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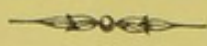


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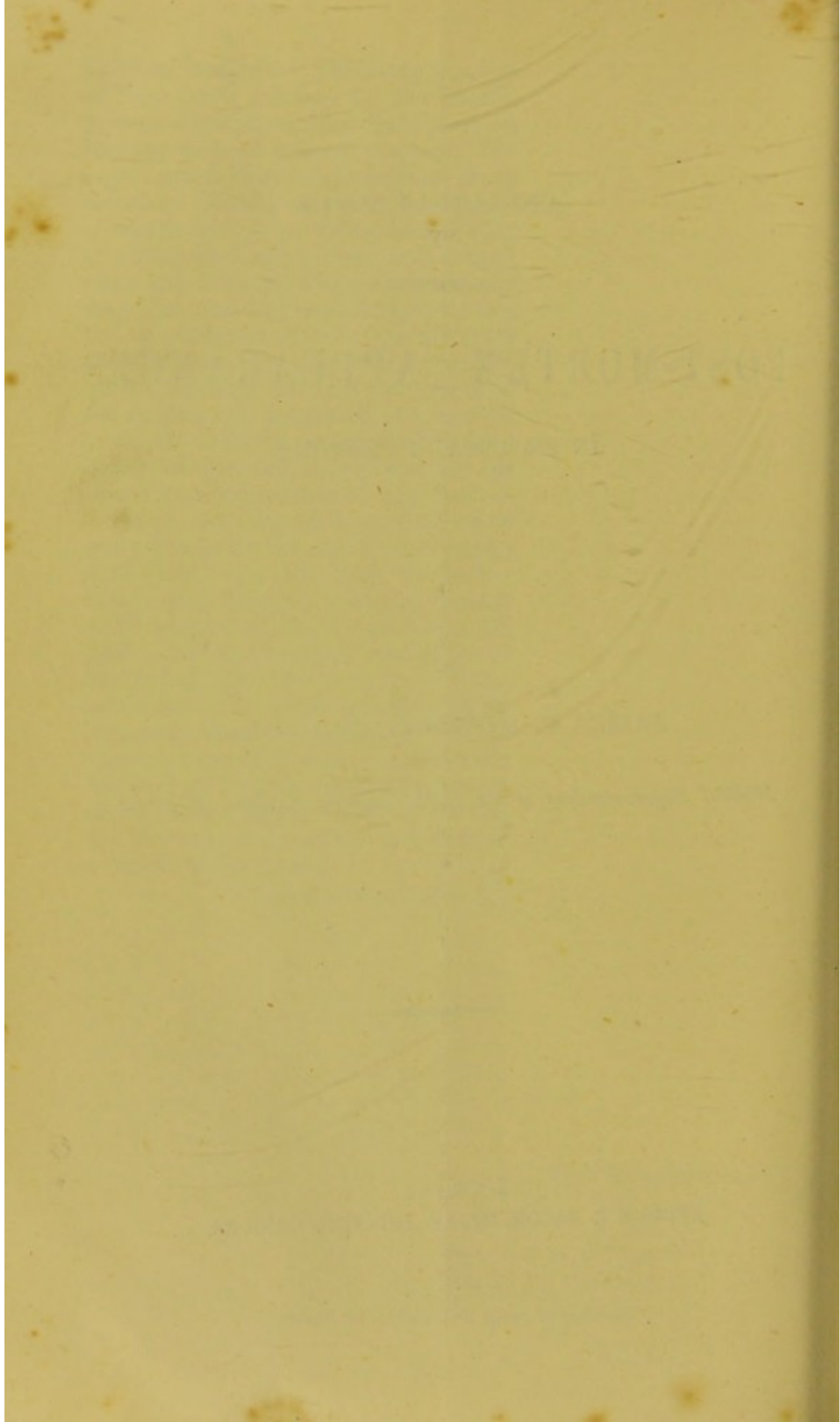
AN ANALYSIS
OF THE
POST-MORTEM APPEARANCES
IN 235 INSANE PERSONS.

BY
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—
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ANYONE who has attempted to work up statistical facts from a Pathological Record must have felt how much time and trouble were wasted in wading through case after case which had no connection whatever with the subject in hand.

To obviate this evil, and to make the facts recorded more available for further research, it occurred to me that an index of the pathological appearances would be of great value. The index, a summary of which is appended to this paper, has no pretension to be complete, or to be generally applicable, but is simply what has been found sufficient to index the lesions registered in the Pathological Record of the Montrose Asylum.* I have purposely excluded microscopic and other appearances, about which there might be room for differences of opinion. In referring to this summary, I shall not attempt to prove any connection between the lesion and the mental symptoms during life.

It is not an easy matter to draw the line of distinction between a normal brain and an abnormal one. Where, for instance, is the line between disease and health in opacity of the arachnoid? We find it passing from the barest perceptible trace over the vessels in the pia mater to the conversion of the membrane into a thick leathery cap over the brain. So with fluid in the pia mater, injection of the vessels, fluid in the ventricles, and other appearances. Every observer will probably form his own estimate of these, and, therefore, it is impossible to be sure that in comparing the observations of any two men you are actually comparing the same things. In my index I have excluded from opaque arachnoids such cases in which it is noted "Arachnoid is slightly opaque," or "Opacity along the course of the vessels," and retained only those in which it is said to have been "opaque," or "very opaque." In the case of fluid in the lateral ventricles, I fixed the limit of normality at two drachms.

So far as there were no unusual appearances recorded, it

* I have to acknowledge the great aid I have received in compiling the index from Mr. W. G. Balfour, Assistant-Medical Officer.

will be observed that of the 235 brains examined, 46 were perfectly normal. Of the remaining 189, the calvarium was altered in 22 cases; in one of these the bone had become absorbed over a scrofulous tumour attached to the dura mater, and the temporal bone was perforated by a hole capable of admitting the point of the finger. This patient—a woman—died from general tuberculosis, which manifested itself in the thorax, abdomen, and joints, as well as in the cranium. In 28 cases the dura mater is recorded to have been abnormal, the most important lesions being tumours attached to the membrane and pressing on the cerebral hemispheres. There is, I think, room for doubting whether tubercle and cancer deposits ever originate in the actual nerve substance of the brain.*

The majority of the tumours I have seen in the Royal Edinburgh and Montrose Asylums appeared to have originated in the membranes covering the brain, and to have extended thence into the nerve substance, surrounded in some instances by a distinct membranous sac suspended from the pia mater. In other cases they seemed to have sprung from the membranes or vascular parts of the ventricular spaces. Even where cerebral tumours appear to be isolated by the nerve substance, it is not improbable that they have originated with the vascular network which permeates it.†

The extent and manner in which the intellect is affected by cranial tumours depends altogether on their position. Central tumours of large size may co-exist with an almost unimpaired mind, but whenever they involve or press on the convolutions, the patient presents symptoms of mental alienation.‡

Passing to the arachnoid, I find that it was abnormal in 153 instances; decided opacity is recorded in 52 cases, serous effusion in 62, crystalline granulations in 17, and in

* Rokitansky, speaking of infiltrated cancer deposits, says—"These advance from the brain to the membrane, and through them to the cranium." (*Pathological Anatomy*, vol. iii., p. 431.)

† Dr. Clouston says "Nerve-tissue seems to be almost exempt from tubercular deposition, for of the eight cases (recorded in the *Pathological Record* of the Royal Edinburgh Asylum) there were only two in which the tubercular deposition had not evidently commenced in the membranes." (*Journal of Mental Science*, April, 1863.)

‡ Dr. J. W. Ogle, referring to ten cases examined in St. George's Hospital, says—"I would observe on the exemption from anything like arachnitis in connection with the various growths—in no case was there any such complication attendant. Neither was there during life anything of the nature of mental imbecility, or any symptom of the various phases of insanity." (*Journal of Mental Science*, July 1864, p. 229.) In Dr. Ogle's cases the tumours were seated in the central parts of the brain, and did not involve the convolutions.

21 there was either effused blood, adventitious membrane, or hæmorrhagic cyst in the sac.

Hæmorrhage into the arachnoid sac seems in most cases to take place very gradually, and as the blood spreads slowly over the whole surface of the brain there are no acute symptoms accompanying it. Adventitious membranes form often in the course of general paresis; the patient becomes demented, and if he lives long enough there is every probability that the membrane splits and allows the formation of limited hæmorrhagic cysts, which give rise to distinct convulsive and paralytic symptoms. In one case I had reason to think that the patient died from a sudden effusion of blood into one of these cysts. In another instance the cysts were of such a size that it was found that the shrinkage of the brain was no less than 18 oz.; that is, a cast of the intercranial cavity displaced 54 ounces of water, while the brain with its arachnoid only displaced 36 oz. Allowance, however, must be made for the fluid in the pia mater and ventricles, the latter being estimated at 2 oz.

The lesions of the pia mater amounted to 144, and consisted of marked injection of the vessels in 15 cases, œdema in 33, local bullæ of fluid in 4, recent sanguineous effusion in 11, brown gelatinous deposits (old hæmorrhages) in 9, a tumour in 1, and adhesion to the grey matter of cortex in 31.

Very marked injection of the membranes is often met with in patients dying maniacal, in the recent stages of general paresis or after severe epileptic convulsions.

Hæmorrhagic effusions in the pia mater are not unfrequent in epileptics; those I have met with are of old standing, and had assumed the character of rusty gelatinous deposits.*

The adhesion of the grey matter of the cortex, which seems to be the result of the formation of a plastic exudation around the minute blood vessels, is well known to be a common lesion in the advanced stages of general paresis; it is, however, frequently met with in cases of simple insanity. An examination of the pia mater under the microscope in these cases generally reveals granules or crystals of hæmatoidsin scattered through it, and the capillaries in the grey matter are often coated with granular matter.

* My experience does not corroborate Dr. Reynolds's statement that "although the epileptic convulsions are not rarely followed by profound coma, and a general appearance of apoplexy, it is exceedingly rare to find that actual cerebral hæmorrhage has occurred." (Reynolds on Epilepsy, p. 225.)

Marked injection of vessels of the brain is noted in only 12 cases, but probably in many more this condition has not been recorded.

Atheroma of the arteries of the base is recorded in 39 instances.

Atheroma of the cerebral arteries, and granular deposits round the smaller vessels in the grey substance of the hemispheres are probably of much more frequent occurrence in lunatics than in sane persons of the same age, but we are not at present in a position to say how far the insanity is the effect or the cause of these changes; it is worthy of note that the vessels of the cerebellum are much less frequently altered than those of the cerebrum.

Of the changes in the brain substance proper, the first to be noted is the marked difference in size and weight of the two sides of the cerebrum. Five instances of this condition are noted: in all of them one hemisphere was shrivelled up while the other was hypertrophied and more or less affected with white softening. The difference in weight of the hemispheres in four of these was as follows:—

	Right.	Left.
1.	27 $\frac{1}{2}$ oz.	23 $\frac{3}{4}$ oz.
2.	22	18 $\frac{1}{2}$
3.	24 $\frac{3}{4}$	20 $\frac{1}{2}$
4.	26	15

The most common change in the white brain substance is œdema and diminution of nerve tissue; it is noted in 44 instances. In 6 cases there was marked sclerosis, in 6 there was white or yellow softening, in 9 cases there was excessive atrophy. In one of these, a man 6 feet in height, and with a well-proportioned cranium, the brain weighed only 40 oz.; the vessels in the grey substance were surrounded by oily or granular matter; the connective tissue was decreased, and the nerve cells had a remarkably swollen œdematous aspect. The height of the body and weight of the encephalon in these 9 cases is as follows:—

MEN.		WOMEN.	
Height.	Weight of Brain.	Height.	Weight of Brain.
6 feet	40 ozs.	5ft. 1in.	38 $\frac{1}{2}$ ozs.
— ?	42 $\frac{1}{2}$ „	4ft. 11in.	40 „
5ft. 7in.	34 „	5ft.	31 „
		— ?	42 $\frac{3}{4}$ „
		5ft. 1in.	43 $\frac{1}{2}$ „
		5ft. 3in.	41 „

Of the recent effusions of blood into the brain, one occurs in the substance of the grey matter of the convolutions, three in the medullary white substance of the cerebral hemispheres, eight in the optic thalamus or corpus striatum, and one in the cerebellum ; white reddish gelatinous softenings (or old effusions) were found in nine cases in the cortical substance, and nine in the corpus striatum or optic thalamus.

In sixty-four instances well-marked crystalline granulations were found on the lining membrane of the ventricles of the brain, and serous fluid, varying in quantity from ziii to many ounces, in these cavities in 93 cases.

In the present state of our knowledge little can be said of the connection between the mental phenomena presented by the insane during life, and the pathological appearances observed in the brain after death.

The structural changes of the nerve-cells observable in chronic cases of insanity, or in those complicated with paralytic symptoms, are probably due to a continuance of functional derangement of the circulatory or nutritive processes in the brain, which at the same time produces the insanity.

If mania and melancholia were the *result* of altered structure, they would be incurable ; and we can only suppose that they are induced by certain unknown conditions of the distribution of the fluids within the cranium affecting the pressure on certain portions of the brain. The symptoms of insanity can be temporarily produced by alcohol and by various drugs, but no one would infer that these poisons altered the nerve structure. Again, a person dreaming during sleep is, intellectually, as irrational as a maniac ; yet dreaming can scarcely be considered morbid, and certainly we would look in vain for structural change in the dreamer's brain.

Insanity is, perhaps, always the result of this functional disturbance, for not only is it so in simple insanity, but even in insanity complicated by distinct pathological conditions, as by tumours, extravasations of blood, exudation of serum, formation of false membranes, or the changes noticed in general paresis ; the mental derangement in the first instance, is caused by pressure on, or irritation of, the grey substance. While, however, it is with the brain as with other organs, that disordered function precedes altered structure, it is not the less important to study these morbid changes which in their turn unfit the brain for healthy action, and produce in the young and otherwise healthy a mental

condition similar to that of extreme old age. Œdema of the brain, the pia mater, and the various cavities in early or middle life means disease, while in old age it is the normal result of long-continued functional activity. So with other changes; in old age the arteries become atheromatous, and the minute vessels and cells of the grey substance coated with granular matter as a normal or at least natural condition; but these conditions must be looked on as none the less abnormal when met with in early life and associated with perverted function.

If insanity does not depend on structural disease of the brain, it is the more necessary that we should examine and carefully study the condition of all the other organs of the body, and trace the connection, if there be any, between their morbid changes and the origin, character, and termination of the mental alienation. I shall only at present simply refer to one or two points of interest in connection with the lesions recorded in the table.

Phthisis, one of the most frequent of the diseases of the insane, leaves its traces in a large per centage of cases.

The per centage in which tubercle or cheesy matter was found in the 235 cases was as follows:—In males, right lung, 27 per cent.; left lung, 24 per cent. In females, the right lung, 37 per cent.; the left, 43 per cent. of the total cases.*

Pneumonic hepatization was found in 19 instances in the right lung and in 13 in the left, and 2 right lungs and 3 left were gangrenous. Cancer of the lung was found in only one case. Changes in the heart and pericardium were of frequent occurrence. Thus the pericardial surfaces were adherent in 7 cases, the membrane presented milky opacity in 12, there was fluid and recent lymph in 24, the valves were diseased in 56. Cancer of the stomach was noticed in 3 cases, of the peritoneum in 2, of the liver in 1, of the mesenteric glands in 1, of the prostate in 1, of the uterus in 2. Cancerous growths in the internal organs give rise more frequently to illusions of sensation than any other disease. When an insane person refers internal pain to the presence of a serpent, or some other beast, or the Devil, there is reason to suspect cancer.

In one of the cases of cancer of the stomach the upper wall was found deficient in a patch of about 2 inches in

* In Dr. Clouston's cases the per centages were respectively 44, 47, 65, and 65. (Op. Cit., p. 7.)

diameter, and the edges of the opening were firmly adherent to the under surface of the left lobe of the liver, which thus closed up the pouch of the stomach. The man was an epileptic, and during life suffered great pain, and had very severe attacks of hæmoptysis. In another case, that of a demented woman, a large fungoid tumour was found at the lower left aspect of the stomach, and a free communication existed through it to the descending colon: the stomach contained fœculent matter. During her last illness any food taken either passed directly out at the rectum or was rejected by the mouth along with fœces.

The liver is recorded as fatty in 91 cases, as waxy in 8, and as having a nutmeg aspect in 21. These numbers seem to be large out of 236. The fatty liver is of course mostly found in phthisical cases. In a Shetland girl several examples of the *Cysticercus cellulosus* were found in the liver. During life she was too demented to give expression to her sensations.

Biliary calculi were found in two men and 17 women. This disproportion in the sexes would point to the supposition that sedentary habits have to do with the formation of these bodies, and this is further supported by the fact that when the old and new asylums at Montrose were both in operation, gall stones were found most commonly in patients who had lived in the old asylum, where the means of exercise and recreation were much more limited. In one case the gall bladder was obliterated by a tumour of a dense horny and calcareous nature. The chief lesions of the kidneys recorded are fatty degeneration in 55,* cysts in 31 instances. In one case a very remarkable condition was found: the left kidney was very large weighing $9\frac{1}{2}$ ozs., but apparently normal; while the right, which at first seemed wanting, was found to be represented by a body rather less than a garden bean; the ureter on the left side was large, and with that on the right, was perforated about an inch above the bladder, and then gradually passed into a fibrous thread. The suprarenal capsule on the right side was of normal size and appearance.

Of the remaining abnormalities, there are two instances of the occurrence of urinary calculi, seven of fibrous tumours of the uterus, and four of similar bodies in the ovaries, and four ovarian cysts.

* The number of fatty kidneys is perhaps too large, and may include some entered "apparently fatty," but that it would be considerable may be judged from the fact that during three years twelve patients were *admitted* with albuminuria.

In conclusion, I have only to draw attention to the annexed summary of the index. The index might include much more, and may be very imperfect, but it seems to me that some scheme of this kind would render the pathological records of our asylums and general hospitals of much more use than they are at present.

SUMMARY OF INDEX

OF THE PRINCIPAL LESIONS FOUND ON POST MORTEM EXAMINATION OF 235
INSANE PERSONS—108 MEN, 127 WOMEN.

HEAD.		M.	F.	TOT.
<i>Calvarium</i>				
"	abnormally thickened	11	6	17
"	" thin	1	2	3
"	Caries and perforation of temporal bone .	0	1	1
<i>Membranes</i>				
"	<i>Dura Mater</i> very firmly adherent to calvarium	15	5	20
"	" abnormally thickened	3	1	4
"	" ossification of	0	0	0
"	" tumours attached to	2	2	4
"	<i>Arachnoid</i> effusion of blood into sac	2	5	7
"	" false membrane in	4	8	12
"	" sanguineous cysts in	2	0	2
"	" pus in	0	0	0
"	" effusion of serous fluid into	27	35	62
"	" crystalline granulations on	12	5	17
"	" opacity of	35	17	52
"	" adhesions of surfaces of	1	0	1
"	<i>Pia Mater</i> marked injection of vessels of	7	8	15
"	" œdema of	17	16	33
"	" local bullæ of fluid in	3	1	4
"	" sanguineous effusion into	3	8	11
"	" pus in	0	0	0
"	" tumours attached to	0	1	1
"	" brown gelatinous deposit in	5	4	9
"	" adhesion of to surface of grey matter	23	8	31
<i>Blood Vessels</i>				
"	Arteries at base atheromatous	19	20	39
"	Aneurismal dilation of arteries of brain .	1	0	1
"	Injection of in brain	5	5	12
<i>Grey Substance</i>				
"	Flattening of convolutions	2	3	5
"	Gelatinous softening of	5	4	9
"	Effusion of blood into	0	1	1
<i>White Substance</i>				
"	Induration of	4	2	6
"	œdema of	25	19	44
"	White softening of	4	2	6
"	Effusion of blood into	0	3	3
"	Excessive shrinking of	3	6	9
"	Marked injection of vessels of	2	2	4
"	Cysts in	1	0	1

HEAD—(continued).		M.	F.	TOT.
<i>Optic Thalamus & Corpus Striatum</i>				
"	Sanguineous effusion into	4	4	8
"	Pink gelatinous softening of	7	2	9
"	Tumours in	0	1	1
"	Cyst in	1	0	1
"	Cicatrix in	0	1	1
<i>Cerebellum</i>				
"	Adhesion of membranes to surface of	2	0	2
"	Effusion of blood into Pia Mater of	0	4	4
"	" " substance of	1	0	1
<i>Other Parts of Brain.</i>				
<i>Ventricles</i>				
"	Excessive serous fluid in (above 3ij.)	47	46	93
"	Sanguineous effusion into	2	6	8
"	Crystalline granulations on lining membrane of	40	24	64
"	<i>Septum lucidum</i> tubercle in	1	0	1
<i>Choroid Plexus</i>				
"	Cysts in	0	0	0
"	Tumours in	0	0	0
"	Earthy deposit in	1	0	1
Marked difference of size and weight of the two Cerebral hemispheres		4	2	6
Brains apparently normal		17	29	46
THORAX.				
<i>Ribs</i>				
"	fracture of, or callus on	1	3	4
"	ossification of, cartilages of	4	3	7
<i>Pleura</i>				
"	effusion of serous fluid into	12	8	20
"	" " sanguineous "	0	0	0
"	purulent matter in	3	3	6
"	recent lymph in	4	4	8
"	adhesion of (A. Universal)			
	Right Side)	16	15	31
	Left Side)	14	10	24
"	" " (B. Partial)			
	Right Side)	21	39	60
	Left Side)	23	38	61
"	tubercle on	2	0	2
<i>Lungs</i>				
"	tubercular, or cheesy deposit in right	30	48	78
"	" " " " in left	27	55	82
"	cavities in right	14	21	35
"	" in left	14	28	42
"	cancer in right	1	0	1
"	" in left	0	0	0
"	congestion of right	15	8	23
"	" " left	14	8	22
"	carnification of right	2	2	4
"	" " left	3	2	5
"	hepatization of right	11	8	19
"	" " left	7	6	13
"	gangrene of right	2	0	2
"	" " left	3	0	3

THORAX—(continued).		M.	F.	TOT.
<i>Lungs</i>				
"	emphysematous dilatation of pulmonary substance of right	1	6	7
"	emphysematous do. do. of left	1	7	8
"	abscess (non-tubercular) right	1	0	1
"	do. do. left	0	1	1
<i>Pericardium</i>				
"	adhesion of surfaces of	4	3	7
"	marked opacity of	5	7	12
"	fluid in, serous	23	27	50
"	" " sanguineous	2	4	6
"	lymph in	13	11	24
<i>Heart</i>				
"	fatty degeneration of	0	4	4
"	valves, abnormal	9	41	60
<i>Aorta</i>				
"	atheroma, at commencement of	46	58	104
<i>Coronary Arteries</i>				
"	atheroma of	5	0	5
ABDOMEN.				
<i>Peritoneum</i>				
"	Fluid in—serous	3	9	12
"	" " —purulent	1	1	2
"	" " —sanguineous	0	0	0
"	tubercle on	2	2	4
"	cancer on	1	1	2
<i>Stomach</i>				
"	cancer of	1	3	4
"	perforation of	2	2	4
"	absence of part of wall of, and adhesion to liver	1	0	1
<i>Liver</i>				
"	fatty	35	56	91
"	waxy	6	2	8
"	nutmeg	9	12	21
"	hypertrophy of	0	3	3
"	tubercle of	0	1	1
"	cancer of	1	0	1
"	tumours in	0	1	1
"	cysts in	0	1	1
"	cystocerci in	0	1	1
"	earthy deposits in	2	0	2
"	abscess in	0	1	1
"	congestion of	9	0	9
<i>Gall Bladder</i>				
"	gall stones in	2	17	19
"	obliteration of	0	1	1
<i>Spleen</i>				
"	thickening of capsule of	1	0	1
"	puckering " " "	1	0	1
"	cysts in	0	1	1
"	waxy degeneration of	0	1	1
"	earthy deposit in	1	0	1
"	tubercle in	1	0	1
<i>Pancreas</i>				
"	hypertrophy of	1	0	1

ABDOMEN—(continued)—					M.	F.	TOT.
<i>Kidneys</i>							
"	fatty degeneration of	.	.	.	16	39	55
"	waxy " "	.	.	.	0	2	2
"	calculi encysted in	.	.	.	1	1	2
"	cysts in	.	.	.	16	15	31
"	abscess of	.	.	.	1	2	3
"	tubercle in	.	.	.	1	0	1
"	atrophy of	.	.	.	2	0	2
"	hypertrophy of	.	.	.	1	0	1
<i>Mesenteric Glands</i>							
"	" indurated	.	.	.	5	6	11
"	" cancer of	.	.	.	1	0	1
<i>Intestines</i>							
"	ulceration of ileum	.	.	.	5	13	18
"	" " ascending colon	.	.	.	7	20	27
"	" " transverse "	.	.	.	3	13	16
"	" " descending "	.	.	.	3	10	13
"	strangulation of	.	.	.	1	3	4
<i>Urinary Bladder</i>							
"	" calculi in	.	.	.	2	0	2
<i>Prostate Gland</i>							
"	" cancer of	.	.	.	1	0	1
<i>Uterus and Ovaries.</i>							
<i>Uterus</i>							
"	fibrous tumour in	.	.	.	0	7	7
"	cancer of	.	.	.	0	2	2
"	earthy tumour in	.	.	.	0	1	1
<i>Broad Ligament</i>							
"	cysts in	.	.	.	0	3	3
"	tumours in	.	.	.	0	3	3
<i>Ovaries</i>							
"	tumours in	.	.	.	0	4	4
"	cysts in	.	.	.	0	4	4

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