

remain in intact connection with the spinal cord, and if the vessels be anastomosed with those of a dog in tetany, so that the peripheral portions of the normal leg are bathed with tetany blood, the nerves of that leg assume the characteristic hyperexcitability of tetany, and twitchings may even occur. Reestablishment of the connection with the normal circulation brings back the excitability to normal.

From these experiments, it may be concluded that the hyperexcitability is peripheral and is dependent upon some change in the character of the blood. Experiments with curare, to determine whether or not this is an affection of the nerves alone, have not yet been completed, although one has the general impression that the excitability of the muscles themselves is increased over normal. The value of the experiments is thought to lie particularly in the opportunity which is offered for the study of tetany blood modified in various ways and used as the fluid for perfusing an isolated extremity.

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Curves from a case of transient complete heart block, showing constantly varying ventricular complexes.

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The patient from whom the curves were taken has been under observation since August, 1910. He was at that time suffering from cardiac decompensation. It was clear from the physical examination that he had a valvular defect. Combined arterial and venous curves were made. These showed that for short periods every impulse from the auricles was answered by a ventricular contraction, while at others the ventricular contractions responded to every second beat of the auricles. Curves were taken in February and March, 1911. These were volume curves from the jugular vein and radial artery and likewise curves of the cardiac action current, registered with an Edelmann string-galvanometer. At first the ventricles responded to every second

auricular beat, but somewhat later there was complete dissociation between the two pairs of cavities. Before the patient left the hospital, the relation between the auricles and ventricles was normal. Electric curves were taken on December 19, 1911, when the ventricles responded to every auricular contraction.

The curves which are of interest date from the period of complete auriculo-ventricular dissociation. Each ventricular complex is represented by *R*-, *S*-, and *T*-waves. They vary from each other in that, when the *R*- is large, the *S*-wave is small; and that when the *S*-wave is large, the *R*-wave is small. The *R*-wave gradually increases in size and then gradually diminishes, when the *S*-wave gradually increases in size and as gradually diminishes. If the apexes of succeeding *R*- and *S*-waves, *i. e.*, the significant wave in each complex were joined, a waved line would result. So diagrammatic a sequence as this did not occur frequently, but there was a tendency to approximate to this description. Sometimes the transition from complexes of one type to those of another was abrupt. The time between the complexes was almost equal, except at points of transition, when it was reduced.

It is concluded from the variation in the shape of the complexes, that they are responses to stimuli arising at levels in the heart varying from some supraventricular position to the apex. The explanation of the shortened time at points of transition is difficult. No hypothesis yet suggested is satisfactory. The fact that there was merely a temporary and not a permanent dissociation may be a significant factor, although the *P*-*R* interval associated with the transitions is not of uniform length. (*P* is the wave representing auricular systole.)

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Further observations on the tolerance of gases by the circulatory apparatus.

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In the *New York Medical Journal* of November 26 and at the New Haven meeting of December, 1910, we gave observations on the quantities of gas (air) tolerated and the apparent relation of