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T. DUNCAN GREENLEES, M.D.EDIN., F.R.S.E.,

Medical Superintendent, Grahamstown Asylum, South Africa.

Reprinted from the 'Journal of Mental Science,' October, 1902.

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AN inquiry into the condition of the various organs of those dying insane cannot fail to be of interest to those who believe that mental disease and physical disorders are, in the majority of cases, closely associated.

Every organ of the body, if its functions are perverted, influences the mind to a greater or lesser degree; in some cases the mental affection is only temporary and slight, while in other cases the mind becomes permanently affected, at least so long as the physical condition giving rise to the mental morbid state exists.

The following observations are an attempt, on a small scale, to sift the information obtained from 232 *post-mortem* examinations held in Grahamstown Asylum during the past eleven and a half years. A comparison between the organs of the insane and those of the sane should throw some light on the pathology of insanity. Whether we are going to arrive at the ultimate cause of mental disease by this method may be open to doubt, for latterly scientists have been studying the chemistry rather than the pathology of the tissues in insanity, and their results, more suggestive than conclusive so far, are such as to awaken the keenest interest of all scientific alienists.

As this is purely a pathological contribution, however, I purpose confining my remarks to the naked-eye appearances of the various organs of those dying insane, a considerable proportion of whom were coloured patients, viz., Kaffirs, Hottentots, etc.

TABLE I.—*Showing the Causes of Death in 232 Persons dying Insane.*

Males: E., 78; C., 96. Females: E., 20; C., 38.

	Males.		Females.		Total.		Percentage of total.
	E.	C.	E.	C.	E.	C.	
Diseases of nervous system	45	41	6	5	51	46	37·8
Exhaustion from mental disease	8	5	8	6	16	11	10·6
Diseases of respiratory system	9	17	2	12	11	29	15·6
„ circulatory „	8	8	1	4	9	12	8·2
„ digestive „	6	13	2	9	8	22	11·7
„ genito-urinary „	2	2	—	—	2	2	1·2
Constitutional diseases	4	12	2	7	6	19	9·8
Senile decay	3	6	3	1	6	7	5·1
Totals	85	104	24	44	109	148	100·0

The causes of death in those dying insane.—In Table I the causes of death are shown in 232 cases, and it is interesting to note that diseases of the nervous system account for a large proportion of the deaths. In slightly over 8 per cent. of the total, diseases of the circulatory system—chiefly organic heart disease—were the cause of death. The respiratory system accounted for 15½ per cent. of the total, and this after excluding certain cases of general tuberculosis where the lungs were secondarily affected. Diseases of the digestive system caused death in thirty cases—chiefly among natives,—being at the rate of 11·7 per cent.; death was due in the majority of these cases to affections of the intestinal tract, such as dysentery, etc. As regards the genito-urinary system, it is interesting to note that in no case was death due to lesions, although uterine and ovarian disease existed in a number of cases.

TABLE II.—*Showing the Weights, in ounces, of the various Organs of those dying Insane.*

The organs.	Europeans.		Coloured races.		Average weights in the sane.	
	Males.	Females.	Males.	Females.	Males.	Females.
Brain	48·63	43·58	46·96	39·53	49	44
Right hemisphere .	21·59	18·83	21·02	18·84		
Left „ .	21·55	18·45	21·03	18·71		
Cerebellum, pons, etc.	4·18	4·77	6·03	5·71		
Heart . . .	11·12	8·09	10·67	7·22	11	9
Right lung . . .	22·60	13·64	22·44	22·33	24	17
Left „ . . .	23·81	12·78	20·16	10·98	21	15
Liver	49·70	34·71	47·18	40·22	53	44
Spleen	5·24	3·06	4·04	2·87	6	5½
Right kidney . .	5·21	3·72	4·94	3·79	5¼	4¾
Left „ . .	5·46	3·83	4·99	3·83	5½	5

The various organs will now be considered in their proper order, beginning with—

The Brain.—As is usual in persons dying insane, we both look for, and usually find, gross lesions affecting the brain or its membranes (*vide* Table III).

TABLE III.—*Showing the Situation of the Lesions affecting the Brain in those dying Insane.*

Site of lesion.	Males.		Females.		Total.		Percentage on total No. examined.
	E.	C.	E.	C.	E.	C.	
Dura mater . . .	49	54	9	14	58	64	62·5
Pia mater . . .	51	59	10	12	61	71	67·6
Cerebral cortex . .	39	33	3	8	42	41	47·6

The dura mater was thicker than normal, or adherent to the skull or meninges of the brain, or inflamed on its visceral surface, in 122 cases, being 62·5 per cent. of the total number examined. One or other of these conditions occurs very frequently among the insane, irrespective of other pathological conditions of the brain and mental state. It is generally supposed, however, that

thickening of the dura is most frequently found in long-standing cases of insanity, but I have found an abnormally thickened dura in children, as well as in persons in whom the mental disorder had only existed for a few days before death.

The pia mater.—Pathological changes in the pia arachnoid are by no means rare in the insane. In 132 cases I found thickening, or opacity, or adhesions, more or less extensive, to the subjacent cortex. In general paralysis, as well as in alcoholic insanity, if chronic, and also in cases of secondary dementia, adhesion of the pia mater to the brain substance was common. A thickening of the membrane and a milky, cloudy opacity is frequently found in long-standing cases of chronic mental disease, as well as in cases of senile decay. According to the extent of this thickening there is consequent atrophy of the brain.

Pachymeningitis hæmorrhagica was found in thirteen cases, in one case traumatic in origin. In the majority of my cases it presented the appearance of an organised clot. As regards its frequency in the insane, Wiglesworth found it in 8·47 per cent., Crichton-Browne in 5 per cent., Bevan Lewis in 5·2 per cent., and I found it in 5·6 per cent. of all my cases.

The cerebral cortex.—Cortical softening was found in eighty-three cases, being 47·6 per cent. of the total. The *frontal* lobes were affected in twelve cases,—in three the right, and four the left, and in five both lobes were affected. The *parietal* lobes alone were softened in twelve cases,—five on the right side and five on the left, and in two cases the cortex of both parietal lobes was affected. Six cases showed softening of the occipital lobes,—one occurring in an epileptic ; in seven cases the *temporal* lobes were affected,—in one the right side alone, and in six the left side. Cortical softening was general, or not specifically defined as to area affected, in forty-six of my cases. It might be surmised that, as the frontal lobes are considered the seat of the mental and intellectual faculties, in the insane lesions of these regions should be found with greater frequency than in other portions of the cerebral cortex. My statistics do not bear out this idea, and cortical softening does not occur more frequently in the "intellectual areas" than in those areas more concerned in motor and organic functions.

Abnormal hardening of the cortical tissue, amounting almost to a sclerosis, and occurring in local patches, is a rare condition

as found in the insane; it has been noted in cases of epilepsy as affecting the occipital lobes, but in the majority of cases it is evidently the result of old hæmorrhage. Among the rarer forms of brain disease I have noted were the following:—cysts in five cases, one being an example of hydatid cyst; extensive hæmorrhage, old or recent, was found in four cases; one case each of cerebral abscess, atrophy of the olfactory bulb and left optic nerve; and four cases of cerebral tumour.

Cerebral tumours.—These four cases are of such interest that a few extracts from the *post-mortem* register may not be out of place here.

CASE 1.—M—, æt. 77, reg. No. 965, an old male native, suffering from senile dementia, died June 25th, 1893. Examination of the meninges revealed an extensive "false membrane" (pachymeningitis hæmorrhagica). Occupying the supra-orbital fossa on the left side and growing from the left frontal lobe was found a tumour about the size of a walnut. It appeared to grow from the white cerebral matrix, and was encapsuled so that it could be easily removed, leaving behind a cavity the walls of which were in part formed by the thinned cortex. In structure the neoplasm was soft and pulpy, apparently breaking down, and stained with effused blood. Microscopically its structure was that of a round-celled sarcoma.

CASE 2.—C. R—, æt. 35, a male European, suffering from epileptic dementia, died on September 10th, 1893. At the autopsy, on exposing the brain, a tumour the size of a small orange was found occupying the mesial line, with its greater bulk, however, more to the left than to the right side, and connected with the inferior surface of the frontal lobe, the brain in this situation being firmly adherent to the skull. On separating the hemispheres two thirds of the tumour were found to occupy the position of the left inferior frontal convolution, while the remainder of the neoplasm implicated the corresponding gyrus on the right side. Immediately behind and above the new growth the left frontal lobe was excavated by a large abscess-like cavity, containing gelatinous material. In structure the tumour was hard and almost cartilaginous on section, and it presented no definite limiting membrane.

CASE 3.—B. F—, æt. 73, reg. No. 1271, a male European, suffering from senile dementia, died on July 3rd, 1895. No tumour was noticeable until the brain was removed, but on cutting through the crura a tumour about the size of a Kei-apple (*i. e.*, a little larger than a cherry) was discovered, occupying a position posterior to the crura and implicating both hemispheres. On separating the hemispheres the tumour, which was rounded posteriorly, was found to pass forwards, in the middle line, to a point implicating the inferior and posterior portions of the corpus callosum and the posterior two thirds of the septum lucidum. Anteriorly the tumour was pyriform in shape, extending one inch into the white matter, and posteriorly it embraced both occipital lobes. To the naked eye its structure appeared to be angiogliomatous, and microscopically numerous large multinucleated cells, as well as blood-corpuscles and cholesterin crystals, were found.

CASE 4.—F. I. M—, æt. 47, reg. No. 1848, a male European, suffering from mania merging into dementia, died on September 5th, 1900. When the cerebral hemispheres were separated a small tumour, about the size of a split pea, was observed in the middle of the optic thalamus. A closer inspection disclosed the fact that it was pyriform in shape, on section dark in colour, and penetrated about two lines into the cerebral tissue. The optic nerves on both sides were softened and in a shrivelled condition. This man had been blind for years, and it is possible the blindness was originally due to the new growth, the softening of the optic tract being secondary in point of time.

The weight of the brain (Tables II and IV).—A study of the condition of the brain as found in the insane would not be complete without some reference to its weight, as observed in different races, different sexes, and different forms of mental disease.

TABLE IV.—*Showing the Average Weight, in ounces, of the Brain in the various forms of Insanity.*

Form of insanity.	Total No. examined.	Males.		Females.		Average of totals.
		E.	C.	E.	C.	
Mania . . .	67	50·30	46·52	44·62	39·95	45·35
Melancholia . .	15	52·50	51·75	44·00	42·00	47·56
Epileptic insanity .	22	50·50	48·69	45·33	39·62	46·03
General paralysis .	34	48·20	44·20	41·33	37·00	42·68
Dementia . . .	55	46·95	45·58	42·62	39·50	43·66
Imbecility and idiocy .	11	43·33	45·00	—	38·12	42·15
Totals and averages .	204	48·63	46·96	43·58	39·53	44·67

A reference to Table II will show that the brain, taken as a whole, is heavier among European insane than among native insane by an average of about 2 oz. Further, the brain of the European female exceeds that of the native female by over 4 oz. These facts are of interest, although increase in mere weight of an organ does not necessarily imply increased functional activity ; or, to put it conversely, elaboration of the cerebral organisation apparently does not influence the gross weight to any appreciable extent. While we can show philosophers with brains of enormous weight, on the other hand cases are not infrequently found in idiot institutions of brains just as heavy.

Again, it is interesting to note the influence, if any, race has on the weight of the brain among white patients, and to ascertain this the weights of the brains of fourteen British subjects, born in England, were taken, and also the weights of the brains of a similar number of Dutch patients. These cases were taken in sequence, and without any picking or choosing, and I found the average weight of the "British" brain to be 42·32 oz., while that of the "Dutch" brain was 43·21 oz.! I would again emphasise the fact that it is not quantity but quality of brain tissue that influences the intellectual capacity of any individual person or race. I further noted, in ten consecutive cases of each, that the brain of the British-born subject exceeded that of the colonial-born by no less than 4 oz. on an average.

The left hemisphere is generally considered to be the most active half of the brain, at all events in right-handed persons, and it might be reasonable to assume that this half exceeded the right in weight; but I found in a large series of observations that the hemispheres were almost exactly equal in weight, the right, as a matter of fact, exceeding by a trifle the left hemisphere. These observations confirm those of Dr. Clapham, who examined the brains of 449 persons dying insane.

The heaviest brain in my series weighed 58 oz., and the lightest, occurring in an adult male native, only weighed 36 oz. Among the male natives the weights ranged from 36 oz. to 56 oz., the average being 46·96 oz.; and among the female natives the weights varied from 36 oz. to 47½ oz., the average being 39·53 oz.

Generally speaking, my observations agree with those of Dr. Thurnam, who showed that the average weight of the "insane" brain was less than that of the "sane" brain; and yet it is important to note that in my series I have three brains whose average weight was 58 oz., an average higher than that of the brains of ten distinguished men, among whom were Abercrombie (63 oz.), Cuvier (64½ oz.), and Spurzheim (55·06 oz.).

As regards the weight of the brain in the various forms of insanity, attention is directed to Table IV, where several interesting facts are disclosed. We note that the brain is very light in general paralysis, a disease which generally attacks men in the prime of life, at a time when the intellectual faculties might be supposed to be keenest. Further, the brain is heaviest in cases of melancholia, and here again an interesting explanation may be offered. While mania is considered a disease of undeveloped brain, melancholia may be regarded as one of developed brain; the intellectual strata that are highest are the latest developed, and are therefore most ready to break down, as occurs in cases of melancholia; whereas in cases of mania the higher mental layers are not yet formed, and here the mental break-down takes place in, intellectually speaking, an undeveloped mental organisation.

These theories help to explain why mania should be so much more common among savage tribes than melancholia. In South Africa, while simple mania is extremely common, melancholia is very rare, and is usually found only in "educated" natives.

In the epileptic insanities the mean weight of the brain is high. The presence of epilepsy, when acquired, very frequently indicates high mental powers. We have but to refer to the many distinguished men in history who were epileptics to prove this point ; and it would seem that while epilepsy, if long continued, materially damages the minute structure of the brain, it does not appreciably affect its gross weight.

The Circulatory System.—In a previous number of this JOURNAL and in an unpublished thesis I have treated fully of diseases of the heart and blood-vessels in insanity, and it will suffice if a brief *résumé* of my work is given here.

As a cause of death among the insane, heart disease occupies a most important position, being third in point of frequency, cerebral and pulmonary diseases being first and second respectively. In English asylums, out of 101,296 deaths, extending over a period of five years, diseases of the circulatory system accounted for 12·41 per cent. of the total, while in Grahamstown Asylum, during the past ten years, heart disease was the cause of death in 10 per cent.

Forms of heart disease.—1. *Hypertrophy*, most frequently of the left ventricle, was found oftener among Europeans than natives ; it was common in cases of mania, rare in melancholia ; common in general paralysis, seldom noted in epileptic insanity ; frequently found in dementia, but rare in cases of congenital mental defect.

2. *Atrophy* of the heart is a rare condition among the insane, being found in only 5·3 per cent. of the total autopsies. It was most frequently found associated with fatty degeneration, and in cases of wasting disease, such as phthisis pulmonalis. The smallest heart in my series belonged to a Hottentot woman, suffering from secondary dementia, and weighed only 4 oz., but this was undoubtedly a congenitally small heart, and can hardly be considered as a true example of atrophy of the heart. Further, Hottentots are a small race, and all their organs are smaller than exist among Europeans or Kaffirs.

3. *Fatty degeneration of the heart.*—The myocardium is here pale or flabby, or even greasy to the touch ; this condition was found in 26 per cent. of my cases, and was likewise found most frequently associated with exhausting diseases.

4. *Pericarditis* was found in 13·7 per cent., and was

generally found co-existing with considerable hypertrophy of the heart itself.

5. *Valvular disease* was found in 25 per cent. of my cases; the aortic valve is the most frequently affected, and when the mitral valve is diseased, as a rule the aortic cusps are likewise affected, and consequently left-sided hypertrophy was common in these conditions.

6. *Arterial disease.*—Thickening of the walls or calcareous deposits, as found (*a*) in the main arteries of the body, and (*b*) in the cerebral arteries, were conditions frequently noted. Hypertrophy of the arterial muscular coat, and atheromatous deposit in the vessel, are conditions common to old age, even in the sane; but it is interesting to note that in general paralysis, and this in cases dying at a comparatively early age, one or other of these conditions was commonly found affecting not only the general arterial system, but also the cerebral arteries. This condition of the arteries in general paralysis no doubt led the older authorities to the belief that this disease was essentially in its nature a premature old age, and it has an important bearing on the sequelæ of the disease.

While arterial disease was found in 20 per cent. of cases of mania, it occurred in 60 per cent. of my cases of general paralysis; in the former disease it was only found in cases of long-standing disease, whereas the average duration of the latter disease is only about three years.

7. *The weight of the heart.*—The average weight of the heart of those dying insane exceeds slightly that of those dying sane. The average weight of the native insane is less than that of the European sane, although the heaviest hearts in my series were found in two natives, viz., 38 oz. and 18 oz. Hearts weighing 26 oz. and 22½ oz. were noted in two male Europeans.

The Respiratory System.—Diseases of the respiratory system, as might be expected, are very common among the insane. A general lowering of the vital processes, from inhibited nerve function, especially in cases of dementia, tends to induce acute pulmonary complaints, and the same condition reduces the power of resistance to disease, so that death results in the insane more readily than it does in the sane, suffering from apparently the same condition.

In addition to this factor in the causation of pulmonary

disease, over-crowding and defective ventilation, such as are found too frequently in our asylums, explain the frequency of phthisis pulmonalis in the insane, a fact which Dr. Clouston pointed out many years ago. In point of frequency phthisis pulmonalis alone accounts for more deaths in our asylums than any other one disease, except those of the nervous system; and in England, of 8133 deaths in asylums, 1169, or 14·4 per cent., were due to this disease.

We will here briefly refer to the three chief diseases affecting the respiratory system, viz., phthisis pulmonalis, pneumonia, and pleurisy.

1. *Phthisis pulmonalis.*—The lungs presented tubercular deposits apart from the condition named "pneumonic phthisis," which will be referred to later, in fifty cases of my series. The right lung alone was affected in nine cases, the left in six, and both organs in thirty-five cases. Thirty-nine were natives, and only eleven were Europeans. Of the natives, twenty-four were men and fifteen women; of the Europeans, nine were men and two females. The percentage of cases of male Europeans with tubercular deposits in their lungs was 18, and among male natives it was 36 per cent.

That phthisis pulmonalis should be a frequent and fatal disease among the native insane of this country is not to be wondered at; coming, as these patients generally do, from districts up country, where they have been accustomed to an open-air existence and the simplest of diets, to an institution where they are called upon to wear clothes like any European, where they have to live and sleep in over-crowded day-rooms and dormitories, and where they have to partake of food more suited for highly organised beings, is it surprising that their vital powers become depressed, and that they are unable to offer any resistance to the tubercle bacillus? On the other hand, it is interesting to note the rarity of tubercular disease among the European inmates of our local asylum, where it is only 11·2 per cent., as against 14·4 per cent. in English asylums.

2. *Pneumonia* was found in thirty-seven cases; the right lung was affected in twelve, the left lung in nine, and both lungs were diseased in fifteen cases. Pneumonia existed in 27 per cent. of the cases examined, and in English asylums it was the cause of death in 7·1 per cent. In Grahamstown Asylum

pneumonia occurs most frequently among the natives, and is more common among men than among women. The tendency of pneumonia, as it occurs among the natives, is to break down into vomicæ, and in the majority of the cases examined the lungs presented all the stages through which pneumonia is known to pass ; thus congestion, red hepatisation, grey hepatisation, and broken-down lung tissue were all frequently found in the one organ, the condition being in the majority of cases most advanced at the bases.

3. *Pleurisy.*—(*a*) *Adhesions* of the lungs to the chest walls occurred in eighty-eight cases—64·2 per cent. of the cases examined. Adhesions were found on the right side in thirty-four cases, on the left side in twenty-two, and on both sides in thirty-two cases. These adhesions in sixty-four of the cases examined were apparently of old date, consisting of tough fibrous bands ; and in twenty-four cases were evidently of recent formation, consisting of lymph deposit gluing the visceral and parietal layers of the pleura together. Pleuritic adhesions were found in twenty-eight Europeans and sixty natives, and old adhesions were relatively more frequent among the latter than among the former.

(*b*) *Pleurisy with effusion*, either purulent or serous, was present in only sixteen cases ; in four the right side was affected ; in one the left ; and in eleven fluid was found in both pleural cavities. Here, again, the condition would appear to be more frequent among the natives than among the Europeans, being present in twelve of the former and only four of the latter.

While as a cause of death pleurisy may be comparatively rare, it is important to note the frequency with which it is found in the deadhouse, and this points to the fact that very few insane die without having had at one time or other of their lives suffered from this disease. Combined with pneumonia, it is relatively frequent as a pathological condition ; but alone, with the lungs in a healthy state, it is decidedly rare. Pleurisy caused death in thirty-five cases out of 8133 in English asylums—0·43 per cent.

In only one case—a female European—were the lungs found infiltrated with cancerous deposit, and this was secondary to scirrhus of the mammæ.

With the exception of pulmonary phthisis as found in the

insane, I am unable to trace any statistical information relative to the frequency with which other lung diseases—either pleurisy or pneumonia—exist among the insane.

According to the Reports of the English Commissioners in Lunacy it would appear that, *as a cause of death*, pneumonia accounts for one out of every fourteen cases, pleurisy one out of every 233, and phthisis one of every seven deaths. In Grahamstown Asylum I found pneumonia to exist in one out of every six autopsies, pleurisy in one of every three, pleuritic effusion in one of every thirteen, and pulmonary phthisis in one of every four cases.

Weight of the lungs in the insane.—(*a*) *Right lung.*—Among male Europeans I found the average weight of the right lung to be 22·60 oz., which is lighter than the same organ in the sane. In ten cases this lung weighed 30 oz. and upwards, in three it exceeded 40 oz., and in one case it weighed 56 oz. Among female Europeans the right lung averaged 13·64 oz., being less likewise than the "female sane right lung."

Of sixty-five male natives the average weight was 22·44 oz., in seventeen it exceeded 30 oz., in five it exceeded 40 oz., and in one case this lung weighed 51½ oz. The average weight of the right lung among female natives was 22·33 oz.; the heaviest of this series weighed 53 oz., while ten exceeded 20 oz. in weight.

(*b*) *Left lung.*—The average weight of the left lung among male Europeans was 23·81 oz.; the heaviest in the series weighed 72 oz., thirty weighed 20 oz. or upwards, twelve exceeded 30 oz., and three exceeded 40 oz. The lightest male European left lung weighed only 8½ oz. Among female Europeans this lung averaged 12·78 oz., or, excluding the case of a girl whose lung only weighed 3 oz., then the average of the remainder would be 14·41 oz. The heaviest lung in this series was 26 oz. The average weight of the left lung among male natives was 20·16 oz., and the heaviest weighed 46 oz.; three exceeded 40 oz., eleven exceeded 30 oz., and the lightest of the series was only 6 oz. in weight. Among female natives this lung weighed, on an average, 10·98 oz.; only one exceeded 30 oz.; and the lightest, occurring in an adult female, weighed 5 oz.

Comparing these figures with the average weight of the lungs of persons dying sane in England, it is noted that the

"colonial" lungs weigh less. If pulmonary disease, with its consequent consolidation, tends to increase the weight of the lungs, then we may boast of a comparative immunity from lung disease in this country.

Diseases of the liver in the insane.—From time immemorial functional derangements of the liver have been considered as closely associated with mental disorders,—the circulation of "black bile" in the blood being, among the ancients, the supposed cause of melancholia. In spite of this apparently most ancient theory as to the cause of insanity, it would seem as if little real scientific attention has hitherto been paid to the condition of the liver in the insane.

It is curious to note the difference of opinion expressed by various authors regarding the relationship that is supposed to exist between somatic disease and insanity. On the one hand, some take the extreme view that observation has failed in eliciting any connection between the two, or that the former can, *ipso facto*, produce the latter; while others maintain that so intimate is the relationship that exists between the body and the mind that all and every disease of the body *may* cause insanity, and that, as a matter of fact, many of them do.

Given a neurotic diathesis, I affirm that disease of any organ of the body may induce mental disease that may be of so marked a type as to constitute "certifiable" insanity. Who, for example, is going to draw the line of distinction between the depression associated with biliousness and the melancholia which is certifiable? The conditions are identical, and differ only in degree. In both the origin is the same, and the results depend very much on whether the patient is one of a neurotic tendency or not; for in all these cases, before we can have psychic manifestations, there must be some predisposing tendency pre-existing,—in this case an unstable nervous or mental system.

While vague statements have been published from time to time referring to the influence of liver disease in inducing insanity, I have been unable to discover any published record bearing upon the actual condition of this organ in mental disease. This is strange, for one would naturally expect that some attention should have been given to an organ upon whose healthy functions so much of our happiness and peace of mind depends.

Regis casually refers to the relationship existing between liver disease and insanity, but declines to be as emphatic as Hammond, who maintained that all cases of melancholia were due to hepatic disease !

During the past eleven years the livers of 199 cases dying in Grahamstown Asylum were examined, and in only 35 cases was this organ noted as "healthy" (*vide* Table V).

TABLE V.—*Showing the Diseases of the Liver found in those dying Insane.*

Disease.	Males.		Females.		Total.		Percentage of cases examined.	
	E.	C.	E.	C.	E.	C.	E.	C.
Simple congestion of liver . .	26	28	7	11	33	39	38·38	31·70
Cirrhosis—general or local, fine or coarse	6	1	—	1	6	2	6·97	1·62
Fatty degeneration of liver . .	8	4	1	1	9	5	10·46	4·06
Perihepatitis	1	4	—	4	1	8	1·16	6·50

Among the morbid conditions more frequently observed were the following :

1. *Congestion* or engorgement of the liver was noted in 72 cases, being 36·2 per cent. of the total.

2. *Cirrhosis*, fine or coarse, was present in only 8 cases, 4 per cent. In only one—a male European—did I find "hobnail" liver.

3. *Fatty degeneration* existed in 24 cases, 12 per cent., and the liver was described as "large, yellow, and fatty" in three natives.

4. *Perihepatitis* was found in 9 cases, 8 of whom were natives, and the—

5. *Gall-bladder* was full or distended in 46 cases ; males, E. 16, N. 17 ; females, E. 6, N. 7.

Among the rarer pathological conditions found were 4 cases of biliary calculi ; 11 cases with caseous or tubercular deposits ; a calcareous nodule in the substance of the liver in a male native ; a total absence of lobulation in another. A large abscess was found in a male, and hydatid cysts existed in the liver of a female, in both cases natives.

The weight of the liver (Table II) in health is said to be about 48 oz. (for men 53 oz., and for women 44 oz.). These averages are considerably above those I show in my series, and may indicate that the "sane" liver is a heavier organ than the "insane," in spite of the theory that the latter may probably have been the most active functionally so as to produce the mental disease. One would certainly have expected higher average weights than are here shown, especially among male Europeans, in a hot country where social habits tend to throw extra labour on this organ. The heaviest liver in my series weighed 69 oz., and belonged to a male European; in 9 cases it exceeded 60 oz.; in 17 it ranged from 50 oz. to 60 oz., and the smallest liver weighed only 22 oz.

A liver which weighed 73 oz. was found in a male native, and one weighing 58 oz. in a female native. The lightest liver found among natives weighed only 15 oz., and this occurred in an adult female.

TABLE VI.—*Showing the Diseases of the Spleen found in those dying Insane.*

Disease.	Males.		Females.		Total.		Percentage on cases examined.	
	E.	C.	E.	C.	E.	C.	E.	C.
Capsule diseased—thickened, etc.	3	3	1	—	4	3	5·12	2·67
Simple congestion of spleen	9	15	1	5	10	20	12·83	17·85
Spleen markedly friable	15	17	1	4	16	21	20·51	18·75
Spleen abnormally pale in colour	7	8	2	3	9	11	11·53	9·82
Tubercular disease of spleen	—	7	—	1	—	8	—	7·84
Supernumerary organ	1	3	1	1	2	4	2·56	3·57

Diseases of the Spleen in the Insane (Table VI).—The spleen is an organ one would naturally expect to see diseased in patients dying in an asylum in this country, especially among Europeans. My records, however, show that the spleen is rarely affected in the insane; and, for the most part, the morbid conditions noted were of a trivial and unimportant character. In 61 per cent. of all the cases examined the spleen was described as perfectly healthy; in six cases of

these, however, a supernumerary spleen existed. Of the "diseased" cases, thirty were noted as being simply congested, twenty were pale and anæmic-looking; in seventy-one the organ is noted as being very friable, and in seventeen cases the capsule was thickened or even cartilaginous in consistence. Tubercular disease existed in eight cases—all natives,—and was found only where tubercle existed in other organs as well.

As regards the *weight* of the spleen (Table II), text-books inform us a broad margin is allowed within the limits of health,—that, in fact, anything between 3 oz. and 10 oz. need not be considered as abnormal, while 6 oz. for men and 5½ oz. for women may be regarded as representing the average weights of this organ in health.

If this statement can be taken as correct, then, according to my observations, the spleen of the insane weighs less than it does in the sane.

The largest spleen in my series occurred in a male European, and it weighed 11 oz.; and the smallest was found in a male native, weighing only ½ oz., being just the size of a florin.

TABLE VII.—*Showing the Diseases of the Kidneys found in those dying Insane.*

Disease.	Males.		Females.		Total.		Percentage on No. of cases examined.	
	E.	C.	E.	C.	E.	C.	E.	C.
Capsules adherent to renal cortex .	15	18	4	4	19	22	24·36	21·57
Congestion of kidneys . . .	19	19	2	2	21	21	26·92	20·58
Cirrhosis of kidneys—fine or coarse	8	6	2	2	10	8	12·82	7·84
Fatty degeneration—large, pale or yellow	7	16	7	4	14	20	17·97	19·60
Tubercular disease of kidneys .	4	4	—	—	4	4	5·13	3·92
Cystic degeneration—chiefly cortical	5	3	1	—	6	3	7·69	2·92
Lobulation of kidneys . . .	3	1	—	—	3	1	3·84	0·98

Diseases of the Kidneys in the Insane (Table VII).—Disease of the kidneys is very frequently accompanied by psychic phenomena, so that the insanity of Bright's disease forms one of the subdivisions in all classifications of mental disease. The circulation of effete products normally excreted by the kidneys acts as a direct poison on the protoplasm of the

cerebral cells, perverting their functions, and producing the delirium of renal disease. Further, if we recognise Bright's disease as of the nature of a general arterio-sclerosis, then such an affection, occurring within the cerebral arteries, must necessarily interfere with the supply of blood to the tissues, and produce actual starvation of the cerebral cells, perverting their functions to a marked extent.

Any slight disease of the kidneys, such as is frequently found in the insane, must, to a greater or lesser extent, impede the excretory powers of the kidneys, so that the cerebral functions are consequently affected by retained excretions To what extent interference with the function of any excretory organ acts as a direct contributory cause to the mental disease we cannot yet say. The arrest of the cutaneous secretions in many cases of melancholia, and the marked concentration of the urine in cases of mania, clearly point to the powerful influence non-elimination has on the mental functions, and the perfect performance of their functions by the kidneys is as essential to mental as it is to physical health.

In my observations I note that the kidneys were found diseased in 59·3 per cent. of all the cases examined. They were most frequently affected among male Europeans, and least so among female natives. Thus—

Male Europeans, kidneys diseased	42	of 64 cases	= 65·62	per cent.
Male natives, ,,	52	of 81 ,,	= 64·19	,,
Female Europeans, ,,	5	of 13 ,,	= 38·46	,,
Female natives, ,,	9	of 24 ,,	= 37·50	,,

As a rule, when disease attacks the kidneys, both organs become affected, although generally one organ is in a more advanced condition than the other. In only one case did I find one kidney healthy while the other was diseased.

In a female native the supra-renal capsule was noted as abnormally large, but no constitutional disturbance existed in the case.

Kidney disease is more common among men than among women in the insane, and I have no reason to doubt, were statistics available, that the same rule would hold good among the sane.

The *capsule* was found adherent to the renal cortex in twenty-one cases; *congestion* was noted in forty-two cases. The organs were described as *large*, *pale*, *yellow*, or *fatty* in

seven male Europeans, sixteen male natives, one female European, and four female natives. Cirrhosis, fine or coarse, existed in both organs of eight male Europeans, six male natives, two female Europeans, and two female natives. *Cysts*, usually cortical in situation, were found in the kidneys of five male Europeans, one male native, and one female European. *Tubercular disease* occurred in four male Europeans and four male natives, but was absent from the kidneys of the females. *Lobulation* of one or both organs was found in three male Europeans, one of whom was an idiot, one female European, one male native, and two coloured females.

In only one case, that of a male European, a solitary organ —the right kidney—existed, and a floating kidney—the right also—was found in a female native.

As regards the *weight* (Table II) of the kidneys in the insane, it is noted that the weight of the "insane" male kidney closely approximates that of the male "sane" organ, while the average weight of the female "insane" kidney is exactly 1 oz. less than that of her sane sister.

Further, my observations bear out those of previous writers that the left kidney is heavier than the right, and this holds good in both sexes, and among natives as well as among Europeans.

Right kidney.—Among male Europeans the heaviest organ weighed 8 oz., while the smallest only weighed 3 oz.

Left kidney.—The largest weighed 9½ oz. and the smallest only 1½ oz., these representing the two extremes in my series.

Natives are not distinguished for large kidneys; in none did the weight exceed 8 oz., and among women, both native and European, the average weight was approximately the same.

Diseases of the Gastro-intestinal Tract in Insanity.—Diseases affecting the digestive tract exercise a marked influence upon the mental system, many delusions being referable to diseased or disordered conditions of these organs. For example, the gnawing caused by a gastric cancer is often referred to by the patient as rats eating away the stomach,—an example of a delusion having a direct material origin.

In Grahamstown Asylum lesions of the stomach and intestines were of frequent occurrence, and were in many cases the cause of death.

Among the male Europeans we note that in nine cases the intestinal tract was affected; of these in five the large bowel was inflamed, and in two it was ulcerated as well. In one of these cases this inflammation was due to the presence of tape-worm. The pylorus was thickened and its lumen diminished in one, while pyloric cancer was found in another case.

Of the female Europeans only two presented inflammation of the mucous membrane of the bowel. In one of these cancerous nodules also existed, and in the other evidences of old peritonitis were found.

Among male natives nineteen cases presented lesions of the stomach or intestines; of these thirteen had inflammation or ulceration of the bowel; seven were cases of peritonitis—mostly tubercular in character,—and one was a case of secondary peritonitis and dropsy in a cardiac case.

Nine female natives had colitis or enteritis,—in one due to the presence of *Ascaris lumbricoides*, with which the entire bowel was packed. In one case cicatrices of old rectal ulcers were found, and in five peritonitis existed, being tubercular in origin in three.

The prevalence of dysentery and tuberculosis in the natives of this country is well known, and fully borne out by the statistics of Grahamstown Asylum.

Diseases of the Genito-urinary System in the Insane.—In only three females—all natives—were lesions of the internal genital organs discovered. Congestion of the left ovary, cystic degeneration of both ovaries, and atrophy were the conditions noted.

In this connection it may be of interest to refer to the case of *hermaphroditism* occurring in a native, admitted under my care as a male, and who was exhibited to the Medical Congress several years ago. Death took place from tuber-culosis, and a careful examination of the genital organs was made.

She was admitted as a male, and insisted on being treated as such, but there was little doubt as to the prominence of female organs of generation over those of the male sex. She was married to a woman, who, however, refused to live with her for obvious reasons, and while in the asylum she refused to live in the female wards. She menstruated regularly, and on these occasions it was considered advisable to keep her in a

room by herself. She knew there was something the matter with her genital organs, and exposed herself readily enough for examination,—not from immodesty so much as from a real desire that operative interference might be attempted to "make her a better man."

The following is a description of the *post-mortem* appearances :

"Body of an adult native ; no hair on face ; the configuration of body that of a female, the mammæ being large and glandular structure evident ; nipples large and prominent. Pelvis capacious and female in character ; external dimensions :

"Diameter between external spines . $8\frac{1}{2}$ inches.
„ „ iliac crests . . $10\frac{1}{4}$ „
„ „ great trochanters . $12\frac{1}{4}$ „

"*External genitals.*—The penis was rudimentary, about two inches long, and was bound down inferiorly to the body of the vulva by a frænum. It was not perforated by a urethra ; the glans and prepuce were normal, although very small in size. The urethral orifice occupied the usual female position. No external orifice corresponding to the vagina existed, but there was some sanious fluid coming from the urethral orifice.

"*Internal genitals.*—In the right pelvis there was an organ of ovarian structure, with the usual appendages and Wolffian remains. On dissection it was noted that the channel which communicated with the uterus and bladder was single for about half an inch from the urethral orifice, then it divided into two passages communicating respectively with the uterus and bladder. The uterine opening to the Fallopian tube existed on the right, but no corresponding opening was discovered on the left side. The uterus was of fair size and virgin-like; the cervix was soft and pulpy to the sense of touch, and contained grumous fluid ; and the uterine mucous membrane was slightly inflamed, presenting indications that the menstrual function was active at the time of death."

I am informed that hermaphroditism is by no means unknown among the natives of this country, but this is the first case that has come under my notice.

In no case did I find lesions affecting the male genital organs.

Lesions of the Bladder in the Insane.—Diseases of the bladder or the presence of calculi are so rare among the insane as only to require a passing reference. In some cases of general

paralysis paresis of even non-striated muscular fibre takes place, so that the bladder fails to act and catheterisation is required ; after death the bladder is often found in these cases distended, its walls having apparently lost their contractile powers.

Cystitis occurred in a few females, and the walls of the bladder were found much thickened in several cases, but in none were the conditions such as to be the direct cause of death, and in no case were other lesions or diseases noted.

Remarks.—The figures upon which these observations are based are hardly such as to justify dogmatic statements as to the prevalence of physical diseases in insanity ; they do, however, indicate, even in a small way, the direction in which such investigations should be carried out, and the character of the results were similar inquiries made, but on a larger scale.

With the figures at the disposal of the Collective Investigations Committee of the Association, referring to all the asylums with which they will have to deal, some definite statements should accumulate to throw more light on this, as yet, the most obscure of all diseases.

Whether the insanities are the outcome of altered metabolism in one or other of the organs of the body, or whether they originate in delicate changes in the constitution of the protoplasm of the cerebral cells, due perhaps to toxic influences, science has not yet enlightened us. The tendency of modern thought is that there is a physical basis to all types of mental alienation.

It may be taken as an axiom that although an insane mind may exist in a sound body, much more frequently do we find the unsound mind in the unsound body, and, recognising this fact, we are guided in our treatment of our insane patients, searching for, in every case, a physical cause for the mental symptoms, and devoting our knowledge towards the alleviation of the bodily ailment in the reasonable expectation of consequent improvement in the mental symptoms.

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