THE HEART RHYTHMS

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INTRODUCTION

The object of this book is not to present anything new in regard to the cardiac rhythms, but to separate them from the intricate mass of information concerning instruments, curves, cardiac physiology, etc., in which they are often buried, and to consider the rhythms themselves as a whole, and in relation to each other, but apart from all other functions of the heart. In doing so they stand out as a very simple and definite mechanism, which when once understood can never be forgotten.

The general plan of this book was developed in 1912 after studying in London, was used in the next year in teaching at the Peter Bent Brigham Hospital, Boston, and since then in connection with lectures in pharmacology at Johns Hopkins University. On account of various requests during the past ten years to publish this plan of the heart rhythms the book has finally been completed.

The lack of a clear understanding of the rhythms of the heart among well informed clinicians and students is quite surprising but easily accounted for. The subject is of fairly recent development, only a very meager knowledge being had before the advent of the electrocardiograph in about 1910. Up to this time the polygraph was used by a few people and it was possible for even the most experienced to interpret only a part of their curves, and the whole subject was entirely out of reach of the busy practitioner. The electrocardiograph cleared up the heart rhythms at once. It is this fact which has been generally overlooked, and which makes such a book as this possible. The subject of heart physiology is of course in its infancy, as is the cause of the

heart beat, etc., but the rhythms of the heart as such are simply the time relations of contractions of auricles and ventricles and these have been satisfactorily worked out.

It is now possible to present a diagrammatic scheme of the heart divided into four areas from which impulses for contraction can arise. As these areas comprise the entire heart, no other points of origin of impulses can exist. A scheme of heart rhythms on the basis of point of origin of impulses can then be worked out which must include all rhythms. Given a few (five) functions of cardiac muscle, rhythms may be calculated by a mathematician with no other knowledge of the heart. There will be a limited number of rhythms, and each of them has been found to occur clinically. With such a scheme it is impossible to forget the rhythms as they can always be worked out. Any curve or tracing obtained from a patient can be referred to this process of analysis, and can be classified at once, Finally one has a clear mental picture of the limits of cardiac rhythms and will not waste time over each new curve imagining that he has some totally new rhythm.

The clinical value of a knowledge of these rhythms is of far greater importance than those not understanding the rhythms realize. The actual diagnosis cannot be made without the use of an instrument, in many cases by the electrocardiograph only, which is a cumbersome, expensive and complicated instrument quite out of reach from a financial point of view of the general practitioner, but which should be part of the equipment of every hospital. The polygraph, a small portable instrument, can however be used by anyone, and should come into more general use. It is of absolutely no value without a complete knowledge of the cardiac rhythms. The reason for this is that the polygraph gives no characteristic curves for the auricle and an interpreta-

tion can be made only by careful plotting of time relations, while in the electrocardiogram the auricular and ventricular impulses are shown by complexes of characteristic shape and can be recognized at once. Besides this in many cases only incomplete information can be obtained by a polygraphic tracing and a diagnosis made by exclusion only, which is impossible when the limit of rhythms is not definitely known. The instrument is much harder to use intelligently than the larger electrocardiograph and the cupboards of many a practitioner probably hold one of these discarded machines. An intelligent understanding of the rhythms themselves apart from other heart functions, instruments, and curves, gives one a basis on which to reason out a case, and will allow every practitioner to treat his patients more intelligently whether the diagnosis is made from feeling the pulse, taking a sphygmographic or polygraphic tracing, or an electrocardiogram.

The book is divided into two parts. It is hoped that the first will be found *readable*, and from it one can obtain an intelligent understanding of the heart rhythms. In the second part a very brief outline of the electrocardiograph and the taking of electrocardiograms is given. It is assumed that anyone using such an instrument would require a much more detailed knowledge than the scope of this book allows.

The polygraph however is taken up at length. With a clear understanding of the heart rhythms, this instrument is of great clinical importance, and is well worth a careful study. Its use requires care, and as many curves can be diagnosed by exclusion only it is essential to have a knowledge of *all* the rhythms before a diagnosis can be made. Although this requires considerable careful study it is hoped that the pointing out of the few essential