

aortic systole ; or these conditions may be found combined. Hayden gives aortic obstruction and regurgitation as the most common of combined valvular lesions. Whether contraction of the valves will follow this growth of connective tissue or not, cannot be foreseen ; it is certain, however, that regurgitation from insufficiency is more common in young persons, while thickening of the valvular vela so as to constitute obstruction is more common in elderly persons.

In aortic stenosis or obstruction, the valves are not only thickened and rendered much stiffer than they are normally, so as not to yield readily to the pressure of the blood on the ventricular systole, but the process of chronic inflammation involves the base of each segment or cusp, and the growth of connective tissue there leads to contraction of the conus, and so stenosis is induced ; consequently the ventricular wall has in its contraction to overcome a new resistance in the form of stenosis with rigid valves, as well as the normal resistance of the elastic aortic walls or the blood-pressure. Under these circumstances, simple hypertrophy without dilatation is found ; in aortic regurgitation, the centrifugal distending force of the aortic reflux produces enlargement of the ventricular chamber. In aortic stenosis, we have a narrowed orifice with an increase in the driving power, and thus a new balance is maintained. Pure aortic stenosis is a disease which often exists a long time ere it is discovered, and commonly its recognition takes its origin in an examination for insurance. There is usually no enlargement of the ventricular chamber, and the hypertrophied heart secures a normal circulation of blood. At other times, medical aid is sought and relief is furnished by the administration of digitalis. At first, Sir Dominic Corrigan explained this beneficial result as being due to the slower contractions induced by digitalis ; and that a longer systole gave more time for the blood to pass the narrowed orifice. If this were the case, the arteries would still remain unfilled as before ; and, if the ventricular contractions are more complete, they would be so many fewer in the minute, and the amount of blood passing the aortic orifice in a given time would remain the same. But digitalis

does not so lengthen the systole, and Balthazar Foster says : "The diminution in the frequency of the heart's beats under digitalis always means an increase of the period of the dilatation of the ventricles. Pulse-traces readily show this." In aortic stenosis, Nature, when her efforts are sufficient for perfect compensation, does not achieve a new equilibrium by retarding the ventricular contractions, but by hypertrophy of the ventricular walls. So with the beneficial effects of digitalis, these are not the outcome of a prolonged systole, but of an increase in the driving power, brought about by more active ventricular contraction. Where, then, a left ventricle is found faltering before, or rather behind, an aortic stenosis, digitalis will restore the lost equilibrium, and by enabling the ventricle to drive an equal quantity of blood through a narrowed orifice in an equal time, a new balance is attained, and a normal blood-flow is secured. It may be urged, and with justice, that the effect of digitalis is to produce contraction of the peripheral arterioles, and so raising the blood-pressure to create a new or additional obstruction to the blood-flow ; but, practically, this is of no moment ; it is not the blood-pressure in the arteries which taxes the powers of the left ventricle ; it is the tight stenosis against which it has to struggle. The effect upon the heart more than counterbalances the action upon the peripheral vessels when digitalis is given.

The changes which lead to aortic regurgitation, and the subsequent alterations in the muscular walls of the heart, and the indications for treatment furnished by them, will now engage our attention.

In the form of aortic valvulitis which leads to insufficiency rather than stenosis, though very commonly these two forms are combined, it seems that the free edges of the semilunar are effected rather than the base. The consequence is, that the valves shrivel along their free edges, and, though not presenting the same obstruction to the blood-flow as is the case with the rigid, thickened valves, they are incompetent and insufficient to completely arrest the backward flow of the blood on the aortic rebound or systole. The changes in the walls of the heart which follow