

is an impure musical note, a minor third below the second sound and in the bass clef. It is a valvular sound like the second sound. It is accompanied by resonance tones of the chest, stethoscope and the ear, these tones being produced by the shock of the contracting heart. In addition, it is, of course, possible that there may be concomitant sounds produced by the rushing of the blood and other minor disturbances." We have given this investigator's conclusions in his own language.—(*Journal of Physiology*, vol. xi, p. 494.)

It will be gratifying to physicians to learn that the view to which they have always been most inclined has been strengthened if not positively settled by these recent studies, in which the physiologist has been assisted by two able musicians. It is also noteworthy that broad views on the causation of the heart-sounds have been taught by a Canadian physiologist. Prof. Mills, in his "Animal Physiology" and his later "Comparative Physiology," writes as follows, after referring to the various exclusive views taught: "But, looking at the whole question broadly, is it not unreasonable to explain the sound resulting from such a complex act as the contraction of the heart and what it implies in the light of any single factor? That such narrow and exclusive views should have been propagated even by eminent physiologists should admonish the student to receive with great caution explanations of the working of complex organs based on a single experiment, observation or argument of any kind. The view we recommend the student to adopt, in the light of our present knowledge, is, that the first sound is the result of several causative factors, prominent among which are the sudden tension of the auriculo-ventricular valves and the contraction of the cardiac muscle, not leaving out of the account the possible and probable influence of the blood itself through eddies or otherwise; nor would we ridicule the idea that in some cases, at all events, the sound may be modified in quality and intensity by the shock given to the chest-wall during systole."

It will appear that such views as the above are in harmony with the latest investigations, and even broader; for we do not think the contraction of the heart muscle can be wholly ignored