

A Short Story of Heart Disease

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THE heart has, in all the ages, occupied an important place in the mind of man. The object of this paper is to give a brief outline of the growth of knowledge of this organ from the darkness of our remote past to the light of our present-day knowledge. If I may borrow an expression used by Sir William Osler in his Sillman lectures I shall take an "aero-plane flight through the centuries, touching only the tall peaks from which may be had a panoramic view of the chief historical facts."

Before describing the process of the discovery of the anatomy and physiology of the heart, it may be interesting to refer to ancient times in order to find the position from which investigations started.

Even during the Prehistoric period it is reasonably certain that the heart attracted considerable attention. The history of the individual is the history of the race. As a child remains for a time in total ignorance of its heart, until perhaps one day, owing to an accident its curiosity is aroused by the sight of blood, and still later it discovers a pulse and knocking of the heart against the ribs; so it is probable that primitive, childlike man for a long period remained in total ignorance of circulatory phenomena. Bleeding would early attract his attention and he could not help associating blood with life and its loss with death. Then he would discover the pulse and the knockings of his heart against his ribs, accentuated by excitement, anger, fear and disease. To the best of his ability he would speculate as to what it all signified and formulate theories usually colored by supernatural beliefs.

Reverting to early Sumerian times, (4000-3000 B. C.) the expression "heart" was largely used in a metaphorical sense. There was probably no clear distinction between the heart and the liver, the latter being the organ used for purposes of divination, presumably as the seat of the soul or divinity in the human body. The pre-eminence was obviously due to bloody appearance of the liver, for man, from the earliest times, not only recognized blood as in a sense the essence of life, but he also assigned to it a divine power.

As primitive interest in anatomy developed and an elementary knowledge of the brain and heart was acquired, the heart-soul theory gradually gave way to a differentiation of bodily functions. To the brain was assigned intellectual power, to the heart the higher emotions such as love and courage, while to the liver were relegated the baser emotions of anger and jealousy. This seems to have been a theory generally established at the time of Plato, and a view, which, according to Galen was held by Hippocrates. Entering into the Hippocratic period, it is a matter of some surprise to find that the prolific writings of Hippocrates contained so little reference to the heart and still less to heart disease. A chapter entitled "De Corde" is believed by some to be spurious and belonging to a later date. In this, nevertheless, the heart is described as a strong muscle

and pericardium as a smooth tunic with a fluid resembling urine. The auricles are compared as bellows, the ventricle and sigmoid valves receive attention. A scanty reference to the heart can be explained by the fact that the heart was considered to be the seat of the soul and therefore immortal and immune from physical disease.

Contemporary with Hippocrates was the wonderful Alexandrian School of Anatomy, and connected with this school that eminent Anatomist, Herophilus, who was the first physician to use the pulse as a guide to the general condition of the patient and actually counted the pulse with a "clepsydia" or water clock. The word "dirotic" dates from this period. It was this school and age that made great anatomical advance.

The next period is ascribed to that famous character, Galen, the most remarkable medical actor in history. The writings of Galen exerted greater influence of good or ill upon the succeeding practice of medicine than any other author. His influence dominated the field of medicine for 1,400 years. Among his works which formed an encyclopaedia of knowledge of his time are sixteen essays of the pulse, his pulse lore being based upon suppositions of a specific pulse for each disease. Although he laid the foundation of the physiology of the heart, his doctrine went far to hinder the discovery of circulation owing to his insistence of the four most misleading theories:

(1) that the origin of veins is in liver; (2) that diastole is the most important movement of heart; (3) that the septum between the ventricles is permeable; (4) that the motion of the blood in both arteries and veins is not a continuous stream, but a tidal ebb and flow.

Nevertheless, he did have the benefit of the Alexandrian School, and he described transverse and longitudinal heart muscle. He was familiar with the valves of the heart and proved for the first time that the arteries contained blood. The report of his experiment is as follows: "If we lay bare an artery, include a portion of it between two ligatures and then open it up, we shall find it full of blood . . . not air as formerly supposed."

Galen held many views which were subsequently shown to be wrong; yet the long spell of intellectual lethargy which followed was not broken until the sixteenth century, and then by the father of modern anatomy, Andreas Vesalius, who actually described the anatomy of the heart and was the greatest of the group which includes Servetus, Fabricius, Fallopius, Eustachious, Leonardo de Vinci, and others of lesser renown. This was the Renaissance.

A short time later, in a theatre of Fabricius, which still exists today, sat one of his pupils, who was to make one of the greatest discoveries in the history of medicine—William Harvey. William Harvey was by far the most illustrious medical man of the seventeenth century. The inspiration furnished by his use of the experimental method, and by his mercilessly keen and incisive practice of inductive thought constitutes one of the important supports on which rest the scientific accomplishments of modern medicine. He proved step by step that the heart was the central pump that forced the blood in a circulating current. He also,

contrary to his predecessors, pronounced the complete pulmonary circulation in which not only a part but the whole venous blood passed through the heart, from the right side to the left by way of the lungs. Equally important was his description of the propulsive action of the heart when systole was substituted for diastole as the primary agent in the cardiac cycle. But farther reaching than all, was his revolutionary discovery of the systemic circulation. Harvey advanced rapidly, stride upon stride, to further discovery and fact to prove his theory, and link by link he forged a chain of evidence so strong that when in 1628, after seventeen years of dead house study and animal experimentation, he published his famous "De Motu Cordis", his thesis easily withstood all the onslaughts.

It is not surprising to learn that Harvey missed the capillary connecting link between the arterial and venous systems when it is remembered that he had only a magnifying glass to work with. The first one to apply the microscope to medicine was Antony Leuwenhoek in the latter part of the seventeenth century, and it was a short but important step that led Marcello Malpighi, with the aid of a microscope, to demonstrate the capillary circulation in the mesentery of a frog. With the contribution of Keill, Lower, Hales and others, the anatomy and physiology of the heart was well established, and it is now necessary to turn to the progress of clinical development.

Leopold Auenbrugger, in the middle of the eighteenth century, was the first to discover the clinical application of percussion, and though his laborious research was slighted at that time, it was revived by Jean Corvisart, who declared he could estimate the diameter and circumference of the heart by this method. Here is found one of the first indications to a physical diagnosis of heart disease—*an enlarged heart*.

Following upon this was the further discovery of yet another clinical method of examination, the stethoscope, invented by Laennec in 1819. The instrument in his original experiment consisted of a paper cylinder only. This simple tube made observation easy and stimulated an interest in heart sounds, normal and abnormal. He described murmurs as to and fro, rasping, sawing, musical, soft, loud, short and long. He noted where they were heard and transmitted. His interpretations were faulty. He advanced the hypothesis that murmurs were due to mechanical obstructions to the onward flow of blood. A wrong conception of the cause of heart sounds prevented a correct timing of murmurs, and at the time of Laennec's death in 1824, no valvular lesion had been diagnosed, and the idea of regurgitation had not entered into the mind of man. It remained for the late investigators to discover important facts bearing on diagnosis, and among such investigators the names of James Hope and Sir John Corrigan stand out as great pioneer cardiologists.

In 1831 James Hope began a series of animal experiments which threw much light on heart sounds. He concluded that the first sound of the heart beat was mainly due to contraction of the ventricles, the second sound mainly to closure of semi-lunar valves. Murmurs were produced

by regurgitation and he concluded these signs should be useful in diagnosis. It remained only for observation on patients to confirm these views.

Sir John Corrigan, in 1832, published his classical account of aortic regurgitation, to which little has been added since. Heart murmurs became an important factor in diagnosis of heart disease. Even at this period functional murmurs were referred to; but as there was no means of differentiating them during life they were usually or perhaps always interpreted freely as evidence of organic disease.

No important change took place until the end of the last century, when there appeared on the scene a man whose name will go down in history as a great clinician—Sir James MacKenzie. The principles he laid down revolutionized existing views and formed the basis of our present conceptions. He used the venous pulse to interpret irregularities of the heart and classified the cardiac irregularities. He introduced the ink polygraph and first described it in 1908. It is perhaps unfortunate that space here does not permit of an adequate acknowledgement of the valuable contribution of Sir James MacKenzie and many others whose names, well known to clinical men today, must be omitted.

A great step in diagnosis of heart disease was made with the development of electrophysiology of the heart. Dr. A. D. Waller in 1889 demonstrated the possibility of registering by the galvanometer the action currents emanating from the human heart. This method was perfected in 1901 by Wilhelm Einthoven by his invention of an extremely sensitive instrument, "the string galvanometer", upon which the modern electrocardiograph is founded. The early twentieth century also prided Sir Thomas Lewis, whose interpretations and contributions to the electrocardiogram is known to all medical men today.

In this penultimate paragraph it might be well to give a short history of an important malady of the heart which has only recently been given a complete clinical picture, namely, Coronary Thrombosis. Dock, in America, recognized the condition during life in one case and reported it with autopsy confirmation as early as 1896. The earliest description of clinical symptoms and physical signs, however, appeared in German literature in 1910. One year later four cases were described by Hockhaus, and in 1912 Herrick, in America, first laid stress on the fact that coronary thrombosis was a clinical entity quite clearly recognizable during life. Despite these reports medical interest in the condition was not aroused extensively until about 1918.

The new discoveries and developments in the diagnosis of heart disease are numerous and valuable. One of the latest is an apparatus called the electrostetograph, on which the vibrations from the heart can be seen at the same time the physician is listening to the heart sounds and photographing them. It is impossible here to enumerate some of the modern developments, but the value of any new discovery can be appreciated only by comparing it with some past period of experimentation and speculation. So it is only by the study of the history of medicine that we can truly appraise the scientific knowledge of today, and realize its importance as a

stepping stone to paths of further discovery. So also it is only in studying the history of medicine that we come into contact with the life and work of the great pioneers of the past, and derive the enthusiasm in the pursuit of truth and inspiration, without which it is impossible to plough the long and lonely furrow of medical research.

Greetings From Dalhousie Medical Society

To the Editor:

The executive of the Student Medical Society of Dalhousie takes pleasure in extending the thanks of the society to the editors and staff of the Journal for the fine service they have rendered in arranging for this first publication.

In keeping pace with the medical societies of other school in Canada, we have long felt the need of such a student bulletin, but the task has always seemed too great to be undertaken by students already busy with the study of medicine. Through the interest displayed by the members of the editorial staff and their unselfish efforts, we are at last able to make a venture into the literary field with the publication of this Journal, the first of its kind at Dalhousie.

The Journal cannot be successful without the whole-hearted support of the members of the society. The executive urges every medical student to support his Journal and help it achieve the success it deserves.

The year now drawing to a close has been a most successful one for our society. A large and active membership was obtained from the undergraduate body and interest in its activities ran high. Meetings were held frequently and were well attended. Two successful social events were held—the Dance and the Banquet. Our athletic teams were likewise very successful in Interfaculty Sport.

The activities of the society were not limited to the aforementioned, but included most instructive talks on varied and interesting topics by guest speakers. For this we wish to thank especially Doctors Atlee, Gosse, and C. L. Gass and Professors Douglas and Richter for the service they have rendered.

And now, to culminate a successful year, comes our most ambitious effort—The "Dalhousie Medical Journal". The executive wishes it all possible success in the future.

GORDON LEA, *Secretary.*