In January of 1967 Professor Durrer and his colleagues from Amsterdam published the first report which described epicardial excitation of the ventricles in a patient with the Wolff-Parkinson-White syndrome (220). Eleven months later Howard Burchell and his colleagues from the Mayo Foundation presented a similar report. (99) In both of these early studies anomalous excitation of the right ventricle was noted with epicardial activation beginning in the region of the atrio-ventricular groove. The reports demonstrated the feasibility of localizing the site of an accessory bypass at surgery; and when coupled with the report by Durrer, Schoo, Schuilenburg and Wellens, (221) implicating the accessory pathway in reentrant tachycardia, led our group at Duke (132) to undertake studies which will be reported in part in this communication. In this chapter we will attempt to present our present view of ventricular excitation in the Wolff-Parkinson-White syndrome.

Professor Wellens also asked that we include comments concerning the relation between the morphology of the QRS complex and activation data obtained at the time of surgery.

The material I will present is based upon 24 patients who have undergone successful surgical correction of the Wolff-Parkinson-White syndrome in the past 7 years. These patients constitute a subset, and fortunately a majority, of our total surgical experience with the Wolff-Parkinson-White syndrome at Duke University Medical Center. They were selected from the larger group because in these 24, separation of atrium from ventricle at the level of the annulus of the atrioventricular valves abolished the delta wave on surface electrocardiogram. Since anatomic material was not available for histologic study in any of these patients it is important to recognize at the outset our premise which underlies the conclusions to be presented; that is that the surgical procedure and the resultant normalization of the electrocardiogram and abolishment of arrhythmias constitute reasonable and adequate proof that a bypass tract did exist at the indicated sites.

Figure 1 presents, in diagrammatic form, a section at the level of the atrioventricular valves. The mitral valve is located to the left and the tricuspid valve to the right. Each solid circle depicts the site of presumed bypass tract based upon our best reconstruction of the location at which surgical separation of atrium from ventricle caused the delta wave to disappear from the surface electrocardiogram. From this evidence regarding the approximate location of bypass tracts four important conclusions follow. The first is that the sites of anatomic faults in the annulus are distributed widely and in our experience have been localized to essentially all portions of both the mitral and tricuspid rings with the exception of that portion of the mitral ring to which the anterior leaflet of the mitral valve inserts. Second, bypass tracts have been localized to those portions of the mitral and tricuspid
annuli which join the free walls of the atrium and ventricle, but as well bypass tracts have been located within the septal structures. Third, the bypass tracts responsible for the Wolff-Parkinson-White syndrome in these patients were clearly accessory since they constituted conducting bridges from atrium to ventricle which were separate from and in addition to

Fig. 1. Section thru the heart at the level of the AV valves, mitral valve to the left, tricuspid valve to the right. * = bundle of His. Each filled circle indicates the approximate location of an accessory AV connection which was divided successfully by surgically techniques. See text for details.

Fig. 2. Diagramatic view of the area of earliest epicardial excitation (filled square) and the site at which surgical separation of the atrium from ventricle abolished the delta wave (solid circle). See text for further detail. Left lateral bypass.