The *post-mortem* examination was made by Mr. Bilton Pollard, whose notes contain the following facts. The small intestines were very much distended, especially in the umbilical region; there was no gas, lymph, or pus anywhere in the abdominal cavity, but the coils of the bowel in the distended area were slightly greasy. The large intestine was not at all distended, and seemed out of the area of inflammation, which had affected the small intestine solely. The latter in the neighbourhood of the wound was more adherent than elsewhere. The portion of bowel sutured, which was in the ileum about three feet from the cæcum, was in a perfectly satisfactory condition. Union had taken place thoroughly between the cut ends, and the bowel was not obstructed in any way. Tested with considerable pressure it was perfectly air and water tight. There were about two drachms of blood-stained fluid in the recto-vesical pouch, about half a drachm in the right flank, and three drachms in the left. There were a few spots of extravasated blood in the omentum, which occupied its normal position, but was adherent to the edge of the wound by recent lymph. There was much hypostatic pneumonia in both lungs, especially on the right side; the other organs were healthy.

It will be seen from these notes that the cause of death was a very moderate amount of peritonitis limited to the small intestine, and in addition no doubt the hypostatic pneumonia told unfavourably. Indeed, there was so little to be found in the abdomen indicating peritonitis, except the distended coils of bowel, that there was some hesitation in accepting this as the cause of death. But the absence of any other lesion except the pneumonia, left no alternative. A septic condition, in the ordinary use of the term, did not exist; the spleen was quite normal and other evidences also failed; in short, one turned away from this necropsy with an intensified feeling of disappointment, because the patient had so very nearly recovered.

These two cases appear to me to possess each its own special interest. In the first there can be but little doubt that a fatal peritonitis would have occurred had not the bullet, its wad and the clots which surrounded it, been removed from the folds of the omentum by abdominal section. Again, laparotomy enabled us to exclude from consideration all other injuries of viscera, without subjecting the patient to any special risk in exploration. The case is also of interest in being the first successful laparotomy for gunshot wound of the abdomen recorded in this country. I trust it may encourage other surgeons to very prompt action in similar cases, so that the conclusions arrived at in America as to the propriety of immediate laparotomy in all cases where penetration of the abdomen is proved, may be justified by our experience too.

The second case, although a source of the keenest disappointment to me, has in no wise shaken my belief in the rule that every case of the kind should be treated immediately by abdominal section; indeed, it strengthens that belief in every way. What little peritonitis there was no doubt started from some spot in the peritoneum not thoroughly cleansed from matters escaped from the wounded bowel. Whether a more perfect antiseptics could have been carried out by a median incision and irrigation may be a question of opinion, but I am strongly inclined to think that it could, though at the time I decided that the extra time and strain upon the patient's powers involved in a double incision and its concomitants would be too dear a price to pay. That the median incision should be the rule in the vast majority of such wounds of the abdomen I am convinced, and this view will be shared by everyone who carefully studies the literature of the subject. This literature is now becoming a large one. Sir William Mac Cormac's classical monograph sufficiently attests this by the numerous cases there quoted. But even in the short interval of only a few months which has elapsed since he published his collection of thirty-two operations for gunshot wound of the abdomen, almost an equal number of cases have been put on record, chiefly in America, and numerous discussions have taken place on this subject. These cases I have been at the pains to collect and tabulate. A study of the results of these operations is most encouraging. They show a greatly lessened mortality, year by year, and also that much more desperate cases may be saved by surgical interference than has hitherto been supposed. I give them as fully as is possible in such a table, and allow them to speak for themselves with only one comment. It will be seen that whereas out of the 32 laparotomies for gunshot injury of the abdomen included in Sir W. Mac Cormac's list, only 7 recovered, there are here collected 26 fresh cases of the same kind, with 16 recoveries and 10

deaths. Combining the two tables, we have 58 cases with 23 recoveries and 35 deaths. The numbers start in this table where Sir W. Mac Cormac's end, that is at 32.

THE GOULSTONIAN LECTURES ON INSANITY IN RELATION TO CARDIAC AND AORTIC DISEASE AND PHTHISIS.

Delivered before the Royal College of Physicians of London.

By WM. JULIUS MICKLE, M.D., F.R.C.P. LOND.,

Medical Superintendent, Grove Hall Asylum.

LECTURE II.—AORTIC VALVE LESIONS.

OF cases of aortic valve lesion, the chief and predominating condition, I make four sub-groups: (1) aortic stenosis; (2) aortic regurgitation; (3) aortic semilunar valve disease, with no very marked local signs, and aorta not very much affected, if at all; (4) disease of aortic valve and arch.

First Sub-group: Stenosis of the Aortic Ostium.—Of eight cases, varying in age at death from 24 to 47 years, the average was almost 40, only one being young. At death the insanity had lasted from nine months to sixteen years in different cases. The relation, in time of incidence, of heart disease to insanity was difficult to appraise in several cases; distinctly prior in some, it was distinctly subsequent in others. Naturally, these cases were not all pure examples of aortic stenosis; in two there was also aortic incompetency, as well as aneurysm of thoracic or of abdominal aorta, and in three others—at least at one period or at several periods—slighter mitral incompetency was added.*

Of these patients, three were monomaniacs, in one of whom the heart disease distinctly preceded the mental; in the others the order of incidence was doubtful. In the first-mentioned of these (with aortic aneurysm a complication) at first the delusions were of persecution, for example, "was plotted against; conspired against by women, illegally detained and ill-treated;" and there-with hallucinations of hearing. Finally, with advancing disease of heart and aorta came delusions of direct bodily injury and persecution, producing horrible pain compared to "electric batteries playing on him."

Of the others, one—a deteriorated wreck of former mingled hypochondriacal and expansive monomania, become demented—often screamed shrilly, was rambling, incoherent, paroxysmally excited and noisy, and on some of these occasions suddenly destructive; finally he uttered merely a jargon, a medley of words. The other, a subject of mingled expansive and persecutory monomania (with imbecility), and hallucinations of all the special senses except of touch; together with the advancing heart disease, pulmonary congestion, and recurring attacks of dysenteric diarrhoea, became deluded as to poison in the food, and as to influences of a hostile kind brought to bear upon his bodily state and health.

* *Heart.*—Average, weight 13.51 ozs. av. Aortic valves variously diseased, thickened, atheromatous, rigid, deformed, stenotic. Mitral valve similarly diseased in some, but less in degree, and the aperture in some widened. The pulmonary and tricuspid valve much less often and much less severely affected than the preceding. Muscle of heart often friable, flabby, or pale. Left ventricle markedly hypertrophied in most, and in some distinctly dilated also; the other cardiac chambers only in a few distinctly dilated, or hypertrophied, or both. Coronary arteries atheromatous in some. The aorta in several aneurysmally pouched; more or less atheromatous, nodular, rugose, calcareous; irregular elevations, yellow patches, puckers, and wavy markings studding the inner surface.

Brain.—In some of general paralysis; in others slightly wasted.

Spleen.—Average weight 8.9 ozs. av. In many, firm, coarse, fibrotic; capsule often irregularly thickened, opaque and adherent, or pigmented; occasionally cicatrised.

Kidneys.—Average weight of each 4.93 ozs. av.; often more or less granular; some partially destroyed by old local lesions. Of the larger kidneys, some were pale-yellow, firm; a few were pale, homogeneous, fatty.

Liver.—Average weight 54 ozs. In some slight cirrhosis; frequently "hepatic venous congestion;" patchy opacity or thickening, cicatricial, or adhesions of capsule.

Lungs.—Usually old pleuritic adhesions; frequently hypostatic oedema, congestion, or even pneumonia; occasionally carnification, brown induration, or cirrhosis of lungs, cured phthisis, caseous bronchial glands.

¹ In the reprint of the article published in the JOURNAL (May 11th, 1887), Sir W. Mac Cormac added two cases, making a total of 32.

Three others were general paralytics. In one, epileptiform attacks were frequent; hypochondriacal and melancholic symptoms throughout more than usually intercurrent. Demented and ataxic, he for a time took on absurd ideas with expansive tinge, for example, "has oak trees inside him;" not infrequently lugubrious and depressed, he felt "very old." Another, at times conscious of being diseased in the head and, then, recognising his delusions as such, had apoplectiform attacks, confusion, drowsiness, amnesia, occasional excitement, dementia; later, depressed, hypochondriacal, stubborn, bellowing; later on, *agitation silencieuse*; finally fatuity. In another, there was at first circular general paralysis, with successively maniacal, lucid, depressed, phases; later, delusions as to poison, and hence refusal of food; delusions of impending injury from those about him, fear; later, variable, restless, excited, violent at night; by day confused and incoherent, muttering about "thousands" and "millions."

In the seventh case the cardiac disease preceded insanity. The son of a drunkard, after an erratic course, rebellious to control and resistive of all regulating influences, and during which he was syphilitised and alcoholised, he fell more deeply into drink; under delusion, made a homicidal attack; became much excited, attempted suicide, and fell into the abyss of melancholia attonita, from which, dying of rapid, caseous, pneumonic phthisis, he roused sufficiently before the end to speak again, and to express delusions as to adverse influences brought to bear upon him, and fear of hostile entities.

The eighth had at first delusions as to military officers being brought to England under his charge, to be tried for an attempt to murder him. On this soon supervened profound amnesia as to dates, passing of time, order of occurrences, or recollection of them. Occasionally were seeming hallucinations of hearing.

Summary.—Thus the cases of stenosis at the aortic ostium, with change of its sigmoid valves, in which the cardiac most probably influenced the mental state, showed some or other of the following—mental depression; ideas of persecution, of adverse influences, of direct bodily injuries, inflicted pain, etc. Possibly, also, sudden intercurrent outbursts of mental excitement and violence of act. Others in whom the sequence of events was doubtful, or in whom the heart disease followed the mental, exhibited similar tendencies (some indistinctly), to which may be added delusions as to bad or poisoned food, and perhaps refusal of it for a time.

Second Sub-group: Aortic Regurgitation.—Of several marked cases of incompetency permitting regurgitation at the aortic gateway, as the chief morbid cardiac condition, the ages were from 30 to 50, and the average 38 years, at death, at which, also, the insanity had lasted from a few months to four years, except in a complicated case of seventeen years' duration; and in all but this last one the heart disease either distinctly or apparently preceded the insanity. In two there were both regurgitation and obstruction at the aortic orifice.* Two were general paralytics. One of these cases began with headache, vacant expression and manner, failing memory and speech, delusions as to his own identity, and declaration of himself as various other persons. Then general paralysis became more manifest, with big ideas, and some hypochondriacal ones concerning his eyes and head. From this he passed into a relatively lucid state, recognising his former delusions as such, but being childish and somewhat demented. Finally, he also became rambling and incoherent in his descriptions, and died in a state of supervenient stupor, or apoplectiform seizure, with pulmonary congestion and hypostatic pneumonia. General paralysis in the other was insidious in its onset; observed to be eccentric, the patient also made mistakes in performing military duties, so as to be unfit to carry them on; and was subject to sudden outbreaks of dangerous passion and destructiveness; of markedly impaired perceptive, reasoning, and mnemonic powers, he became quiet, obedient, childish, incoherent, demented, extremely amnesic; at times smiling and pleased, at times devoid of emotional feeling and expression.

Another, maniacal, in some respects resembling a general para-

lytic, at a comparatively early date was sleepless, loquacious, abounding in expansive delusions as to wealth, rank, titles; continued partly the same throughout, being also restless, prone to interfere, troublesome, talkative, and sleeping badly at night; agitated and noisy if thwarted in his impracticable wishes; obstinate, and requiring much attention and tact in management.

Were we to stop here, these cases might seem to indicate that at least aortic regurgitation is particularly liable to be followed by (if not a factor in) insanity of a more or less expansive kind, and exhibiting emotional exaltation. Cases similar to these may have led some, but not its originator, Mildner, to the idea that aortic orifice and valve disease is apt to occasion, or to be associated with, insanity presenting the maniacal rather than the melancholic type. To make suggestion on this point will occupy us under the fourth sub-group of aortic-valve cases; and here I hasten to add an example of what I believe to be more accurately tenable as insanity produced by, or influenced in its production or aspect by, regurgitation of the blood stream at a dilated aortic gateway, and incompetency of its now decreascent lunatic valves.

Here, with insanity supposed to be of several weeks' duration, on admission, but possibly of three or four months', and with obviously chronic cardiac disease, were well-marked aortic diastolic murmur, also purplish, leaden, marbled congestion, of irregular distribution, about the trunk and limbs. Suffering from cranial pain, the patient heard imaginary voices, took the delusions that he was followed everywhere by persons who prevented him from earning a living and tried to murder him; and restlessly he muttered. Admitted, he still asserted that these persons followed him, talked about him, accused him of various crimes and his sister of being "on the streets," and once they tried to murder him, on which occasion, although he took refuge in a shop, he did not see or hear his supposed would-be murderers, nor could he say who they were, or assign any reason why they should speak or act so; and he denied having done any wrongful criminal act. Hallucinations of hearing, only, were acknowledged as having existed, and these as occurring at night solely. Later on, he was restless at night, getting out of bed, anxious, in fear, declaring there was a conspiracy to injure him in some way he could not definitely explain, and that his bed had an evil smell (hallucination). Later on, he refused to rise from bed or dress, and struck the attendant who insisted on his rising. Still later, were delusions that particular females got under his bed at night, or came to share it with, and thus annoy, him.

That of such complexion, as in this last case, is the mental modification dependent on regurgitation at the aortic ostium,—rather than a likeness to or identity with that found in the three cases preceding it, which presented expansive symptoms, otherwise explainable by the co-existent organic brain affection, and, as it were, in spite of severe aortic valve and cardiac disease,—gains also, I think, some support from the next case I will mention here—that of the chronic lunatic in whom incompetency of the aortic semilunar valves, as well as abdominal aortic aneurysm, came in the course of the insanity. The aortic *bruit* was double at times, and a diastolic apex murmur was sometimes heard.

A soldier becomes eccentric, surly, attempts homicide, has delusions as to a conspiracy against him in the regiment, and that he is ordered "to act daft;" becomes sullen and threatening in connection with hallucinations of sight and hearing as to "persons who plot to get him out of the regiment," and has the delusion that his and others' voices pass out and injure the townspeople; later, that everything went against him in the army, and the regimental doctor's mesmerism still affected him. Later on, quiet, subdued, confused, of bad memory, incoherent and irrelevant in replies, he says he "would rather be dead than live with his body as it is," and speaks of a powerful mysterious influence still exerted on him by "a change of his number in Ceylon;" hallucinations of sight and hearing continuing. After cardiac disease and abdominal aneurysm are well-marked, at various times he is dull, emotionally depressed, "has people inside his skin hurting him," "flew at night." At times suddenly noisy and threatening about being kept in bed; delusions as to the occult constraint on his limbs, extraordinary personal bodily injuries inflicted on him, or that his breath is stopped by thick air, or that he is soaked through with medicine; hallucinations of hearing; is sleepless, he says, and troubled, and devoid of self-control because of a book he has read, and makes other delusional statements. Here we have a depressed modification of the emotional state, and delusions of personal injury and constraint more marked when the

* Heart, average weight, 20½ ozs., av. Incompetency of aortic valve, with various degrees of deformity, thickening, atheroma, fibrotic change, cohesion. The left ventricle hypertrophied and dilated, usually much so, big and rounded; while in one case the left auricle, and in one the conus arteriosus of the right ventricle were noticeably and unduly capacious. The aortic sinuses of Valsalva were usually much changed, and the aortic arch (in some the whole thoracic aorta) more or less nodulated, calcareous, atheromatous, or dilated. The spleen, weighing from 4½ to 9½ ozs., and on the average 8½ ozs., had in some cases capsular adhesions or irregular thickenings. The liver, on the average, 5½ ozs. In some unduly firm, or presenting passive "hepatic venous congestion." Average weight of each kidney, 8½ ozs.

cardiac and aneurysmal diseases were becoming more disabling and severe.

Although he did not definitely become insane, I may mention the case (not counted in my statistics) of an attendant, of robust frame, moderately athletic habits, active mind, cheerful, somewhat buoyant disposition, fond of conversation, sociable, and free from special sources of anxiety or care. Unaware of special disease, he became depressed, gloomy, brooding, silent, taciturn, forgetful; nor could his wife elicit from him any definite reason for this; in vain, by reading, conversation, and other arts, did she seek to rouse him permanently from this state; he would soon relapse, although the condition varied much from time to time. Interest in his work failed, his duties were performed without life, mechanically, and in a defective perfunctory way. Feeling general physical *malaise*, and pain in the hepatic region, and suffering from pulmonary symptoms, he consulted me as to his health. Examination revealed severe aortic regurgitation, the leak working backward on lungs and liver. He left, and a few weeks later died of his cardiac disease.

Here, also, I may mention (although, like the last, not included in my statistics) a case of aortic valve disease in a young melancholic, with hallucinations of hearing voices which swear at him through the wall and tell him to cut his throat.

Third Sub-group: Aortic Valve Disease; no very marked local Signs; Aorta not very much Affected, if at all.—Next there is a small group of cases which I shall not linger to discuss. Usually the valve's crescentic flaps were thickened, rigid, unduly opaque, and usually more or less coherent or fused together. These hearts also presented various degrees of flabbiness; but, with these comparative exceptions, they were not gravely diseased, had not undergone any very marked degree of compensatory hypertrophy, and no very great abnormality of cardiac function or physical state had been noted; nor in them was there any severe degree of disease of arcuate aorta; therefore, they do not serve our present purpose. One was a case of hypochondria, one of dementia secondary to mania, one of placid, gay syphilitic dementia with congenitally feeble mind, and one of melancholic general paralysis in a syphilitic subject.

Fourth Sub-group: Disease of Aortic Valve and Aortic Arch.—Aortic valvular thickening, rigidity, fibrotic change, or atheroma; and marked atheroma or nodulation, or even ectasis or dilatation of aorta.

In this sub-group there were, conjointly, marked disease of the lunulate aortic flaps and of the aortic arch, or in some instances of the whole thoracic aorta, but morbid physical cardiac signs were moderate or even slight, and the valvular alteration did not lead to marked obstruction or regurgitation of the kind I have just been discussing, or to the grosser sorts of cardiac hypertrophy, dilatation, and so on.

Although they number twenty, yet four of these cases are mentioned elsewhere in these lectures as illustrating some other point, and the following is a summary of the remaining sixteen only.

Varying from 27 to 66, the age at death, on the average, was 42½. The order of precedence was doubtful in some; of the rest, in about one-half the insanity seemed to have preceded the heart disease, and in about one-half the heart disease the insanity.*

Mental State.—Five were general paralytics, and one other a general paralytic, recovered as to the physical state. In all but one were more or less expansive symptoms; in several with marked maniacal states, as well as the usual dementia, and in one with hypochondriacal symptoms. The remaining one was an example of the demented form of general paralysis. Some of these general paralytics were syphilitic.

Three others were syphilitic cases, as (a) a syphilitic, demented, amnesic, emotionally weak subject of right hemiplegia and general spasmodic tremor; (b) a syphilitic, melancholic, and suicidal, apathetic, confused patient, with rare fleeting excitement, later *melancholia sine delirio*, but later still with delusions as to hos-

tility, annoyance, and the general malevolence of those around him; and (c) a syphilitic, excitable, suspicious, moody, phthisical subject.

Three others were monomaniac; one chiefly of the persecutory type, one chiefly expansive, one partaking of both characters, but the persecutory element being the fundamental basis left after the early maniacal excitement had cleared up. In all three, more or less deterioration, mental incompetency, tendency to confusion, and to incoherent, rambling replies had occurred before death together with persistent hallucinations in two.

Of the remaining four, three were secondary dement, their dementia being consecutive to melancholia or mania; and one was demented, amnesic, yet with some absurd, expansive ideas, and with emotional facility (diabetes mellitus, destructive lesion of striate body and crus, secondary degeneration thence downwards).

These cases show a state of heart and aorta which seems as if it might often well be an early stage, or less marked degree, of the changes found in the severe examples of incompetency or of constriction at the aortic orifice, forming the first two sub-groups; and in which, with marked signs of cardiac affection and of disturbed circulation, and grave alteration of heart and aortic valves, were also severe change and deformity of the thoracic aorta. In some cases an originally more active inflammatory basis is a requisite foundation of the eventual changes we have studied under the marked examples already grouped as stenosis, or as incompetency, of the aortic lunule cusps; but the slighter cases, composing the present fourth sub-group of lesions of aortic valve, throw light, in my opinion, upon those graver cases, and elucidate those (of aortic valve incompetency especially) in which we found a clinical history telling, rather, of excitement, grandiose delusions, and emotional exaltation, than of suspicion, ideas of persecution, self-abasement, or melancholy; which former set of symptoms, as I stated at the time, I believed not truly to exemplify the modification of mental symptoms by the aortic valve disease and its results and associated conditions; while I proceeded to illustrate by other cases what I take to be the mental phenomena or modifications really dependent on a widened aortic gateway, or one defectively guarded by its crescentic folds. Whilst, as regards aortic stenosis, we found chiefly melancholy, delusions of persecution, of adverse influences, of direct bodily injuries, and, in some, occasional sudden outbursts of noisy excitement, violence, or destructiveness.

I believe that many of the cases in this fourth sub-group originated in the way following: under excitement, or co-existent with some expansive mental disorder, there is great physical activity, and much strain is thrown upon the circulatory organs. Before becoming insane, the future subject of such insanity often is active, engaged in strenuous effort, under a never ceasing urgent industry and activity, whether in toil or in the pursuit of pleasure. Energetic, pushing, free-eaters, free-drinkers of intoxicating liquors, ever ready to plunge with zest into work or play or debauchery—these persons, while sane, strain their hearts and aorta and other blood-vessels; and, should they become insane, are apt to get at first some excitable and expansive form of mental disorder, and, in some cases sub-inflammatory or active degenerative states of brain and cord. But whether as preceding or following the outbreak of insanity, the powerful heart, working irregularly, fitfully, at times violently, pumps the stream of blood forcibly into the systemic arteries; the kidneys, too, are overwrought, their function is embarrassed, the blood imperfectly depurated, and disease of the aorta and aortic valves follows (comes almost as part of the general condition), that of the aorta being often primary and assisting to bring on a valvulitis, or slower indurating or degenerative change, in the aortic semilunar valves, casting, as it does, upon them a still greater strain, and inducing a further irregularity in the circulatory movements of the blood and of its impact on the crescents of the aortic valve.

Here, at first, is increased arterial tension, but in the later stages, if with kidneys relatively affected in but slight degree, the tension remains normal, or is lowered, and there is no advance beyond a moderate degree of the disease of valve and arcuate aorta. Usually with this latter condition, and in a merely incidental way, is associated some deterioration of the former mental state; but not the production of the symptoms I have found to be those ordinarily seen with disabling aortic valve disease and its concomitant affections and conditions.

Now, let the same change proceed further; let the valvular orifice become constricted or become unduly patent; let the signs,

* Of the aortic valves in these cases, there were, in order of relative frequency, and differently combined in different cases, some of the following changes: cusps thickened, rough, opaque, coarse, occasionally much deformed, or rigid, or fibrotic, calcareous, nodulated at their bases; or with corpora Arantii overgrown or fused together, or with dilated aortic sinuses of Valsalva. Aortic arch more or less atheromatous, deformed; in some ridged or calcified in parts. The kidneys were much granular and atrophied in only two cases; but in the majority were one or more of the following changes: slightly granular surface, or slight adhesion of capsules, or slight ordinary cystic change. Two cases had pale, or yellowish, or fatty-looking, and one case somewhat lardaceous, kidneys; one kidney contained a creamy collection; in one case was premature and obscuring decomposition of the kidneys.

respectively, of obstruction of the bloodstream, or those of the regurgitation of incompetency, come into being; and let the kidney become more affected than before, and still there may be, on the mental side, merely a deterioration of the former excited or expansive state, inasmuch as other influences may intervene and prevent the development of true characteristic cerebral symptoms in disabling aortic valve disease, and these very imagined cases would represent and explain those with expansive symptoms which I discussed, under aortic regurgitation especially. Thus we reach at least one probable reason why aortic valve disease has been erroneously held by some to be characteristically associated with excitement, in contrast with melancholia, supposed by the same to characterise mitral disease.

Here we might well branch off into the subject of other cases of disease affecting the thoracic aorta, but, before passing to that, it is desirable to insert a few brief summaries as to forms and conditions of cardiac disease other than those already examined. And, first, as to disease gravely and about equally affecting both the mitral and the aortic valves.

Both Mitral and Aortic Valves (with other changes).—Here come fourteen cases, but six of these are also mentioned elsewhere. Varying from 32 to 84, the average age at death was 53 years—the highest average we have met with thus far. With regard to the cardiac sounds, pulse, and other physical conditions, the abnormalities of these, marked in some cases, were in a few comparatively moderate only; yet I need not linger to analyse these signs and symptoms in cases so complicated, but note, by the way, the frequency of feeble, irregular, intermittent heart's action and pulse in the more aged patients; also that, while it was difficult to estimate with certainty the order of precedence of the two sets of symptoms, the morbid cardiac seemed to precede in more cases than did the morbid mental condition, but in many of the examples this point cannot be decided with certainty, so slow and insidious were they.*

Mental State.—Six were general paralytics. On the whole, these presented more irritability, surly moroseness, and intolerance of examination, interference, or management (and perhaps more depression) than the ordinary average run of cases of general paralysis. Some of them, too, were of long duration and aberrant course.

Three were senile dement. Two of these were extremely restless, excited, noisy, destructive; and one of these latter had delusions as to being "poisoned."

Two were subjects of "organic dementia," one being a case of dementia with organic local destructive brain lesion, and the following clinical succession: epileptiform fits; dementia; improvement; maniacal excitement; fits; left hemiplegia; fits; death. The other (glioma cerebri) was restless, confused, "lost."

Three were either deteriorated monomaniacs or chronic maniacs. (a) Deteriorated, demented, muttering, confused, depressed state, following on delusions of change of sex. (b) Chronic mania, with periods of depression; latterly quiet, depressed, deteriorated, phthisical. (c) Persecutory monomania: delusions of being tormented; later, depressed, solitary, taciturn; lastly, delusions that his bodily organs are "eaten into."

Somewhat resembling those already given under the aortic-valve sub-groups, these cases differ from the latter chiefly in (a) the relatively prominent position held in the present group by senile dementia, and by dementia associated with still grosser organic lesions than uncomplicated senile dementia is, the proportion of aged cases being high and unusual in this present group; and (b) in the relatively somewhat stronger number of general paralytics in this than in the above four combined aortic-valve sub-groups. Mentally, those of the present group also resemble aortic-valve much more than they do mitral cases, although several constituent members of the group showed something of the mental complexion observed in many mitral stenotic cases.

More or Less General Hypertrophy and Dilatation of Heart.—Of the twenty-two cases coming here, twelve are also made use of in exemplification of other points. At death the average age

was 45.6 years, the range being from 27 to 72. The cases being linked together by the existence of hypertrophy and dilatation, very differently distributed in the several cases, and associated or not with intrinsic valvular changes varying in seat and extent, the physical signs necessarily differed much in the several cases, and so did the necroscopical records. The average weight of the heart was 14.36 ozs. av., and was brought down very much by hearts dilated but not, or not much, hypertrophied.

Left ventricle hypertrophied in 10, dilated in 17

" auricle " " 4, " 14

Right ventricle " " 7, " 17

" auricle " " 4, " 14

In three or four of these dilatation was slight only.**

Mental State.—Four were melancholic, depressed, deluded; most of them terminal, deteriorated states.

Six of monomania, about equally divided, collectively or individually, between the expansive and depressed forms.

Four of general paralysis; of which one was expansive, loquacious, restless, interfering, obstinate, difficult; another demented, restless, noisy, filthy, brutish; another slightly expansive, childish, querulous at times; and the last one successively expansive, maniacal, hypochondriacal, abusive, querulous, demented, dolorous.

Three of dementia from organic brain disease, or coming on comparatively early in life.

Two of senile dementia.

Three scattered single cases of other forms, depressed rather than expansive.

But let us examine a little more closely. Of the six monomaniacs, one throughout was of the persecutory form (electric batteries playing on him, conspiracies against him); one, formerly expansive, was latterly depressed, quiet, sombre; in one the earlier mingled expansive and persecutory form had deteriorated into a relic of the latter element, associated with more querulousness; one, formerly exalted, latterly got delusions of extraordinary influences on his powers and constraint on his speech, hence his delusional silence; one, formerly expansive, eventually took delusions about dead bodies and sulphur burning near him, and about bodily illness, and was childish and somewhat demented; and in one early excitement and hallucinations, and subsequently mingled expansive and persecutory monomania, were to a large extent replaced, latterly, by delusions about "poison" in the food, and hostile influences brought to bear upon his body and his health.

Take these monomaniacal cases, take also the particular general paralytics of the group, take the melancholic cases and the depressed delusional states, take the demented and senile demented, and we find the tendency of more or less general hypertrophy and dilatation of the heart is to be associated with depression, melancholia, moroseness, sullenness, and also with dementia, amnesia, and a general deterioration and defect of the mental powers, rather than with any symptoms of pure active mania, or symptoms of a more exalted or expansive form. Undoubtedly a number of the cases in this group presented expansive symptoms, but these were chiefly found in the earlier stages of some of the protracted cases. Exceptions to this exist where the compensatory hypertrophy has been full and complete, and the heart drives with ease a powerful stream of blood to the brain; obstruction outside the heart, if more than usual, being nevertheless overcome with comparative facility. Yet the usual tendency of heart disease which ends in hypertrophy and dilatation of any extreme degree and wide extent is to disable the heart and circulation; and disablement of heart and circulation tends to defective quality and quantity of arterial supply to the brain, to venous congestion thereof, and to mental depression, moroseness, sullenness and irritability, or querulousness, rather than to any actively gay or exalted symptoms. Concomitantly, and in some cases partly due to the heart disease, is the dementia observed in so large a proportion of the cases of this group, and in some of them grave brain degeneration as well.

The mental symptoms in this group of somewhat general dilatation and hypertrophy of heart resemble those found with mitral

* Average weight of heart, 12.2 ozs. av. The mitral and aortic valves presented some of the following changes: thick, opaque, coarse, atheromatous, occasionally stenotic or incompetent; occasionally, in the aortic valves, also, enlarged corpora Arantii, or more irregularity or roughness than in the mitral. In a few cases, similar but less change of tricuspid or pulmonary valves. The ventricles and auricles, one or more, hypertrophied or dilated, or both in some instances; the left ventricle most frequently, next the right ventricle and left auricle. The heart muscle often more or less flabby, or even degenerate; in two cases, the heart laden with fat externally; in two cases, marked old pericarditic adhesions. The heart diseased in many examples, and variously so.

** In 16 one or more sets of valves were considerably diseased. In 15 the heart-muscle was in one or several of the following states: pale, flabby, friable, yellowish, of dull hue, granulo-fatty; and in one was syphilitic. In 20 there was considerable disease of aorta. The kidneys, whose average weight per kidney was 5.5-12.75 ozs. av., had a degree of granular change in one-half, and in a few more were pale, fatty, or presented other alterations. Average weight of spleens 8.1 ozs. av. Half of them unduly firm or hard; of many the capsules thickened, pigmented, or calcitrated.

more than those with aortic-valve lesions; but there is a greater chronicity, and a greater variety in the mental depression, and relatively more dementia in this than in the mitral group. And that this resembles the mitral rather than the aortic-valve group is, of course, largely due to the fact that the latter is weighted in one direction by the fourth sub-group of aortic-valve cases, that in which valvular change is conjoined with grave alteration of the arch, and in which, as we have already found, is a considerable proportion of cases with expansive and active mental symptoms, and a well conserved vital energy.

PARTIAL DILATATION OR HYPERTROPHY OF HEART.

I have not included here the cases of slight or comparatively mild cardiac changes. Of such mild kind is the majority of the cases in which cardiac dilatation or hypertrophy is due solely to the long-protracted, irregular violence of the heart's action, or strain of it, under persistent or frequently recurring mental excitement in chronic cases of insanity, or the respiratory embarrassment of the depressed forms. Yet in some of the more extreme cases under this group, as well as other groups already mentioned, mental excitement or depression probably had some share in the production of dilatation or hypertrophy, notwithstanding the operation of such factors as valvular lesion, or organic disease of brain, kidney, or lung.

Here would come twenty cases in which the condition was very marked; but, inasmuch as many of these quite partial hypertrophies or dilatations—that is, those affecting one chamber very chiefly or even exclusively—are due to, or connected with, either a preceding valvular change, or else incompetency of a valve, healthy in itself, but unduly patent owing to dilatation of a cardiac chamber; and, inasmuch as eleven of the present group are of that nature, and therefore coming under some of the preceding heads, I take here the remaining nine only.

In them, the average weight of the heart was about 12.4 ozs. In five the hypertrophy, with or without dilatation, very chiefly or solely affected the left ventricle; and in four the right ventricle, or it and the right auricle. The former were mostly general paralytics with—at least, in the advanced stages—well-marked symptoms of emotional depression. The latter were chiefly cases with well-marked pulmonary disease (tubercular phthisis), and mostly with irritability, moroseness, depression, taciturnity, mental deterioration; and one, with both right chambers immensely dilated and hypertrophied, was an asthmatic monomaniac (formerly of considerably exalted type), with typical changes of lung ("large-lunged vesicular emphysema"—Sir William Jenner²⁷), and of all the large, hard, congested viscera.

Any valve disease that existed in a few of these was comparatively slight and unimportant. In the former sub-group of five cases, there was obstruction to the systemic circulation from the brain disease of general paralysis, and in two also from the coexistent decided renal disease (in one there being subacute nephritis, in the other granular atrophy), while a third showed very slight granular change. This obstruction induced left ventricular hypertrophy; whereas, in the latter group, phthisis pulmonalis or asthma threw heavy work on eutrophic right cardiac muscles, leading to their hypertrophy, the left not becoming similarly affected.

An interesting deviation from the above arrangement was the case of one who, besides phthisis, had hypertrophy of left ventricle only, in a marked degree, old adhesions of pleura to the pericardium dragging the latter leftwards, and finally two fluid ounces of pericardial fluid, and sub-pericardial oedema over the right side of the heart. Although their cortices were thin, the kidneys weighed 6 and 5½ ozs. Latterly, he was irritable, morose, intolerant of examination, and bit attendants who held him. The irascibility, sullenness, and bad temper were more like the symptoms frequent in phthisis pulmonalis in the insane, than either the querulousness or apprehensive fear so often observed in embarrassing or disabling heart disease.

This case conveniently leads us to glance at the heart in phthisical insane persons.

But before doing so I must mention a form of heart disease, hinted at above, often consecutive to mental disorder, but often apparently of constitutional origin, and connected with or forming part of the general vascular and circulatory condition natural to the individual, and becoming morbid in degree before or after the onset of insanity. I refer to moderate hypertrophy or dilatation of the right side of the heart, unaccompanied by marked

valvular disease. Cases of this kind are scarcely represented in my statistics, inasmuch as they are comparatively slight or moderate degrees of organic change, are cases, therefore, of a kind which I have excluded from consideration here, for the reasons already mentioned. By others the pure cases of this kind are usually mixed with cases presenting also hypertrophy of the left ventricle, and to this combined and impure (that is, mixed) group is attributed a causation by the strain on the heart due to prolonged mental and physical excitement and over-exertion, as well as by the obstruction and interference with cerebral circulation occasioned by the obscure changes of minute vessels in some forms of insanity. This has been found mostly in dementia and in chronic or recurrent mania. Thus, Dr. Burman,²⁸ drawing this conclusion, however, from a single examination of the living cases in an asylum, reported that he found hypertrophy of right heart, with apex beat in the epigastric region, in 10 per cent. of the cases of consecutive dementia, in 15 per cent. of chronic and recurrent mania, and in 3½ per cent. of melancholia; yet the addition of examples complicated by replacing or by modifying murmur yielded proportions very different from these.

But I think some further discrimination is necessary here, and that in a moderate number of cases, slight or comparatively moderate dilatation of the right side of the heart is consecutive to insanity, or springs from the same general vascular and constitutional condition as that which predisposes to the insanity, and that these cases take the depressed form; and the anguish of the melancholic and hypochondriacal patients, with the interference with respiration thereby engendered, further aggravates this tendency to dilatation of the right heart, or even dilatation and some hypertrophy.

As Mr. J. A. Hingeston²⁹ said, with enlargement of veins, a general tendency to varicosity, the mind is usually unaffected, but occasionally mental symptoms arise "from dilatation of the right side of the heart superinducing premature old age. Patients thus affected never are strong-minded or courageous, they have no heart for great things, but are timid and vacillating. They end by being fatuous. Gout is often at the bottom of this malady."

The Heart in Phthisical Insane Persons.—Of the insane who die, or die chiefly, of phthisis pulmonalis, there are not a few whose hearts are more or less hypertrophied, and of full or over weight, like the patients mentioned in the preceding group, with hypertrophy of right ventricle or of both right chambers. For example, at the moment of writing, I observe the notes of a case not included in my statistics. This male patient, formerly of medium size, and weight, died phthisical at the age of 38, with a heart as much as 12½ ounces in weight, mottled, pale, flabby, friable, without any disease of coronary arteries, but with slight atheroma of aortic sinuses of Valsalva, and some pericarditis.

Nevertheless, the majority of the phthisical insane die with small, wasted hearts, which usually also are flabby, friable, and not seldom somewhat granular or granulo-fatty, that is to say, exhibiting that form of degeneration under the microscope. This occurs more frequently than I had supposed it to do before the space of time during which I regularly examined the heart, microscopically, in almost every case in which I made a necropsy.

In the phthisical, and in the tubercular, insane I have met with several examples of another form of cardiac affection, consisting of tuberculosis of the myocardium or pericardium, not infrequently with pericarditis. What I might say here on this subject I have already published³⁰ in the *Lancet* several years ago, together with two examples of the affection, since when I have met with two more examples. It is a secondary change, and unimportant in relation to our present subject.

Fatty or Granular Degenerate Hearts in the Insane.—Only a fraction of the examples of fatty or granulo-fatty degeneration of the heart I have observed in the insane can be taken up here.

Of the twenty-five cases which happen to come in the notes analysed, in twenty-four were necropsies, and one is a living case. But six of these cases of microscopically fatty heart had severe valvular or other cardiac or aortic disease; in these few cases, therefore, the effects of the fatty heart, and its relations, are too much complicated for our purpose, whatever may have been the importance of the fatty change as a factor in the state of brain-nutrition. Deducting these, the remaining nineteen cases are adapted to our present purpose, and these alone are utilised

²⁸ *West Riding Asylum Medical Reports*, vol. iii. p. 250.

²⁹ *Medical Times and Gazette*, November 20th, 1852, p. 530.

³⁰ *Lancet*, May 26th, 1853, p. 898.

²⁷ *A System of Medicine*, edited by J. Russell Reynolds, M.D., vol. iii. p. 486.

in the following. In many the fatty change was later than insanity.

Age.—The average age at death was about 44½ years.

Weight of Heart.—The weight of the heart varied from 6½ to 17½ ounces. The average was just over 11 ounces.

Degenerate Muscle of Heart.—The muscle of the heart, whether pale, or of dull appearance, or mottled by pale and by congested patches, was in all cases flabby, friable, and in a state of granulo-fatty or granular degeneration. By which I mean that either the striæ were indistinct, the substance blurred, and bead-strings of fatty molecules were seen; or else there was a homogeneous appearance of the fibres, free fat-molecules, indistinct striæ, and granular collections, or the fibres also readily splitting up; or the muscle was of a granular appearance, the transverse striæ quite blurred, almost effaced, but fatty corpuscles or beadlets absent.

Coronary Arteries.—Of the cases in which the point was noted, in two-thirds were more or less atheroma, or whitish, or whitish-yellow opaque thickenings, or nodules and calcified patches, in the coronary arteries, occasionally in the left one only.

Lungs.—In nine cases of the present group the lungs were more or less phthisical; one of these was fibroid phthisis or cirrhosis pulmonum.

Mental State.—In 6, delusions of persecution, ill-treatment, annoyance

- „ 4, dementia, secondary or primary.
- „ 3, later stages of general paralysis.
- „ 4, mental depression, melancholia (following violent excitement in 1).
- „ 2, senile mental affections.

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To particularise: *I Sub-group.*—In six were several of the following symptoms: delusions of persecution or annoyance; for example, patient says he “is followed by women who talk about him;” or, as in another case, “torment him.” Next most frequently came delusions of bodily injuries inflicted upon them, such as being “throttled,” or of injuries done to their health by real or imaginary persons. In some the alleged injuries were of an extraordinary kind, were perhaps called “tortures,” or attributed to the malpraxis or malevolence of the medical man; in others the alleged injuries were vague (as part of general ill-usage), or only threatening or impending. Occasionally were delusions as to the food being noxious; or ordinary hypochondriacal delusions, for example, as to the stomach being “full of food.” Hallucinations may or may not exist.

In some were restlessness, and irritable, angry, excited, ill-tempered, querulous, hostile states of mind, or even hatred, associated with delusions such as the above; or obstinacy, contrariness, and threats or acts of violence and destructiveness; or, in one or two, sadness; or latterly in some, confusion and incoherence; in several cases, symptoms such as the above more or less superseded previous intermingling expansive ones.

II Sub-group.—In four was dementia; one of these, formerly maniacal, latterly was profane, obscene, gross; one, at first maniacal, then threatening, insulting, with slightly expansive ideas; became a restless, impulsive, silent, destructive window-breaker, but finally quiet and more demented. A third for many years was a nervous, apprehensive, easily-startled dement; in the fourth, dementia followed on early depressed delusional states.

III Sub-group.—In three was the demented third stage of general paralysis. Simultaneously, one of these was also impatient, denouncing, morose, selfish, jealous, foul-mouthed, profane; another, depressed, weeping, stupid; the other, obstinate, morose, demented, brutish.

IV Sub-group.—In four was melancholia, with delusions of evil impending or even actual injuries, conspiracy, poisoned food, false accusations against the patient, with self-abasement; or refusal of food under the delusion of being followed by those to whom it belongs; or vague fears of poisoned food, of being electrified by a touch, or killed, of being about to be burned, or injured by medical treatment; or assertions by the patient that he has “no swallow and no stomach, and the Dr. cut off his privates;” or he is taciturn, hallucinated, depressed, apathetic, amnesic, incoherent. Here I may add another case. After an early outburst of excitement under vague terror and with imperfect consciousness, the patient had ideas of ill-treatment and of hostility to him, vague apprehension, anxiety, nervousness, semi-terror; and early delirious confusion, rapid failure of heart, and death under the onset of moderate pneumonia and congestion of lungs.

V.—Besides the above, were a case of mania in old age, and one of senile dementia.

Although an accompaniment or even a factor in the causation of symptoms such as the above, fatty heart is not always an un-mixed evil; indeed in some cases it may be a preservative lesion, for when the arteries are diseased it may be safer for the subject to have a feebly-acting heart than a normally strong and vigorous one, as taught by Sir William Jenner.³¹

Anæmic and spanæmic as are many of these insane, yet the fatty degeneration in the above cases was more associated with a general deterioration of tissues than due to the defect of the oxygen-bearing elements of the blood in grave and prolonged anæmia. Fatty cardiac degeneration from this latter cause has been found in almost all cases of pernicious anæmia, as originally observed by Drs. Addison and Wilks, and this degeneration of the heart in ordinary anæmia was made prominent in Dr. Coupland's Goulstonian Lectures³² several years ago.

Syphilitic Hearts.—As might well be expected, the four cases I have to offer in which the heart was syphilitic exhibit the most various states of mental symptoms, and present nothing characteristic, or on which one can fasten.

One of these cases of syphilitic heart I³³ published in full in the *British and Foreign Med. Chir. Review* some years ago, and cited cases observed by Drs. Wilks, Ricord, Lebert, John Morgan, Virechow, Haldane, Aitkin, and Mr. Jonathan Hutchinson. Interesting pathologically, these cases of syphilitic heart are scarcely to our immediate purpose, and I leave them.

Aneurysmal Hearts (four cases).—All the patients were males, aged at death 34, 38, 44, and 50 years, respectively, and in all the left ventricle was the aneurysmal chamber.

One was the subject of dementia, amnesia, childishness, and some depression, with excessively feeble circulation of blood, and tendency to peripheral ulceration and gangrene.

Another latterly, and differently from his previous mental state, had delusions of the fumes of sulphur and of corpses affecting him, and of darts of fire coming on him.

Another, who had previously been in a mingled expansive and hallucinated state, with occasionally some ideas of being annoyed, latterly took marked delusions of annoyance by hallucinatory voices (chiefly women's), and including the voices of persons who “had been burned alive;” said he was “300 years old,” and made absurd, incoherent, childish statements, especially on religious topics.

Another, having at first had hallucinations and depression, undefined alarm or excitement, for years with delusions of being sent to the asylum to be killed, of persons sent for the purpose, attempting to take his life, and these delusions occasioning paroxysmal excitement and violence; became subsequently the subject of more circumstantial delusions—for example, people “rise in his mouth,” “reply to him,” “sit on his mind,” “breathe on him,” and while thus persecuting him, desire and intend to take his life.

Without further comment or recital of the cases in detail, we may now add a summary of the modifications of mental state coincidently with disabling cardiac aneurysm. Usually in these cases of aneurysmal heart, when in an advanced stage of more or less physically disabling cardio-aneurysm, the tendency was to a modification of the previous insane mental state in the direction of delusions of annoyance, physical injuries, and damaging acts and influences hostile to the patient's bodily state and health, and sometimes taking the strangest forms; or, persecution of another sort, and chiefly by hallucinatory voices; while other delusions and hallucinations of sombre tinge, relating to death and corpses, were observed in two. The comparatively recent case of mental disease following the cardiac was a complicated one, and its dementia and depression not necessarily related to our present topic.

AORTA: ITS DISEASED STATES IN RELATION TO INSANITY.

Here we take up (1) aneurysm, (2) nodulation, and (3) more ordinary atheromatous change of the aorta.

1. Aneurysm of Aorta.—One might have spoken of the frequency of heart disease in soldiers. Very frequent also is arterial aneurysm, both facts holding a relation to the comparatively large amount of cardiac disease or aneurysm, and the large military element, in the cases for some years under my care.

³¹ Address at Leeds (JOURNAL, July 31st, 1869, p. 115; *Med. Times and Gazette* July 31st, 1869, p. 142).

³² *Lancet*, April 30th, 1881, p. 689; *BRIT. MED. JOURNAL*, April 23rd, 1881.

³³ *Brit. and For. Med. Chir. Rev.*, July 1876, p. 176.

Of the two lesions chiefly affecting the aorta in soldiers, (a) the passive limited opacity (sometimes fatty), and (b) the fibroid growth, Brigade-Surgeon F. H. Welch³⁴ concluded that it is the latter which, disintegrating, so often leads to aneurysm, or to implication of aortic valves, or to hypertrophy of cardiac chambers; this growth is connected with syphilis in a major degree, with rheumatism and alcoholism in a minor degree; while the chest constriction and forced temporary exertion of the soldier act as adjuvants to the disease of aorta in the production of aneurysm. On the other hand, it has been held³⁵ that syphilis is only the predisposing and not the direct cause of the aortectasy.

The frequency of heart disease in soldiers was attributed by Surgeon-Major A. B. R. Myers³⁶ to the prejudicial constraint of the uniform and accoutrements, so obstructing circulation as to lead to abnormal strain of the heart, a strain which may be brought about or aggravated by disease of the aorta, such as aneurysm, which latter, in the young soldier, often appears to be due to an acute inflammatory softening, brought about by some severe distension of the affected vessel.

Not accepting mechanical strain alone for heart disease in the soldier, nor syphilis alone for his aneurysm, Surgeon-Major W. E. Riordan³⁷ made the aneurysms of soldiers to be usually secondary to heart disease, and the heart disease to be due to drill and discipline; the early drill, with violent exercises and alteration of form of chest, changing the condition of circulation much, the discipline causing mental anxiety and worry. Now, to a large extent, this is only the older idea of mechanical strain, but ignoring the (real) aggravating influence of the soldier's uniform and accoutrements thereupon.

Entirely omitting small pouches or dilatations not giving rise to marked local or systemic symptoms, and not the cause of death, I bring forward eleven extreme cases, eight of the thoracic aorta, and three of the abdominal. Here I can only find space for the insertion of a few particulars as to the mental state.

During, and for some time prior to, the attainment of large size by the still growing aneurysmal tumour, in one were peculiar delusions of being tormented, grievously hurt, "destroyed," and his bones bored into, by snakes, scorpions, weasels, in body and limbs. Once he had "seen" and once he had "heard" them. He says his body is full of snakes, scorpions, rats, and weasels, which eat him up, gnaw on the bones, etc. "They are the most horrible varmint ever known." Later, often feels his head and hand falling off; has "pains all over," worse in trunk and head, equally on the two sides, and "boring pains through both jaws." "Is eaten up alive; some of the 'varmint' make sores, which others eat, every day. It began the same way six or seven years ago. Millions of snakes and scorpions got inside him, and began eating his body. They now push out his ribs, first at one side then at the other, and eat them, and finally level them down; they also push out and eat the jaws." Later, being short of breath, he says it is forced out by the "varmint" inside him. "His chest is all sores, and every inch of his body is the same." Intercapillary tubular respiration, profuse clammy sweat. Later, respiration made in a sudden, rapid, audible way, as if by one taking breath after a long exertion. Later, tracheal wheezing. Still later, he says the top of his head, especially its left side, and the ribs are "split out." Turgid, sweating face; brassy cough. Once, subsequently, he says the vermin "carry pocket knives, and during the last twenty-four hours have been scraping his ribs, first on the edge and then on the broad, and finally they bend them, and go through the operation of breaking them." Dyspnoea, orthopnoea, giddiness, "reeliness," and "a blindness" (as he called them), with cold and purple hands, ear-tips, nose, and lips preceded somewhat sudden death.

Of another, the certificates stated that he had the delusions that he was plotted against, conspired against by certain women and a Captain —, and also by the men of the regiment; that, in an excited way, he demanded immediate trial, or redress, refused to answer questions about himself, and was restless and excited in appearance.

On admission, the delusions continued, but he was taciturn, and complained of pain in the chest and dyspnoea (much relieved by treatment), with congestion of lungs and expectoration, at first clear, then streaked with blood. So the case went on. He said

the men watched him and talked about him in India, and therefore he was sent into hospital. There were dyspnoea, congested lungs, blood-streaked sputa, constant hacking cough, occasional severe pain in scrobiculus cordis, right infraclavicular and subscapular regions. He retrograded steadily, suffered much from orthopnoea, moaning, restlessness, *malaise*; declared that a galvanic battery was constantly applied to him by Captain — and others; this they "took off," he said, on the approach of the asylum medical officers. He asserted that he distinctly heard them talking about him, and what they would do to him, and saying "give it him," etc., and often he urgently pressed to have the police brought in, or to be allowed to make oath before a magistrate as to these hallucinations, and secure the protection afforded by law against his persecutors. Of anxious and painful expression of countenance, gloomy and anguished, he was a type and sample of the mental and physical suffering engendered by aortic aneurysm. Oedema, vomiting, anorexia, icteroid and livid countenance, and, finally, painful delirium and orthopnoea, preceded death.

Another was formerly the subject of monomania of persecuted and hypochondriacal type, blended with some expansive ideas; for example, "God and others speak to him in visions; internal voices cause him to speak and act without power of self control." He had hallucinations. "His wind-pipe," he said, "is worked up and down; has two personalities in his body; there are two meanings in what he says; has been sent here in mistake for someone else; a false nerve is worked on his body." He made treacherous homicidal attacks on attendants. Later on, quiet, depressed, sullen, irritable, complaining of his detention, and subject to delusions of ill-treatment.

Dr. Sibson's conclusion, that the symptoms during life are less formidable in aneurysms than end by rupture of the sac than in those which kill without such rupture, is just what we would expect as a general rule, and as such is easily explained on the ground that those which kill without rupture do so by their pressure-effects, which are formidable and painful.

It is well known that some cases of aortectasy, owing to their position and other circumstances, are almost unattended by any symptoms indicative of pressure; yield only local, innocuous physical signs; even when fatal give rise to no special functional disorder or organic change, or pain of any other part until death, or until rapid changes in the tumour, rupture, or leakage, set up some painful distressing symptoms shortly before the close of life. Aortic aneurysms, too, far more readily in the insane than in the sane, may not lead to complaint, as in one or two of the cases in my statistics, and as may still more readily be the case if the heart be fatty and friable, as in an example by Dr. T. B. Worthington,³⁸ in which sudden death from rupture of a previously undetected thoracic aortic aneurysm occurred in a quiet, silent, taciturn melancholic. And I³⁹ described a case in which thoracic aneurysm was unattended by symptoms until hæmorrhage from it occurred about twelve days before death.

In such cases we do not expect to find any marked or, indeed, any distinct, modification of the mental symptoms as a consequence of the aneurysm, its pressure or other effects, that is to say, as a consequence of the construction put upon, the interpretation arrived at of, the pressure effects and circulatory disorders engendered by the aortic aneurysm, that construction and this interpretation being those of a morbid mind. Consequently it is in cases such as those of some aspects of which I have just given a brief summary that we find symptoms which I believe to be those most likely to arise when aneurysm of the aorta modifies the previous mental state by its effects upon the important parts and structures adjoining it, and of these upon the brain. Into the other cases of large thoracic aortectasy I need not enter; they were not attended by characteristic mental modifications.

Abdominal Aortic Aneurysms.—In three insane patients under my care the cause of death was aneurysm of the abdominal aorta. It is perhaps unnecessary to give summaries of these cases, especially in view of the limitations imposed by waning space. Suffice it to say that in these cases of abdominal aortic aneurysm we find illustrations of the interpretation put by the insane mind upon the symptoms, especially the pains, discomfort, arising from the

³⁴ "Tabulation of cases from the *Necrological Register* of the Royal Victoria Hospital," etc., and *Lancet*, November 27th, 1875, p. 769.

³⁵ *Lancet*, December 4th, 1875, p. 809.

³⁶ *The Etiology and Prevention of Diseases of the Heart among Soldiers*, 1870.

³⁷ *The Causes of Origin of Heart Disease and Aneurysm in the Army*, 1873.

³⁸ *Journal of Mental Science*, October, 1882.

³⁹ *BRITISH MEDICAL JOURNAL*, December 18th, 1875, p. 755. "Grave Lesion of both Corpora Striata: Recovery from Hemiplegia: Extensive Cerebral Regeneration: Dementia: Death twelve days after Rupture of Intrathoracic Aneurysm."

pressure and other effects of the aneurysm; and we find that interpretation taking the form of delusions of definite types, or showing a tendency thereto. We trace in these abdominal aneurysmal cases at least the same character of delusions as to local bodily injuries, damages, personal injuries, hostile influences and effects, and delusions of mingled persecutory and hypochondriacal types, as in some thoracic aneurysmal cases. Yet the abdominal aneurysms were complicated with more or less heart disease, and, therefore, were not pure cases.

Of these eleven cases of large aneurysms of thoracic (8) and abdominal (3) aorta, only five gave evidence of nodulation of the aorta; and of these the majority not so very markedly as many other cases. This brings us to

Nodulation of the Aorta: Cases.—Here I mention twenty-seven cases, of which five are described under aortic aneurysm, and several others presented small aneurysms or pouches.

Age.—At death the average age of all the cases was 38.8 years; of the five with large aneurysms, 42 years; of the rest, 38.05 years.

Condition of Aorta.—The aorta becomes irregularly nodulated by greyish, somewhat translucent tissue, the elevations formed by which, and sometimes projecting boldly into the lumen, eventually contain opaque or yellowish patches; or the semi-translucent elevations are more or less ridged; or at a subsequent, or even at an early, stage the internal surface of the aorta presents small, rounded, opaque, whitish, thickened patches; or in one part flattened, whitish prominences, at another dull-whitish or yellowish patches and infiltrations; these at points may be undergoing incipient erosion, or the elevated, fibroid, whitish and slightly bluish, semi-translucent formations may be associated with yellowish and calcareous patches, or the fibroid thickening with yellow deposits here and there. Still later, and commingled, are puckers, yellow patches, calcareous plates, and whitish, somewhat translucent, round elevations projecting between the depressions; or nodules are surrounded by stellate cicatrices, and, of the nodules, the large ones have sometimes firm, yellowish-white centres. The condition is chiefly a deforming inflammatory change of endoarterium, and is usually included under the name "atheroma."*

Syphilis.—As to the question of syphilitic causation. In six, were distinct histories of antecedent syphilis; scars on penis, or on tongue, in several cases. In a case or two each, syphilitic rashes, enlarged inguinal glands, nodes on periosteum or bones, or syphilitic headache. In several cases, syphilitic lesions, gummatous or inflammatory, of brain, meninges, or on both. Calvaria dense, or of worm-eaten appearance internally; meninges of brain very tough, dural hæmorrhage or rusty films, excessive "adhesion and decortication," or irregularly distributed sclerosis of brain cortex or other parts, including pons and medulla oblongata; syphilitic arteritis in vessels at brain-base, or elsewhere. In one there was a syphilitic gumma in the wall of the heart; in another a gummatous patch in a coronary artery. In seven were gummatous traces in the liver; in seven (mostly the same) old perihepatic adhesions; in three, irregular thickenings of the capsule. The spleen showed traces of gumma in four; in two, old perisplenic adhesion membranes; in two, irregular thickenings of the capsule.

Mental State.—Fifteen were general paralytics. A larger proportion of these cases than usual presented marked emotional depression and corresponding delusions and actions, being either melancholic or hypochondriacal. Some were of the demented form of general paralysis, and many were inclined to the early exhibition of restless, excited, destructive, troublesome, and degraded states. Yet, in some, grandiose ideas were well-marked, either intermingled with or modified by the depressed ones, or

standing revealed in the more ordinary form. Of the groups of general paralytics described in my work on the subject, the third and fifth would be those relatively represented in larger proportion by the cases just mentioned, and, with unusual frequency, the cerebral changes included irregularly but widely distributed cortical or other somewhat localised palpable sclerosis, or tough meninges, or an extensive distribution of that change which I⁴⁰ have termed "adhesion and decortication."—One case of lead sclerosis, resembling general paralysis. Three cases of syphilitic dementia and emotional depression. Three of monomania, chiefly of persecutory or of hypochondriacal type; some of them much deteriorated, but in two of them the earlier symptoms largely, the later slightly, expansive. Three of delusions of annoyance, of being tormented by women or others, with hallucinations, or resembling querulous or persecutory monomania, but not markedly systematised. In some of them, at times, was an expansive tinge. Two of dementia, of different forms, following melancholia or mania. Total, twenty-seven. (Accompanied, not caused by nodular aorta).

To begin with, several groups of facts stand out here in strong relief.

(a) The relative frequency with which aortic nodulation is found in general paralytics (certainly in military general paralytics), at least double their share relatively to other forms of mental disease and ratio of necropsies; so, also, the relative frequency with which comparatively localised sclerosis affected their brain cortex, or other parts, or with which the meninges were unusually tough or markedly adherent to the cerebrum over an extensive area; and the relative frequency with which melancholia, dementia, and restless degraded states predominated, as compared with the more usual clinical aspects of general paralysis.

(b) The relative frequency with which there is some history, some clinical indication, or some necroscopical evidence, of syphilis (irrespective of the aortic change itself).

(c) Other points are: that most of these patients were comparatively somewhat young, or of early middle age; excluding the very markedly aneurysmal, an average age at death of only 38 years; and, again,

(d) That the heart was not so often or so extremely diseased as to be the dominant factor in the morbid drama, either clinically or pathologically. The coexistent heart affection was, on the whole, oftener and more severe in affecting the aortic rather than the mitral valves, a fact which brings these cases much into line with a group already discussed under aortic-valve affections, and composed of examples of coexistent aortic valve and arch disease; in relation to which I showed how these cases arose chiefly in persons of sanguine temperament, active circulation, vigorous vitality, and bodily and mental activity, abounding energy, free livers, eaters and drinkers, and by no means frigid to the other sex; who, becoming insane, tend, on the whole, to have expansive symptoms, at least in the earlier stages, rather than depressed ones. Avoiding repetition of that discussion, here, I merely add that the aortic disease and the similar changes affecting distant blood vessels, even if in a minor degree, account for some of the hypertrophies found in a share of these cases, and chiefly of the left ventricle. And the last of the points here is:

(e) That among coincident changes, were frequently degrees of splenic induration, and of renal granularity, or else a mottled state; and then there was the relative frequency of traces of gumma of liver and spleen, of perihepatitis and perisplenitis of a past date.

That the larger arteries of the body may be affected by syphilitic lesion has long been known. Lancereaux even cited observations of the kind from the older writers on the subject; and Bäumler,⁴¹ even a dozen or more years back, collected other examples. But it is especially from the medical officers of the British army that has come the view as to the very frequent dependence of aortic disease upon syphilis. Thus Brigade-Surgeon Francis H. Welch adduced a large amount of evidence to show that aortic endoarteritis, as distinguished from mere opacity or fatty degeneration of the inner coat of the vessel, in the majority of cases was connected with syphilis. In most cases of aortic aneurysm he found that syphilis was the only diathetic condition to which the vascular disease could be attributed. And in 60 per cent. of the cases of syphilis, terminating fatally through special lesions, aortic nodulation was found. He concluded that in

* **Heart.**—Heart on the average 11 ozs., av.; its muscle flabby, friable, in half the cases. Marked hypertrophy of left ventricle in five cases, and dilatation in three of these; right ventricle hypertrophied and dilated in three cases. These include a case of dilatation, and a case of hypertrophy and dilatation, of all four cardiac chambers. Heart muscle softened in half, and in half the coronary arteries diseased. Chronic aortic-valve disease existed in ten cases, also in one more was acute, ulcerative, aortic valvulitis; mitral valve disease in seven, and comparatively slight. Kidneys granular in ten, mottled in three, soft in two; other changes in single cases.

Average weight of spleen, 6½ ozs. Capsule in many thickened irregularly, or adherent, or pigmented. Usually of undue firmness, the spleen in four cases presented cicatrices, apparently of old gummata. Whitish thickened plates, of cartilaginous hardness, affected the capsule in a few cases.

Old perihepatic adhesions, irregular thickened patches, of the capsule of the liver, were observed in many cases. In seven the liver was cicatrised, as in the manner due to former gummata; one liver was lardaceous. In a few was very slight cirrhosis.

⁴⁰ *Journal of Mental Science*, Jan., 1876, pp. 571-6. *Ibid.*, Apr., 1878, p. 29; and *General Paralysis of the Insane*, second edition, pp. 282, 361, etc.

⁴¹ *Ziemssen's Cyclopædia of Practical Medicine* (Trans.) vol. III, p. 218.

soldiers there is often "a lesion of the aortic walls characterised by the presence of a fibroid growth in the deeper layers of the internal coat which as a rule ultimately disintegrates, and that this growth is connected with syphilis in a major degree, and with rheumatism and alcoholism in minor degrees as exciting agencies. There is also a lesion of the aortic wall, characterised by limited opacity and fatty change of the inner coat; this is common in all diseases associated with prolonged general deterioration." And it was the former of these two kinds of textural derangement of the vessel-wall which was so often the precursor of aneurysm.

Practically, very similar views were held as to the frequency and effects of syphilitic arteritis in military patients by Professors Aitkin⁴² and W. C. Maclean.⁴³

More Ordinary Changes of Aorta.—Here I bring thirty-five cases, a number which I might easily increase.*

Mental Condition.—In nine, general paralysis, of different forms. In nine, dementia with local organic disease of brain, or widely-spread atrophy, and including cases from syphilitic affection of brain, and one of epileptic dementia.

In seven, deteriorated, incoherent, feeble-minded states supervening in monomania, or occurring in chronic alcoholic insanity; many with expansive elements formerly.

In three, monomania of mingled form, but the expansive element more marked in the earlier stages, the depressed or persecutory in the later.

In three, paroxysmal maniacal excitement; delusions of annoyance, hostility, evil intent, poison in food, and as to surrounding and ubiquity; or expansive delusions, and hallucinatory visions.

In four, either melancholic hallucinations and delusions, for example, "is robbed," "is told by a spirit to cut his throat," "is peculiarly affected by air," and perhaps suicidal or apathetic states; or delusions of hostility and malevolence, or unsystematised delusions of persecution.

Total, thirty-five. (The state of aorta a concomitant, not a cause).

Of the thirty-five, eleven have already been mentioned under "aortic valve and aorta" disease, the fourth of the sub-groups I made of affections of the aortic valve. These I might have omitted, and in place of them taken others with less or no valvular change; but the thirty-five cases fairly illustrate the average associations and combinations of the ordinary disease of aorta, and the conditions coincident therewith, except that senile dementia is comparatively little represented, the examples of that form, included, having also organic changes of a grosser kind than that at the basis of simple senile dementia. In order to select the present group from cases of aortic change taken indiscriminately, we should exclude examples of extreme cardiac or valvular affection in which that affection completely dominates, and in which the coincident ordinary aortic atheroma is an affair of comparatively little moment, and we should exclude also the cases of marked aneurysm of arcuate aorta, as well as those of aortic nodulation.

Here apply many of the remarks and the general principles and conclusions mentioned in my commentary on the sub-group of aortic valve affections, presenting coincident disease of aortic valve and arch; for here also do we find that in many of the cases in which aortic atheroma is marked at the necropsy there is an expansive mental element and excitability, in the early years

at least, even if later on there comes a demented or a painful and worried state, or one of imagined persecution; and we find that the diathetic conditions which favour the production of aortic atheroma, as a relatively marked change, also co-exist with, and even favour, the production of activity, mental and physical, free-living, and so forth. And with these also is the influence of the sanguine temperament. Hence mental disorder is apt to be active, expansive, often subsequently degenerating into a state of disagreeable, painful hallucinations and delusions, and eventually into a worse failure of mind and incoherence. But the widespread vascular changes, so often coexistent, promote diffuse degeneration of nervous tissue elements; promote, too, local destructive lesions, visible to the naked eye, and destroying masses of nervous substance; and not only so, but also setting up a number of secondary degenerative changes in neighbouring or else in systematically-connected and comparatively distant parts of the nervous system; and not only so, but also tending eventually to atrophy of the nervous organs. Therefore it is that we find a large proportion of the cases with aortic atheroma end, on the mental side, in dementia, while some consist chiefly of dementia from the first; in them also are local and general motor and sensory symptoms prominent.

But in the later stages of many cases there are depressed or psychically painful symptoms, and if the aortic is only part of a general atheroma—or in some cases where this is not so—melancholia, or states such as of unsystematised delusions of persecution and annoyance; or, again, the persecutory or hypochondriacal forms of monomania, may be observed. I am speaking of very marked atheroma; yet atheroma in its slighter degrees is so common a condition with advancing years, that we may speak of slight aortic atheroma as the usual, nay almost the normal, senile condition. Nevertheless, when it is very marked, atheroma is usually co-existent with cardiac lesion or degeneration, which dominates the situation, or else with disease of the peripheral vessels, which is far more important than the aortic atheroma. Therefore, with atheroma affecting the arterial system widely, and associated with embarrassed circulation, it is no matter of surprise, but, rather, to be anticipated, that the imperfectly supplied and badly-nourished nervous system evinces emotional depression, mental suffering, mental failure, dementia.

Statistical Summary of the Preceding. Heart, Cases of Disease of.

Total Cases.		Or excluding Cases also coming under other Heads.
20	<div> <div>6 in 1st</div> <div>7 " 2nd</div> <div>16 " 3rd</div> </div>	<div> <div>1st 6</div> <div>2nd 7</div> <div>3rd 16</div> </div>
37	<div> <div>8 in 1st</div> <div>5 " 2nd</div> <div>4 " 3rd</div> <div>20 " 4th</div> </div>	<div> <div>1st 8</div> <div>2nd 5</div> <div>3rd 4</div> <div>4th 16</div> </div>
14	Group of disease affecting about equally both mitral and aortic valves.	8
22	Group of somewhat general hypertrophy or dilatation.	10
20	Group of partial hypertrophy and dilatation.	9
25	Fatty hearts.	19
8	Aneurysmal hearts (4).	1
	Syphilitic hearts (4).	1
Aorta, Cases of Disease of.		
11	Large aneurysms of aorta.	2
27	Nodulation of aorta (including some cases with smaller aneurysms).	22
35	Ordinary atheroma of aorta.	21
228		157
About 8	cases of heart disease introduced to illustrate some points, and not included above.	5
236		165

Of the 236 instances of diseased conditions, 163 were of heart, and 73 of aorta.

Of the 165 separate diseased individuals, 107 were entered under "heart" only, and 48 under "aorta" only.

Besides the above were many hearts in phthisical subjects already mentioned but not enumerated. I shall not take up the consideration of cases of embolism and thrombosis (often cerebral). Before me is an incomplete table containing fifteen of the cases I have seen, to which others are to be added.

THE distribution of prizes to the Volunteer Medical Staff Corps by Her Royal Highness the Duchess of Albany, on Saturday, March 17th, has, on account of the death of the Emperor of Germany, been indefinitely postponed.

⁴² *Practice of Medicine*, vol. ii, p. 644.

⁴³ *BRITISH MEDICAL JOURNAL*, 1878, vol. i, p. 283.

* The average age at death was 42 5-7th years. The changes were of the ordinary atheromatous kind, irregular thickening of the internal coat, or internal and middle coats, of the arch of the aorta; opaque whitish slightly raised patches, sometimes a gelatinous appearance, but more often yellowish patches, some of them eventually becoming calcareous. The surface of the aorta may be rendered more or less irregular, slightly ridged; the change often affected the sinuses of Valsalva, or the arch near where it springs from the heart. In a majority, one or both of the coronary arteries were more or less affected in a manner similar to that described for the aorta.

In fourteen the heart was more or less hypertrophied, partially or generally; in some of these the left ventricle alone was hypertrophied, or was so more than the other chambers, where several were so affected. In the great majority the hearts at the necropsy were more or less flabby, friable, or softened. In eighteen, was very decided aortic-valve disease; of these, in one was marked constriction at the aortic valve, and in two marked incompetency of it. In thirteen, was some mitral disease, on the average less severe than that of the aortic valve and orifice in the cases just mentioned; in one of them there was marked mitral regurgitation.

Some of the large cerebral arteries at the base of the brain were atheromatous, or otherwise conspicuously diseased in ten cases.

The renal changes were as follows, and usually more than one of them existed in the same case: In nine the granular, in three the ordinary cystic change, eight with capsules adherent or greatly thickened, two atrophic, and one indurate, yet not distinctly granular; three entered either as "mottled" kidney, or as "subacute nephritis," and one lardaceous.