine any part but the head, so that I cannot speak as to the post-mortem appearances of the lungs. I can certainly affirm, however, that neither pneumonia or phthisis was the cause of death.

If insanity does not tend to produce phthisis by any morbid influence of the pneumogastric nerve, is it not possible that the impaired innervation generally, and the consequent weakening of the circulation, that we find in cases of long-continued insanity, may produce it? We have seen that one third of the patients with tuberculosis lived over six years, one sixth of them over ten years, and about one fifteenth of them over twenty years after the commencement of the insanity. The fact that phthisis is not common in the last and deepest stages of dementia, when the nerve functions are carried on with minimum activity, is not favorable to the idea that the ordinary forms of insanity predispose to tuberculosis. The tendency to tuberculosis which we have seen diminishes rapidly in

* 'Leçons Orales sur les Phrénopathies,' tome i, p. 431.

proportion to the length of the insanity, although partly explained by the rarer occurrence of phthisis as age advances, yet is pretty clear proof that on the whole insanity does not tend to the development of phthisis. The number of cases dying tubercular after being more than ten years insane, compared with the tubercular dying at all ages, is exactly the same proportion as that of those dying non-tubercular after being ten years insane, to the whole number of those who die non-tubercular.

It has long been remarked by all asylum physicians, that phthisis frequently runs its course in the insane without giving any symptoms of its presence, if we except emaciation and weakness; and even emaciation is not always so extreme as to attract special attention. Dr. Workman,* of the Toronto Asylum, has, since I commenced to collect the data for the present paper, published one on latent phthisis among the insane, in which he states his general impressions of its frequency, and goes so far as to attribute the incurability of so many cases of insanity to pathological lesions of the lungs and other organs of the body than the brain. I shall show the extent to which latency of lung disease really prevails, and I think that the brain must be looked on as the organ whose altered function or structure is the cause of so much incurable insanity as we find in all our asylums. I carefully perused the histories of the 213 cases in which there was much tubercular deposit in the lungs, and in 185 of them I have been able to ascertain the time at which the phthisical symptoms first appeared, if such symptoms existed, and the number in which they did not appear at all.

TABLE XI.

	M.	F.	Total.
Phthisis entirely latent	26	30	56
Symptoms of Phthisis			
appeared less than 1 month before death	6	5	11
" 3 " "	9	28	37
" 6 " "	17	20	37
" 1 year "	11	14	25
" 2 " "	3	5	8
" 3 " "	2	4	6
" 4 " "	1	0	1
" 5 " "	0	1	1
" 6 " "	0	1	1
Symptoms appeared . . . 9 " "	0	1	1
" 35 " "	0	1	1
Totals	75	110	185

* 'American Journal of Insanity,' July, 1862.

It is thus seen that in one third of the men, and in a little more than one fourth of the women, the tuberculosis manifested itself by no symptom during life. The greater number of men in whom it was latent is accounted for by the greater number of male general paralytics, in whom we have seen that latency is the rule. In about one fourth of all the cases the symptoms of phthisis appeared at periods under three months before death; in one fifth of them the period when they manifested themselves was between three and six months. In only about one tenth of all the cases did symptoms of tuberculosis show themselves more than a year before death. By the symptoms of phthisis I mean cough, expectoration, hectic, and difficulty of breathing. In many of the cases I have put down as latent, phthisis was diagnosed by physical examination. From this table it appears that long-continued phthisis, although exceptional among the insane, yet is not altogether unknown. The two cases, one of whom was markedly phthisical for nine years, and the other for thirty-five years, are examples of this. The average duration of life after phthisis has commenced is calculated by Ancell to be about eighteen months, so that in *nearly all the cases among the insane, phthisis is latent for a certain period.* Among the sane, Louis says that, "out of 123 cases of phthisis, eight (or only one fifteenth) were examples of pulmonary tubercles which were latent, or in other words, which preceded the cough during a period varying from six months to two years." Only four of these preceded the cough, and every other important general symptom; "in the others they gave rise to intense general symptoms, as fever, anorexia, &c., before they excited cough or expectoration."

It is surprising how small is the effect even of advanced lung disease on some of the insane. We constantly see patients going about doing their ordinary work, taking their food pretty well, and looking well, when suddenly their appetite fails, they begin to look haggard and weak, they become more deeply demented and listless, if their pulse is examined, it is found to be almost imperceptible, and in a few days they sink exhausted. After death the lungs are found to be totally disorganized. Old cavities are found that must have existed for months or years. I have seen even more sudden terminations. A man who had been failing somewhat in strength and appetite for a few weeks, and in whom the physical signs of phthisis had been discovered, sat down to dinner as usual, took what appeared to be a fainting fit immediately after dinner, and was dead before I could be sent for. His lungs were found riddled with tubercular cavities. A woman in whom the symptoms of phthisis had shown themselves for a fortnight, went out to walk with her fellow-patients, got weak, and appeared to faint in the grounds, was carried in, and died within an hour. But cases like these, although not uncommon, are extreme; as a general rule the patients show

signs of failing health two or three months, rarely much longer, before the phthisical symptoms appear; they lose flesh, and become more demented, and the periods of irritability and excitement become fewer and shorter, while the suspicions, although still present, are more seldom expressed. In a great many of them, however, the suspicions and obstinacy remain so marked till death, that however weak and exhausted they may be, an examination of the chest is resisted with their remaining strength. Every asylum physician ought to examine the chest of any patient who shows the least sign of failing health and strength, especially if this be accompanied by unusual listlessness and languor.

It must not be supposed, however, that the exhausting cough and the restless, weary nights of hectic and dyspnoea of ordinary phthisical patients are quite unknown in asylums, for although in the majority of the insane the symptoms are either quite latent or modified after they appear, yet in some cases the disease, after its symptoms have once been developed, runs its ordinary course as among the sane. The irritability of the ganglia that regulate the peristaltic motions of the intestines is even lessened, for although ulceration of the intestines exists in the majority of the phthisical insane, diarrhoea is by no means so common, or so troublesome when it exists as in ordinary phthisical patients. I have often seen the whole of the lower part of the ilium and colon one mass of tubercular ulceration, yet there had been no sign of this whatever during life. On the whole, however, diarrhoea is more common among the phthisical insane than either cough or expectoration in the latter stages of the disease.

Almost all writers on insanity, from Mead* downwards, have noticed the occurrence, in some cases, of a kind of metastasis between phthisis and insanity; when the one disease appears the other is abated, or disappears altogether, as if the body had no power to carry on two such diseases at the same time. I believe this is much more apparent than real in those cases. We constantly see a patient who, when free from excitement, is harassed with a cough and spit, and great difficulty of breathing. Immediately he becomes excited those symptoms leave him, and he gets out of bed, walks about, speaks much to his fellow-patients, and appears to be free from any chest complaint, and this may last for a few weeks, till the excitement passes off, when he takes to his bed weaker and much more exhausted than he was before, while the cough returns and goes on more rapidly. Doubtless here the brain excitement masks the phthisis; but it is only masked, and we have no proof whatever that the pathological changes going on in the lungs are stayed in the least degree. In only one small class of cases,

* 'Monita et Precepta Medica.' Dr. Mead.

and exceptionally even in these, is the one disease ever really stayed by the advent of the other, and that is where a short attack of mania occurs in a patient with old, very chronic, slowly-progressing phthisis. In such cases I have seen the patients become stout and healthy during the maniacal attack, while all the phthisical symptoms disappeared. In one such case the improved bodily health remained after the mania had disappeared. I do not believe that insanity is ever relieved or cured by the commencement of phthisis, but think that in all cases where such appears to be the case, the insanity was one of the signs of the pretubercular stage of tuberculosis. True, we often have acute excitement or even deep melancholia disappearing on the commencement of phthisical symptoms, but disappearing only to be followed by dementia and permanent weakening of the mental powers.

The general results to which my investigations have led me are the following:

1. Phthisis pulmonalis is much more frequent, as an *assigned cause of death* among the insane, than among the general population.

2. Tubercular deposition is about twice as frequent in the bodies of those dying insane as in the sane.

3. Phthisis pulmonalis is the "assigned cause of death" in only about one half of those in whom tubercular deposition is found after death.

4. The brain in the cases of tuberculosis is not so frequently diseased in a marked manner as it is in those dying of other diseases among the insane. In the majority of the cases the brain is pale, anæmic, irregularly vascular, with a tendency to softening of the white substance of the fornix and its neighbourhood, and the gray matter of lower specific gravity, than in any other cases of insanity.

5. Tubercle is not more frequently found in the nervous centres among the insane than among the sane, and when found, it does not in all cases, or even in the majority of them, produce any symptoms, and is not connected with any particular form of insanity.

6. Tubercle of the peritoneum is not more frequent among the tubercular insane than among the same class in the sane. In the former it is more frequently associated with melancholia and monomania of suspicion than ordinary tuberculosis of the lungs.

7. The average age at death of the cases of tuberculosis is about three years below the average age at death among the insane generally, and the average age of those in whom *much* tubercular deposit is found is five years below the general average.

8. The proportion of the tubercular who had had previous attacks of insanity is about the same as among the insane generally.

9. There is hereditary predisposition in seven per cent. more of the cases of tuberculosis than of the insane generally.

10. Monomania of suspicion is the form of insanity in which

tuberculosis is most frequent, and general paralysis stands at the other end of the scale that marks the frequency of tuberculosis in the different forms of insanity; mania stands next to general paralysis, and melancholia to monomania of suspicion; while the tendency to dementia, in all forms of insanity, is greater among the tubercular than among the non-tubercular. A majority of the cases of general paralysis and mania die non-tubercular; a majority of the cases of melancholia, monomania, and dementia exhibit proofs of tuberculosis after death.

11. In all the cases of general paralysis who were tubercular the disease had commenced with depression.

12. In a certain number of cases (about one fourth of all those in whom tubercle was found) the insanity is of such a peculiar and fixed type that it may be called "phthisical mania." In all those cases the phthisis is developed so soon after the insanity that tubercles must have already formed in the lungs, or a strong tubercular tendency been present and about to pass into actual tuberculosis when the insanity appeared. We know that the chief characteristic of tuberculosis is an impaired energy in the nutritive processes; and as a badly nourished bone becomes carious or necrosed for slight causes, or a badly nourished skin becomes subject to parasites, so disordered action results in those imperfectly nourished brain-cells from causes which would not be felt by a healthy brain. It is not the enfeebled nutrition directly so much as the perverted action to which the enfeebled nutrition predisposes, that produces the insanity. The peculiar mental state, the incurability of the insanity, the appearance of the brain after death, and its lowered specific gravity, all point to such a cause for the derangement.

13. There is a special relation between deep melancholia with long-continued suicidal tendencies and refusal of food and lung disease—either gangrene or tubercular disorganization.

14. There are a few cases in which the insanity is only a kind of delirium, occurring during previously developed chronic phthisis, and soon passing off.

15. The prognosis is most unfavorable if tuberculosis occurs in any case of insanity.

16. Half the cases of tuberculosis die within three years after the commencement of the insanity.

17. There is no proof that the "morbid influence of the pneumogastric nerve" has anything to do with the tuberculosis in cases of insanity.

18. Long-continued insanity does not tend to the development of tuberculosis more than to the production of other diseases.

19. Phthisis is entirely latent in between one third and one fourth of all the cases among the insane, and in almost all the others it is latent for a considerable time. This latency is most

frequent in general paralysis, in which the majority of the cases of phthisis exhibit no symptoms whatever.

20. There are very few cases where the commencement of insanity benefits the phthisis, but in a few, where the phthisis is very chronic, an attack of insanity may be followed by the permanent disappearance of the phthisical symptoms, or attacks of mania may alternate with symptoms of phthisis. In by far the majority of such cases, however, the phthisical symptoms are merely masked, while the deposition of tubercle goes on.

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