thinks, that during the ordinary rate of speed of the human heart, an appreciable interval occurs between the two sounds—between the termination of the first sound and the commencement of the second sound in the human heart, and it appears to us that the second sound follows the first more immediately at 40 pulsations per minute than at 30, and at 50 pulsations than at 40 per minute.

If, after having removed a portion of the sternum, we carefully observe the thoracic parietes during the action of the heart, we see clearly that they are gently raised or slightly heaved up during the contraction of the ventricle, so that we can distinctly follow the movement of the passage of the blood from the ventricle to that part of the aorta a little above its origin, where the first sound is heard to terminate, and we clearly perceive that it is one distinct and continuous movement. During this period the first sound is heard, and the second sound, which immediately follows, occurs as the thoracic parietes fall, a short silence ensuing, and then the thoracic parietes are raised again by the contraction of the ventricle.

From these statements, it appears that the first sound is heard during the contraction of the ventricles, and the distension and pulsation of the arch of the aorta, or the arterial systole near the heart.

In some cases, when the action of the heart became weaker, a slight bruit attended both sounds, and then the tone of the first sound was not so firm, and the second was more prolonged, putting it beyond all doubt that the second sound was connected with the auricles projecting their blood into the ventricle. We have also, in some cases during the summer, heard the second sound double when the contraction of the auricles was not exactly synchronous.

No portion of the first sound could be connected with the auriculo-ventricular valves, because a membranous expansion very small, of the internal parietes of the ventricle is extended over the orifices and covers that part completely during the contraction and expansion of the walls of the ventricle, and it is so small and so situated that no sound can be produced at the part during the ventricular contraction.

The second sound could not depend on the blood in the aorta falling back against the semilunar valves during the dilatation of the ventricle, or as it is stated, by the diastole of the ventricle drawing part of the blood back against the valves, for the valves are too small, and the backward force exerted too weak to produce the sound that is heard. There are other two vessels that arise from the ventricle along with the aorta, which must diminish their respective areas. The vessel situated to the left side represents the aorta, along which most blood passes during the contraction of the ventricle, and after the death of the animal, when we examined the semilunar valves situated at the origin of the aorta, they are so small that they seem totally incapable, by the falling back of the blood on them during the dilatation of the ventricle, to produce the second sound of the heart. Besides, if a sound is produced in the arch of the aorta, it must occur when the walls are distended and tense, and react on their contents in transmitting the blood forward. For it is a fact that the walls of the aorta become soft and compressible, in unison with the relaxation and dilatation of the ventricle. The moment the parietes of the ventricle relax, the walls of the aorta also become soft, and could not then cause the blood to recoil against the semilunar valves, so as to render them tense and produce the second sound that is heard during the action of the heart.

The first sound is produced by the contraction of the ventricle, the movement of the blood as it is propelled along the internal parietes of the ventricle into the aorta, and the distension and pulsation of the aorta at its origin; the sound terminating a little above that, where the aorta becomes more curved at the moment.

It commences with the contraction of the ventricle, and terminates in the aorta, a little above its origin.

The second sound is produced by the contraction of the auricles, and the movement of the blood as it is propelled by them into the ventricle during its dilatation.

It appears to follow the first sound as an immediate sequence, as it takes place so quickly after its completion. But it is the commencement of a new beat, and synchronous with the dilatation of the ventricle, and of course precedes the ventricular systole.

When the ventricle contracts, and propels a wave of blood into the aorta, it distends its walls and renders them more curved, hard, and tense, and the aorta instantly gives a pulsation and transmits the blood forward with increased velocity, and the pulsation of the aorta takes place whilst the ventricle is still contracted. At this moment the contractile or elastic power of the aorta is distinctly exerted, as can be proved by perforating the walls of the aorta with a needle, and allowing the blood to be expelled through the orifice. When the ventricle contracts and propels the blood into the aorta, the parietes are rendered firm and tense, and as the aorta gives a pulsation, a jet of blood is expelled through the orifice made by the needle. But when the contraction of the ventricle ceases, the walls of the aorta become soft and compressible, and the