THE PSYCHOSES OF HEART DISEASE.*

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The task of classifying the psychoses caused or aggravated by disease of the heart is not easy. Eliminating organic disease of the brain, it is probable that disease of the heart is responsible for more cases of psychic disturbance than is disease of any other organ. It is notable that but brief attention is accorded to this etiologic phase of insanity and allied psychoses by textbook authors, probably for the reason that heart disease is in most instances regarded as a result or simple complication and not as a cause. A further explanation of the possible oversight rightly to place heart diseases in the etiology of mental disturbances is that, primarily, the psychic phenomena of the milder forms of heart trouble, such as palpitation, are usually insufficient to constitute insanity and are looked on as unimportant. Secondly, the severe forms of heart disease producing active mental disturbance, incapacitate the victim for undue violence, weaken his power of decided physical activity, and constitute an excellent reason for his treatment in the wards of a general hospital where his mental infirmities are regarded as subordinate to his physical ones, with the result that, while the latter are carefully considered, the former are usually regarded as of small consequence. I do not at all take issue with this method of caring for such cases, believing that it affords opportunities for treatment that are as good as, or better than the public asylum, in which the organic phenomena are not unlikely to be subordinated to the purely psychic, with the result that the latter, or symptom, is treated, while the former, or cause, is apt to receive scant attention; and in the forms of psychosis due to severe heart disease, it appears that treatment directed at the physical infirmity is after all the essential thing, so that such cases are valuable more for comparative and etiologic purposes than for therapeutic reasons. But in the milder forms such reasoning is distinctly bad, for the mental disturbance must not only be carefully analyzed, but treated coincidentally with the cardiac disease, whether that be organic or functional. And it is important to trace the relationship between the two, as to which is cause and which effect; for it is certain that if cardiac disease can cause mental disturbance, no less can mental disease cause cardiac disturbance, as witness the irregularities and palpitations easily produced in neurasthenics by suggestion.

It is possible to divide the psychic disturbances of heart disease according to their etiology into those due to:

1. Local sensations usually not painful, whereby the patient becomes aware of some cardiac abnormality, as in palpitation, irregularity, tachycardia, bradycardia or excessive loudness.
2. Local pain, as in angina pectoris, endocarditis, pericarditis, or compression from pericardial effusion.
3. Disturbances in circulation.
 - a. Vasomotor constrictions.
 - b. Feebleness of heart's action with cyanosis.
4. Secondary lesions in the brain.
 - a. Embolism from valve lesions.
 - b. Edemas and effusions from incompetency.

From the standpoint of symptoms the psychic phenomena of heart disease may be divided into:

1. States of fear or apprehension, usually accompanied by more or less panic, and alternating with some depression and irritability, without being accompanied by active delusions or hallucinations.
2. Delusions founded on misinterpretations of local cardiac phenomena, such as pain.
3. Active hallucinations and delusions from circulatory disturbances involving sensory organs.
4. Dementias from secondary lesions in the brain.

In such classifications as the above it must be remembered that one division may shade into another imperceptibly. Any of the symptoms of the second classification may occur with any of the causes of the first, and, indeed, the symptoms of any of the various subdivisions may be associated with one another with kaleidoscopic possibilities. And yet it may be said that as a result of Class 1 of the first classification the symptoms of Class 1 of the second are the symptoms most likely to be encountered. In like manner the second class of each classification will most frequently be found related, and the third and fourth classes likewise, but to a less extent. It will be found, however, that the symptom of fear is commonly found in all the subdivisions and classes.

To Division 1 of the first classification belong all those cases of cardiac palpitation and irregularity witnessed in neurasthenics. In these cases the heart usually presents no evidences of abnormality when the patient is at ease, except that it is somewhat hypertrophied and rapid. Attacks of palpitation come on without warning or apparent cause. At other times disturbances of rhythm result from excitement, emotion, or gastric disturbances. Often at night the patient awakens with a violent start, finds his heart beating like a trip hammer, rises to a sitting posture, grasping his chest, and becomes apprehensive, irritable, excited, incoherent and irrational. Following such an attack he develops what might be called cardiophobia, living in constant fear of a recurrence, and not infrequently working himself into a state of excitement resulting in severe tachycardia or palpitation, with an intensification of the fears and doubts of preceding seizures. He demands close attention, sympathy and repeated assurances of safety, and is afraid to be left alone. After an attack the patient is sleepless, morbidly depressed, emotional and irritable.

CASE 1.—J. M., aged 26, born in U. S., farmer, entered sanitarium in June, 1904. A typical neurasthenic. Physical appearance rugged. No evidences of organic abnormality except increase in rapidity and loudness of heart sounds. While on half-rest treatment, was awakened one morning from nap by violent palpitation, accompanied by great terror and anxiety. I saw him within ten minutes and found his pulse 140, heart slightly irregular, no murmurs. Face was pale, terror stricken and wet with perspiration of fear. He insisted he was going to die and demanded attendance and encouragement for one-half hour, when his heart having ceased to beat so violently, he became calm. He had numerous similar attacks during his stay with us.

CASE 2.—C. L., aged 38, born in U. S., politician and postmaster. Physical appearance remarkably healthy. Heart sounds accented and frequency from 92 to 100, ordinarily. Saw preceding case in attack described, and within twelve hours experienced seizure bearing striking similarity. The attack was repeated about every third night, usually around 2 a. m., and patient refused to go to sleep without first being visited, when assurances that he was all right and free from

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danger calmed him. The next day he was always more restless and emotional than before the attacks, and for months lived in terror of them. He has since recovered sufficiently to perform his official duties.

In the first of these cases the cardiac disturbances acted as a stimulus to the excitable nervous system and bore the very distinct relation of a cause for the intensified psychic phenomena. In the second case apparently suggestion produced palpitation and thus the heart trouble might reasonably be regarded, at least in part, as due to the psychic disturbance.

Not only may these disturbances of rhythm with abnormal mental phenomena be witnessed in ordinary neurasthenics, but also in pronounced degree do they occur in the cases of so-called Pennsylvania heart of Stockton. These cases are seen in their most classic aspects in lumbering regions, where men subject themselves to great strain for long periods, achieve cardiac hypertrophy, and follow it with complete cessation from hard work. As a result the heart becomes irritable and subject to attacks of palpitation and rapidity. The seizures in many instances are accompanied by minor disturbances of mind as witnessed in the following case:

CASE 3.—L. L., lumberman, aged 44, born in U. S., admitted to county hospital in 1895. Physical appearance robust. All organs normal except heart, which was hypertrophied and rapid, about 120 per minute. On exertion he developed palpitation and became excited and apprehensive. Following attacks he was irritable and quarreled with nurses and attendants, patients and physicians. Was unruly and refused to obey orders. Finally dismissed for insubordination. Was at all times fully aware of his physical infirmity and its dangers, and when free from attacks, tractable and obliging, but declared that he could not control actions described with seizures.

In another subclass of cases there is more pronounced cardiac disturbance and likewise more marked mental phenomena. A typical example of such was Case 4.

CASE 4.—C. J., aged 28, born in Germany, cook. Admitted to County Hospital, Feb. 13, 1896. Present illness began five days ago with vertigo, pain in chest over heart, and dyspnea. The slightest exertion causes patient to become so weak and tired that he is obliged to go to bed. He states that effort is followed by coughing spells, which last until he has had a rest of several hours. Examination: Heart is enlarged, 92 per minute. While undergoing examination heart suddenly became exceedingly rapid and irregular, first sound being bell-like in tone. There is no murmur. Patient grasps chest, breathes hard, face expresses intense fear, actions emotional, articulation indistinct and sentences incoherent. Following this, he was seized with convulsions, from which he could be aroused by sharp orders and threats. The seizure thus presented many of the classic phenomena of hysteria, with decided departure from customary hysterical or normal mental actions. While under care, these attacks were repeated a number of times and it was noticeable that the cardiac disturbances preceded the mental in every instance. The administration of nitroglycerin was uniformly followed by prompt improvement in pulse and mental symptoms. There was at no time pain in the region of the heart. With rest and nitrites the patient's condition was such that he was able to resume work in a month. The visiting physician, a well-known consultant in New York state, diagnosed this case as "nervous heart" and later "neurosis of the cardiac ganglia," a striking commentary on the possibilities of nomenclature to conceal ignorance of exact conditions.

Passing on, one comes by natural processes to false and true angina pectoris and in these cases witnesses some of the most interesting but distressing phenomena of mind associated with heart disease. The following case is unique in my experience:

CASE 5.—Male, aged 37, single, admitted to Manhattan State Hospital May 15, 1897. Born in Ireland. Foreman of

excavating gang. Temperate. Family history good. Repeated attacks of articular rheumatism. On admission, was excited and hysterical. Burst into tears when being questioned and said: "I am worrying for the sins I have committed. Adultery and other sins, sir." Appearance depressed and melancholy. Body somewhat emaciated. Pulse weak and running 160 to 180 per minute. Apex beat diffuse and two inches to left of nipple in greatest intensity. Relative cardiac dullness much increased. At apex, sounds were loud and bell-like. There were no murmurs, but sounds were transmitted to axilla, and all over chest were heard with metallic intensity. When patient moved the heart became irregular and more rapid, and this was always accompanied by mental excitement. While under care, patient experienced a number of attacks of mild cardiac pain with what he called "rheumatism" of his left shoulder, and at such times always became emotional, hysterical, incoherent, irrational and finally maniacal, but amenable to some degree of control. An ice bag to the chest, rest in bed and the use of heart tonics and vaso-dilators invariably produced quiet.

Eliminating those cases of true angina pectoris in which during the attack there is fear of death—which is well founded and therefore not properly to be regarded as abnormal—there are yet some cases of angina pectoris in which the repeated attacks have produced psychic disturbances such as are illustrated by the following:

CASE 6.—P. C., aged 32, admitted to County Hospital March 28, 1896. Alcoholic and heavy smoker. Had grip and pericarditis two years ago. Entered for treatment of acute bronchitis. While convalescent, developed attacks of angina pectoris with terrific pain. He was often able to inhale as much as 1 dram of nitrite of amyl without relief, which finally came only with chloroform anesthesia. Attacks were accompanied by terror, excitement and incoherence of speech, and following these he became offensive and obscene in language, threatening and unreasonable until sleep came on, from which he awakened quiet, tractable and with but partial remembrance of the events of the seizure.

Misinterpretation of local cardiac sensations and delusions built thereon was well witnessed in two cases in which the pathologic conditions were similar. The mental phenomena were fairly typical of two somewhat opposite phases of insanity, yet bore in each case striking relationship to the degree of acuity and character of the general symptoms.

CASE 7.—J. K., aged 62, laborer, admitted to County Hospital February, 1896. Examination showed consolidation of posterior portion of base of left lung, which was diagnosed as bronchopneumonia. Heart 84 to 92. Temperature 101 to 102. Mental disturbance pronounced, but differed from ordinary febrile delirium to such an extent that he was looked on by the visiting physician as an insane case in which the lung trouble was simply an accident. He was confused and incoherent in speech, muttered constantly, was sleepless and declined food. He refused to lie down, declaring that a huge vise was clamping his heart and that he must sit up to watch it. Also that electric currents were coming up through his bed magnetizing the vise. His facies was typical of a low form of acute mania, and his general conduct corresponded. He died at the end of a week, and necropsy disclosed an unexpected purulent pericarditis, with about four ounces of pus. There were numerous adhesions binding the apex of the heart to the pericardium in front. The fluid, although small in quantity, really distended the sac, and it was easy to understand the production of symptoms, resulting almost logically, one might say, in his delusions.

CASE 8.—W. L. L., aged 62, German, admitted to County Hospital May 15, 1905. There were the characteristic physical signs of bronchopneumonia of left base. Within a week he became depressed and melancholic and suffered from insomnia. Talked to himself and ate but little. After two weeks was able to be up about ward and appeared to be influenced by hallucinations of sight and hearing. His heart

was about 116 to 120, and during the night he frequently complained that weights were put on his chest whenever he lay down to sleep. The mental state was one which I have since frequently observed and considered as mild simple melancholia. He died suddenly forty-four days after first visit. Necropsy showed purulent pericarditis with 16 ounces of pus and enormous distension of pericardium. The lung was not involved except by compression.

In Cases 7 and 8 sepsis unquestionably influenced the mental state, yet clearly the cardiac lesions were responsible for the character of the resulting delusions.

The preceding cases illustrate throughout phases of mental disturbance dependent on abnormal sensations in the region of the heart, and except in the last two cases, recognized by the patients as due to disturbance of that organ. But there is a distinct class of cases in which, though the heart is diseased, the patient is unaware of it, and yet has pronounced mental symptoms directly traceable to the organic heart trouble and in no sense due to the secondary organic consequences thereof. Of such are the following:

CASE 9.—W. M., aged 19, male, well educated. Mental trouble, judging from history, dated back one month, when he left home for a neighboring state to seek work. He was there arrested, charged with insanity and brought to our sanitarium in November, 1904. On admission, he was depressed, melancholy, delusional, and suffered from auditory hallucinations. There was a faint murmur over the aortic area, probably due to slight stenosis, but not at that time regarded as of importance in relation to the mental phenomena. With rest, patient became cheerful and improved. After a few days he complained of cold and numbness in extremities and hands and feet were found blue and cold to touch. The heart murmur was louder than at first, the melancholic depression greatly aggravated and accompanied by suicidal tendencies. Regarding the cyanosis as due to vasomotor disorder, belladonna was administered. There was prompt disappearance of the peripheral cyanosis, an improved pulse and a return to a more nearly normal mental condition. Withdrawal of belladonna was followed after a few days by return of the cyanosis, this time with a feeling that the hands were dead, and accompanied by aggravation of mental symptoms with hysterical outbursts. Belladonna again relieved the cyanosis, and its disappearance was followed by decided mental improvement. After four months patient showed evidence of beginning dementia with continual auditory hallucinations.

This case I regard as one of dementia præcox, having an hereditary basis, with the cardiac disease as the distinct exciting cause of onset.

During the time Case 9 was under care we had another patient with a double mitral murmur, whose mental phenomena were typical of acute mania.

CASE 10.—Mrs. H., aged 56, married, no hereditary influence. Recently removed from the East to Oregon. Had lost her home in fire previously, had brooded much over this misfortune and weight was considerably reduced. One week before admission to the sanitarium, she became suspicious, quarrelsome, and finally, while laboring under a delusion, assaulted her husband. On admission she was maniacal, incoherent and sleepless. Was anemic and had temperature of 101. The heart was exceedingly irregular with double mitral murmurs and typical gallop rhythm. There was no edema and no evidence of focal cerebral involvement, such as might have been due to embolism. Patient was put in resting sheet and fed through nasal tube. No improvement for several days. Digitalin was then administered by hypodermic, and as the heart's action gradually became steady, the mind improved coincidentally. She had several relapses with excitement, increase of delusions, vivid hallucinations of sight and hearing, and the performance of irrational acts. In each instance these attacks were preceded or accompanied by recurrence of the cardiac irregularity; in several instances the attacks were directly traceable

to undue physical activity. With tonic treatment, in addition to the digitalis, cardiac compensation was restored, and in six weeks the patient was taken home by her friends, quiet, tractable and orderly.

The relation of the heart and mental diseases was here unmistakable. The shock of loss of home followed by transplantation can scarce bear the relation of more than predisposing elements. Loss of appetite followed, then dilatation of a weak and diseased heart. Insomnia and the mental phenomena were the logical outcome. There was striking contrast in the symptoms of these two latter cases, in that the outbursts of excitement in the vigorous and independent old woman were substituted for the hysterical, helpless attacks of the constitutionally weak natured boy. In his case also there was an astonishing relation between the asthenic cardiac disease, the feeble circulation, and the slow, depressed, and confused mentality. While in her case there was exhibited a violent, restless, active and racy mind which but kept pace with the irregular riotous circulation, and galloping, tempestuous heart.

Coming to the last class are first, those cases of embolism in which valvular vegetations are the cause of organic brain lesions. Such cases are too frequent and well recognized to need comment and it is safe to pass to the remaining group, in which the secondary results of heart disease, the arterial dilatations and tortuosities, edemas and toxemias, result in mental disturbances which, were they not associated with unmistakable heart disease, would be classed as true insanities.

The variations in these cases are numerous, but in the main certain more or less distinctive symptoms are recognizable. The first of these are ocular and auditory hallucinations. The former are doubtless due to tortuous retinal arteries, often albuminuric, and are of a vividness comparable only to the hallucinations of sight in acute alcoholism, in which the immediate cause, i. e., arterial dilatations in the retina, appears to be identical. Occasionally the auditory hallucinations occur independently, but for the most part they are founded on the ocular misconceptions and interpretations, and on both a series of delusions is based. The remaining cases illustrate this well.

CASE 11.—C. N., aged 37, German, was brought to County Hospital Jan. 21, 1896, because his family found it impossible to keep him longer at home owing to outbursts of excitement and violence. On admission, he was suffering from endocarditis with insufficiency, and had dropsical limbs. Mental phenomena were insomnia or restless sleep, from which he was disturbed by haunting dreams. He insisted that he had just seen his wife enter dormitory and heard her speak to the nurses and other patients. Declared that she refused to speak to him, but waved her hand derisively, and on this basis built up an elaborate system of delusions of her infidelity and persecutory attitude toward himself. This statement, with slight variations, was repeated daily until death occurred two months after admission. Contradiction invariably resulted in violent excitement, accompanied by incoherent, abusive and blasphemous language, followed by great exhaustion.

CASE 12.—M. G., aged 46, German, admitted to County Hospital July 22, 1895. Had double aortic murmur and mitral insufficiency. With the gradual development of dilatation and edema, patient became restless and irritable. He complained of strange visitations, claiming that he saw people in the ward who went out through the windows, hooting and shouting at him. On this he constructed a series of delusions of persecution involving other patients, nurses and physician. He lived nine and one-half months after admission, alternating but little from a steady and gradual progression of heart symptoms, with as regular an accompaniment of the

mental phenomena, until about one month before death, when he became partially demented.

The gross postmortem findings in the two immediately preceding cases were edema of the limbs, abdomen, and brain. The heart conditions substantiated the findings of the physical examinations.

CASE 13.—W. B., aged 44, German, formerly a hard drinker, was brought to sanitarium because his family was unable to keep him at home, as he was noisy, excited and delusional. Had well-recognized heart disease. On examination he was found to be suffering from general edema. Heart dilated with loud mitral insufficiency murmur. He slept badly, groaning and muttering. Usually awakened with a start and an appearance of fright. Spoke of seeing people in the room and heard them talking about him, but, as a rule, indistinctly and not unpleasantly. Unwilling to take medicine for fear of poison. Very irritable, cross at times, confused. Was under care seven weeks, and died two days after an embolism of the left middle cerebral artery, this being confirmed by autopsy.

Throughout the histories, in the interests of brevity, all extraneous matter has been omitted. In some of the cases cited there were possible hereditary and other etiologic elements. It is not my intention to regard such details slightly and in every instance the aim has been to describe both heart and mental symptoms in a manner to best show their relationship to each other. It is not contended that the heart disease in every case was the sole cause, but rather that it was the exciting cause, except wherein the cardiac troubles were rather the effect, and to this attention has been called. Especial insistence is placed on the relationship of mental improvement to therapy directed against the heart trouble. In selecting the histories, only cases under personal observation were used, and no reference has been made to the cases of heart disease occurring in the chronic insane, for there is no reason why insanity should protect against such accidental complications. Also less than one-half the actual histories preserved with a view to presenting a paper on this subject have been used, for the reason that in many cases the relationship between the heart and mental disease was obscured by some other trouble, as in one case of alienation due apparently to aortic aneurism and endocarditis, in which there was a history of syphilis. In the absence of positive knowledge to the contrary, it was assumed that there may have been a syphilitic cerebral lesion. An extremely interesting case under care as this paper is being completed has also been omitted. In this case the patient came under care with highly acute maniacal symptoms. His heart was examined, as well as his active movements would permit, and no murmurs discovered. When, after a week, the excitement somewhat subsided, it was noticed that his respirations were rapid and his lips cyanosed. Examination revealed a loud mitral insufficiency murmur and great dilatation. From his wife a history of articular rheumatism was obtained, together with the statement that he had been rejected for life insurance three times because of heart disease and accepted on different occasions by three other companies. Under the circumstances it seems probable the murmur depended in part on dilatation under the strain of the maniacal excitement and thus was a pure and simple complication. It is noteworthy that even here, as soon as the lesion was discovered and digitalis used, the cyanosis disappeared, the murmur softened, and the improvement in the expansive and confused mentality was markedly accelerated.

All the cases cited, with one exception, were ob-

served in a general hospital or private sanitarium. During a residence of nearly two years in one of the largest of our state hospitals, over one-half of the time on the receiving service, I observed but few of these cardio-mental cases. The obvious deduction is that such cases, as suggested in the beginning of this paper, are usually treated by the internist and not by the alienist, and I am sure that, as a result, the psychic side has been minimized. I do not regard any of these cases as unusual, rather believing them typical examples of comparatively common disease forms, and I desire only to recall your attention to them as being almost as much within the province of the psychiatrist as the internist, and to commend them for closer observation than the literature indicates they have received.

DEFECTS OF WILL FROM A MEDICAL STANDPOINT.*

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At first my subject may seem too intangible to be of importance in practical medicine; but one has only to think of his cases of alcoholism to realize that complete recovery or absolute ruin may be determined by the operation of the patient's will. Analogous cases in which a morbid appetite needs control at once suggest themselves, and when we further recall the many disturbances of voluntary action from which hysteric and neurasthenic patients may suffer the great importance of the subject is manifest. But, granting the desirability of remedying defects of will, some may ask whether we have any definite knowledge of the nature of volition and of its defects, such as a physician can utilize in the actual treatment of patients. I am convinced that there is a great and growing fund of such knowledge which, if carefully considered by any physician, will help him to be a better therapist.

The will, of course, is not to be regarded as a mysterious metaphysical entity, or even as a faculty, but as a cerebral process, accompanied, it is true, by consciousness, but nevertheless a nervous mechanism whose operation is modified by various conditions in health and often very seriously deranged by disease. Recent knowledge of the localization of motor, sensory and psychic functions in the cortex makes it possible to form a fairly definite and highly probable hypothesis as to what the mechanism of volition is and to deduce from it important clinical precepts.

The essential effect of willing is to cause motion, and when we inspect our own minds we find that a voluntary motion is always preceded by the idea of the motion. Now, ideas have definite locations in the sensory centers of the cortex, each according to its kind, ideas of form and color in the visual centers, of sound in the auditory centers, and so on, and each idea is the memory of a sensation. The ideas of motion are located in the kinesthetic centers in the posterior part of the Rolandic region and are memories of the sensations caused by motion. The memory or idea of any particular motion is the cause of that motion being repeated.

Suppose, for example, that one sees an orange on the table and picks it up. Something like the following must occur in the brain: Nerve currents, starting from the eyes, reach the visual center (V, Fig. 1), and these

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