Heart disease in Insanity

In this paper I wish to touch upon certain points relative to the relationship between heart disease and insanity. During a short acquaintance and a much longer acquaintance with Carmarthen Asylum I could not help being struck by the large proportion of patients who were the subjects of heart disease, as evidenced by clinical examination during life and post-mortem records, and was led to look for some cause for such frequency. In this paper I shall endeavour (1) to show evidence that heart disease is of greater frequency in the insane than in the sane (2) to discuss the possible bearings of cause and effect and (3) to touch upon certain peculiar characteristics which are said to exist in insane persons with diseased hearts.

In addition to the post-mortem records of Carmarthen asylum I have drawn from the annual reports of Broadmoor Asylum for the years 1881 and 84-85-86-88 and 1889. These years were in no way selected but were taken at random.
In the post-mortem records of the Crichton asylum, the following points are noted: the weight, the age of the valves, the competency or not of the aortic valve, the condition and appearance of the aortic muscular substance, the condition of the aorta at the aortic valve, and any abnormalities that may present themselves.

The cases I have taken consecutively and date from a month or two ago for 5 years back. There are 139 male cases and 129 female cases.

If we now take the weights in these cases a standard with fairness and marquis must be fixed. Reid gives 11 oz for the male and 9 oz for the female heart. Peacock gives 9½ and 9 respectively. (Both these are given in Grau's Anatomy vol. II). J. Reynolds in his System of Medicine (Vol. II p. 36) gives the mean weight of the healthy heart from 20 to 55 years of age 9½ oz in males and 8½ oz in females.

Prof. Hamilton (Textbook of Pathology p. 379) gives 12 to 13 oz for the male and 10½ oz in the female. If then 9 to 13 oz is taken as the limits for the male
and 8 oz to 12 oz for the female. I am allowing a fair marquee for differences in age in the persons examined. All the cases with one exception were adults.

In 136 male cases in which the weight was recorded 33 gave a weight of less than 9 oz. Of these 22 weighed 8 oz, 6 weighed 7 oz, 5 were 6 oz, and three were less than 6 oz - the percentages weights of these being - two of them 5½ and one 5½. One of these cases weighing 5 oz was only 17 years of age and is the one case alluded to who was not an adult. On the other side 27 cases were 13 oz or over 13 oz - 9 being 14 oz, 5 of 16 oz, 4 from 17 to 20 oz and 3 being 20 oz or over. Of these, three one weighed 20 oz, one 18 oz and one no less than 24 oz. Nothing cases therefore were within the prescribed limits and only cases outside them - these being about 5½ per cent and 44½ per cent respectively. The average weight of all 136 cases was found to be 10 8 oz which corresponds very well with the accepted average.

If we now take the female cases with the limit of 8 oz to 12 oz I find
that the weight has been recorded in 121 cases. Of these 21 were below 8 oz. in weight; 12 weighed 7 to 8 oz.; 8 weighed 6 to 7 oz. and one weighed only 5 ½ oz. in a woman 21 years of age. Twenty cases weighed 12 oz. or over; of these six weighed 12 to 13 oz., two 13 oz., one 14 oz., two 15 to 16 oz., three 16 oz., one 17 oz., one 18 oz. and two no less than 19 oz. It is interesting to compare the two last cases: the one showed marked vascular disease during life and at the post mortem; in the other there was no vascular lesion diagnosed during life or discovered after death. The muscular substance was very soft and fatty and there was great hypertrophy of the left ventricle suggesting that in this case there was an increase in quantity to make up for a deficiency in quality of the muscular wall. Eighty cases were within the limits and forty one beyond them giving respective percentages of about 33 ½ and 66 ½. The 121 cases gave an average of 9.58 oz. which is rather above the usual weight usually recorded for the
female heart.

Turning now to the sizes of the cardiac orifices as estimated by Dr. Peacock (Practitioner, Theory, Practice of Medicine 1818) and I found that the circumference of the aortic valve is for the male 3.15 inches and for the female 3.02 inches; of the pulmonary 3.55 inches in the male and 3.49 inches in the female; of the mitral 1½ inches in the male and 1¾ inches in the female; of the tricuspid 4.74 inches in the male and 4.56 inches in the female. From these measurements I have calculated the diameters to be: Aortic 1½ inches in the male and a little less in the female — 1½ inches; Pulmonary 1.13 inches in the male and 1.11 inches in the female — practically 1½ inches for both; Mitral 1.27 inches in the male and 1.26 inches in the female or 1½ inches for both; Tricuspid 1.51 inches in the male and 1.45 inches in the female or 1½ inches for both. There is then very little difference in the two sexes with regard to the diameters of the cardiac orifices and 1½ inches 1½ inch and 1½ inch may be taken as fairly representative measurements for both for the four values.
I find that in the 137 male cases in which the aortic valve was measured, that 74 gave the normal measurement of 1 inch: 17 cases measured 7/8 inch and 4 1/8 inch—thus 95 cases being not far from the average size: 33 cases however only measured 5/8 inch: one case 1/2 inch whilst 5 cases were contracted to below 1/2 inch and were not capable of measurement—one of them being described as a mere slit. Two cases measured 1 1/2 inches: one case 1 1/2 inch whilst one cases gave the enormous measurement of 2 inches.

In 127 female cases 67 cases gave a measurement of 7/8 inch or 1 inch: 37 were only 3/16 inch in measurement: 5 were 7/8 inch and 5 were only 1/2 inch. Only one measured over 1 inch and that one was 1 1/2.

In these 264 cases the abnormal tendency was towards narrowing of the aortic valve.

The valve was found to be incompetent in 53 male subjects or 38 per cent and in 43 females or 33% per cent of the total number of necropsies.
In 135 measurements of the pulmonic valve in the male 116 cases were from 1/16 to 1/4 inch—being fairly normal; 11 cases were below one inch in measurement and one of these was only 1/2 inch in diameter. In 126 measurements of the valve in the female 95 cases were 1/16 or 1/8 inch; 16 measured 1/4 inch; two measured 1/2 inch. On the other hand 13 were below 1/16 inch; 3 being 1/32 inch; 7 being 1/64 inch; and one being 1/128 inch and two only 1/32 inch.

In the Pulmonary valves again the abnormal tendency was towards contraction in both sexes.

Turning now to the Mitral valve I found that in 134 cases in the male subject 53 gave the normal measurement of 1/4 inch, two were 1/8 and two 1/16 inch—making 57 cases about average in size. Thirty-one measured 1/32 inch; two 1/16 and one 1/8 inch. On the other hand no less than thirty—five gave a measurement of only 1/32 inch, two measured 1/64 inch and 1/128 inch, contracted to 1/32 inch. For 49 cases showed mitral stenosis to a greater or lesser degree or 32%.
In 127 females I found that forty nine cases were recorded at from 1 3\text{\textfrac{1}{8}}\text{in.} to 1 3\text{\textfrac{3}{8}}\text{in.}—thirty nine of these being 1 3\text{\textfrac{1}{8}}\text{in.} One case measured 1 3\text{\textfrac{1}{2}}\text{in.} No less than fifty three cases measured 1 3\text{\textfrac{1}{4}}\text{in.} Of these cases seven cases were 1 3\text{\textfrac{1}{4}}\text{in.} one case 1 3\text{\textfrac{3}{8}}\text{in.} and one case only 1 3\text{\textfrac{1}{8}}\text{in.} The very large number of cases measuring only 1 3\text{\textfrac{1}{4}}\text{in.} cannot all or nearly all be put down to strumus. I found that in 19 of these 59 cases were very small hearts weighing 8 oz. or less—thus leaving 74 cases in which the mitral orifice was decidedly small relatively to the size of the heart. Taking 34 of these 1 3\text{\textfrac{1}{4}}\text{in.} measurements as indicating some contraction I found that 51 cases out of the whole 127 showed more or less strumus—that is to say about 40 per cent.

Lastly, we will take the tricuspid valve measurements and here I found much less to be noted. Most of the cases I found described as having a soft and flabby condition.
of the right heart and this would
cause assist in making the measurements
with the case abnormally large.
Again although there is a general
agreement as to the sizes of the
other orifices I found that Professor
Hamilton in his little book of
Pathology (p. 121) gives 1.8 in the
male and 1.5 in the female as the
average tricuspid measurement.
In my 129 male cases 43 are 1½ in.
3 are 1 ½ : 32 are 1 3/8 ; 5 are 1 7/8
and no less than 16 are 2 in. in
diameter. With regard to all of
these I have no remark to make.
Two cases are 1 3/8 : 25 cases are
1 3/4 : one cases 1 5/8 and two
are only 1 1/2 — these last
28 cases may I think be
considered abnormally small.
In 112 female measurements 45-
cases were 1½ in. or under —
one of these being only 7/8 in. and
6 cases only 1 in. Of the cases
were about the usual average, being
from 1 3/8 to 1 5/8 — 30 of these were
1 1/2 in. Thirteen cases were 1 3/4 in.
and one 2 in. I have now finished recording the
In measurements and in them I have placed more reliance on the Evidence of Contraction than on the most abnormally large measurements. When the ordinary Cone is used if the heart is soft and at all fatter degenerated the table tends to go up before it, and accurate measurement is made impossible.

I think however that the statistics have shown a large percentage of Aortic and mitral Stenosis and of Aortic Regurgitation.

The muscular substance was soft in a large number of cases; it is described as very soft in about 30% in both males and females. There is however no method of testing the softness and different observers might describe the same heart differently.

In 35 male and 26 female cases this was marked hypertrophy of the left ventricle.

In 27 male and 19 female cases atresia of the aorta close to the aortic valve is recorded. In 4 male and 6 female cases the pericardium was adherent to the heart.
I shall now turn to the statistical tables in the Broadmoor Asylum yearly reports.

Out of 100 cases which I have taken — all the cases successively in the years mentioned above — I find that the weight is recorded in 98 cases — 76 being males and 22 being females.

The average weight of the 76 male cases is 13.1 oz and of the 22 female cases 13 oz. Twenty-two of the male cases weighed 13 oz or over and of these 20 had been eleven more than 13 oz or more. The largest beast weighed was 30 oz; two more were 25½ oz and 23 oz respectively. Six male beasts were under 8 oz — the smallest weight being 6 oz.

The twenty-two female cases show two more remarkable figures: the smallest weight was 5½ oz and the largest 31½ oz. Eight weighed more than 12 oz and three exceeded 13; of these, three of from 15 to 16, one of 19½ oz and one of 29 oz and one of 31½ oz. Five weighed less than 8 oz of which two were below 6 oz.

These figures alone will show that a
Carpent's percentage of these 98 cases was suffering from cardiac hypertrophy or from fatty heart.
Such in almost every case some sort of account of the heart is given and almost every case has some form of cardiac disease or degeneration recorded against it. In 11 out of the 100 cases the aortic valve was incompetent: in 12 cases there was disease of the mitral. There was great hypertrophy of the left ventricle in 13 cases: in 11 cases the heart is described as being fatty degenerated. In 9 cases there was former evidence of old pericarditis. The aorta is described as atherosomatic in 98 cases. In but few of the cases is the heart described as healthy.

In these two sets of post-mortem accounts it has been shown I think that heart disease occurs in a large proportion, and by heart disease I wish to imply any change in its form or substance which would lead to the improper performance of its functions. What is the proportion of heart disease in
the general community outside asylums. I think that it must be of less habitual frequency. It must be that in any collection of destitute persons, whether suffering from disease of the brain or from disease of the foot or any disease whatever, there is a greater proportion of cases of cardiac disease than in healthy persons. But I think that there are many reasons wherefore it should be very common amongst insane patients. These reasons may be summed up into two namely that heart disease may be a cause of insanity and that insanity may cause or at any rate aggravate heart disease.

(2). Dr. Julius Meckel in his Gaulstonian lectures discusses at considerable length the influence of cardiac disease on the mental state. He tabulates six ways in which this influence is exerted and shortly they are as follows: 1. the disturbance of the balance of the circulation in the body generally. 2. disturbance of the Cerebral Circulation. 3. a change in the composition of the

extra cranial blood + 4 - of the blood
generally 5 by bringing on pulmonary disordar and the morbid passions
associated therewith 6 by peripheral irritation influencing the centrum
safely. These groups seem to me to be rather self-inclusive. The
first group appears to include the
second. I do not see how the
iliac condition of the blood
generally can affect the brain until
it reaches it and then it comes
into group 3 i.e. extra cranial blood.
I should prefer to divide it into
the following four groups 1. Actual
change in the brain substance. 2.
Malnutrition of the brain which
has not gone on to organic change.
3. Artistic conditions of pressure in
the brain 4. Disorders sensations.
Under group 1 the chief alteration is
white softening of the brain.
I found in D. Stokes book on the
heart that D. drew abroad white
softening of the brain in permanent
patency of the aortic opening allowing
free repurpligation - in contraction of
the mitral orifice - and in permanent
patency of the mitral orifice allowing

*The diseases of heart and aorta by D. Stokes p. 360
The degeneration of the heart after agreeing with this goes on to say that most probably fatty heart without vascular disease would cause the same effect. This is disputed by other writers and it may be considered an open question. Central hemorrhage may be brought about by absence of the heart. On this point, I find Dr. Forbes Airslopes writing that heart disease is one of the commonest causes of apoplexy. As a result of hemorrhage, softening of the brain substances around the C.S.F. may gradually lead to impairment of the mind. Another common cause of brain alteration is the passage of an embolus from a disused valve into one of the cerebral vessels with an area that is supplied by that vessel undergoing fatty degeneration. Softening. Dr. Forbes Airslopes suggests as another cause of brain change the violent shock to the delicate tissues from the beating of the arteries in disordered conditions of the heart—so for instance in aortic incompetency.

2. In the second place of the brain. Observe changes of the brain and read p. 600.
may be unable to carry on its highest functions from insufficient or improper nutritive material. In aortic disease, especially a too little blood is carried to the head: the complexion of the face is pale, and to also the brain substance. Or the blood may be insufficiently oxygened owing to mitral disease and the brain is starved of oxygen. In long standing cardiac disease also the blood begins to be poor in quality owing perhaps to deoxygenation of the liver or kidneys which have been set up.

3. I now come to attend conditions of pressure on the brain. Congestion of arterial congestion of the brain may be induced. Dr. Winslow quotes M. Bertini and Bouchard as saying that "the majority of patients in whom hypertrophy of the left ventricle of the heart is present will be found to exhibit symptoms of cerebral congestion and that many of them will fall victims to desease of the brain. He has the backward pressure due to effusion—caused by obstructive mitral disease."
Anemia of the brain might have been mentioned here; and a question arises in my mind whether the alteration of mental symptoms in brain anemia may not partly be due to altered pressure, as well as to its malnutrition.

Lastly we come to the disorders of sensations. In ultimacy of the heart's action, i.e., palpitation, i.e., the faintly throbbing pulse we have disagreeable and alarming sensations always or very frequently present, which may readily dimify a patient already perhaps of a nervous and irritable temperament. The sleepless, and horrible, dreams which are often associated with aortic disease must be powerful factors in disturbing the mental balance of a man whose brain is already starved from a feeble blood supply. It may be added that the patient with heart disease is precluded from doing as other men do, by fear of a sudden death with no warning. Many men, I think, would if this fear was constantly before them become melancholy and depressed.
As Dr. Savage says in his book on insanity, 'one knows that the general aspect of insanity which is depicted on the faces of many patients suffering from brain disease is recognisable enough; and that this insanity should be further developed into melancholia is readily to be believed.' The same writer ascribes the derangement of the brain not only to insufficiency and poor quality of blood, but also to the irregularity of the supply. 'Anything,' he says, 'interfering with quantity, quality, or regularity of the supply may upset the nervous balance, and cause on the one hand, anxiety with perplexity and rapid pulse - on the other, alternation of ideas and emotional instability.'

Dr. Bristow, in writing on 'recurrent palpitation' (Bristow: Medicine p. 541) says that the patient during the attack is 'irritable and fretful, and sometimes complains of a constant feeling of being in a hurry.' No organ in the body responds with such readiness to any emotion whether of fear or joy, grief or surprise, as indeed the insanity, p. 107. Dr. George Savage.
heart has ever been considered by
unscientific writers to be the 'seat
of the emotions.' Looking at it then
from this point of view it is
no surprising thing that disease of
the one should be coincident with
disarrangement of the other. I do not
however wish to carry this point
to extremes and to claim as evidence
those asylum patients whose insanity
is ascribed to 'love affairs' and
'disappointed affections.'

Another reason for the frequency of
heart disease in insanity may be
found in the fact that insanity
aids the production of heart disease.
The nervous mechanism of the heart
is must be largely affected by the
excitation of acute mania or by the
flaccidities of chronic dementia. And
prolonged excited action may be
expected to lead to hypertrophy and
prolonged flaccidities of nerve stimulus
to fatty degeneration. With regard
to this point I find Dr. Bucknill
and Tuke stating that dilatation of
the heart with great irritability of
the organ and palpitation are frequent
in mania; that in dementia they
usually found fatty degeneration. The enormous muscular action is often increased by unused patients, apparently without fatigue, must put a very severe strain upon the heart, and one is liable to set up degenerative processes, and particularly to aggravate and increase any preexisting, though perhaps latent, disease.

Dr. Savage in his book states that the majority of his cases of heart disease in insanity followed rheumatic fever and gives it as his belief that this is occasionally associated with rheumatic fever a nervous disorder which may develop into insanity. This being quite independent of the hyperpyresia which may occur with or of heart disease which may follow the rheumatism. The connection between rheumatism and character is

Dr. Cullen mentioned several cases of insanity associated with chorea, which were apparently originated by acute rheumatism. This view opens up a new list of reasons for the frequency of cardiac disease in insanity - namely that both may have
the same origin. On the same ground we may place the rustic and
sustained life, so often the antecedent of insanity, which would also tend
to produce degeneration or disease of the heart.

3. I now come to the third part of my paper—namely, to touch upon the characteristics of heart disease in insanity. It has been said that hypertrophy is associated with dilated conditions and dilatation with depression; or again that aortic valve conditions generally cause excitation whereas mitral valve disease causes melancholia. We know that in sane persons heart disease has its mental phenomena. Sometimes there are great excitation and high spirits; sometimes suggestion, irritability, and depression. Dr. Kline of Chicago says, 'to form an idea of the influence of cardiac disease on the mental state, we are forced to study the insane, since mental phenomena arising in them from any given somatic cause, are simply exaggerations of the minor...
mental phenomena of the same type found in the same affected with the same disease.

Of the same nature, Dr. Herman quotes a number of different authorities on this subject, some of which I shall give here. Thus is quoted as saying that the symptoms of the psychoses produced by cardiac disease are excitation and coguacity followed by somnolence; he also says that when there is periodic cardiac dysphoria that the excitement and other psychical symptoms show an equal periodicity with it. Katz and Burman have observed irritability and irritability and volition in cardiac disease. Dr. Greenlee has found it usual patients with cardiac disease to exhibit irritability and displays of passion. Many other authorities are quoted and most of them agree that irritability is the most general symptom. Several have noted periodic returns of excitability with periodic exacerbations of the cardiac disease.
Dr. Kennan mentions Matthew Arnold and John Hunter as instances of mental phenomena varying with the cardiac condition. He suggests that the alternating buoyancy and apneoxia of the former and the irascibility of the latter were mental symptoms of cardiac disease. He then goes on to say that, 'this great hypocrisy which occurs in the course of these troubles is as much a part of the disease as the murmurs,' and suggests in the way of treatment that an effort should be made to restrain them.

Dr. Savage states it as his opinion that melancholia generally occurs in patients who, having had the malady with heart affection, become insane. Initial disease he finds to be associated with melancholia; with aortic or with aortic and mitral disease he finds that the symptoms may be melancholic or maniacal; with simple aortic disease and hyper plots of the left ventricle he has met with

Acute mania and faltation of ideas.

He goes on to say that cases of heart disease with hypertrophy of the left ventricle may be difficult to diagnose from general paralysis of the insane.

Dr. Julius Fischel mentions several cases of same patients whose disposition was changed by heart disease. The characteristics he noted in them were feelings of suspicion, restlessness, rest and irritability. In one of these same cases there were hallucinations which subsided with the quieting of the cardiac symptoms and always returned with them.

He gives his results after analyzing a large number of cases. With marked mitral regurgitation he found that there was a state of melancholic dread or "some emotional depression," or they were morose, sullen and taciturn. With mitral insufficiency he found a greater tendency to "querulousness and delusions of persecution, annoyance and injury."

Cases of aortic insufficiency showed mental depression with arias of persecution, etc. With aortic incompetency
he found in some cases

depression and suspicion. He does not agree with the theory that
elevation is associated with acute

disease. He explains the existence of

—a pure persons with a tendency

elevation of minds plunge into

all kinds of diseases; they strain

their hearts and induce acute
disease and should they become

ensue. Their insanity tends to be

of the same excited type.

I endeavored to learn from the case books

of Camarthen Asylum to draw

some parallel between the various

forms of heart disease and the

various types of insanity: Such an analogy would require a very

large number of cases to gain any
definite result. If I take the

experience of a number of experts of

intensity—as in D. Riehn’s paper—I

find that they differ very

widely. Certainly suspicion and

irritability are very frequently

noted; but what common symptoms

are these in any form of insanity?
There is, however, a considerable weight of opinion in favour of separate and distinct mental symptoms with aortic and mitral lesions.

I must now bring this paper to a close, having gone through it in some manner the three points I set before myself. Very much more might have been written, but with so large a field it is impossible to traverse the whole of it. Much more is being done every day in tracing the relationship between mental symptoms and their somatic causes.

The day is perhaps not far off when, by the mere application of the stethoscope, the whole mind and disposition — may even the fears and aspirations — of the patient will be at once revealed to the ear of the practised physician.

C. P. Parry. Carmarthen.
April 1891.