

Upon the subject of "functional," "accidental," "anæmic," or "hæmic" murmurs, as they may chance to be called, there is a large literature, rich in observation, but especially rich in hypothesis. In many of the studies the hypothetical considerations have overshadowed the clinical description.

It cannot be denied that there are many cases in which the significance of a murmur can be determined only by time and observation. That, however, which seems to me to have been hardly enough emphasized is that there are certain clinical pictures of functional cardiac murmurs, which are really rather easily recognizable. To consider some of these commoner pictures is the main object of the present communication.

What is the significance of a cardiac murmur in general? By what mechanism are cardiac murmurs produced? Rather broad questions, one may say; and yet the questions may, I believe, be answered in a relatively simple manner. The overwhelming majority of cardiac murmurs are probably the result of fluid veins arising beyond a point of constriction, or just beyond a more or less fixed point through which the blood passes into a vessel of considerably larger size, or capable of greater distension. At such points it is obvious from the simple physical consideration that murmurs should arise the more readily the more rapid the current and the less viscous the fluid; and, moreover, that they should be transmitted in the course of the current.

Nothing is simpler than the illustration of these points to a class by means of rubber tubes attached to a water tap. The character of the murmurs which arise with stenoses or insufficiencies of the four cardiac orifices are familiar enough to all, and the explanation of their manner of origin and conduction is simple enough. The manner of origin and the conduction of all the ordinary cardiac murmurs, with the exception of stenoses of the auriculo-ventricular orifices, may be illustrated in the living dog's heart as clearly as with a rubber tube, and I know few demonstrations more illuminating than the production of an artificial mitral insufficiency, where one may hear, on auscultation, a soft systolic murmur at the apex of the left ventricle, while in the left auricle, immediately beyond the valves, there is a marked thrill and a murmur of the very highest degree of intensity.

If it be easy to see why, in disease, murmurs arise, it is difficult, indeed impossible, to explain why at certain points in the heart murmurs *are not always present* in the normal indi-