The concluding chapter of Volume VB, transposed from Volume VI, deals with the related problems of abnormal growth as these are illustrated by plant tumors and galls. This chapter recognizes the innate powers of cells to grow and deals with various ways in which the normal controls are dislocated, reversibly or irreversibly, in the formation of plant tumors and abnormal growth forms. Chapter 9 deals with abnormal growth in the expectation that understanding of its causation may shed light on the normal processes of growth. There are, therefore, obvious points of contact between the subject matter of this chapter and those (Chapters 6 and 8) on the growth of isolated tissues and cells; as well as others concerned with the hormone concept in plants, with morphogenesis, and with the role of genetics in development which will appear in Volume VI. However, the overall message is that the genetic information of cells may remain intact whether they participate in normal or abnormal growth.

Exogenous stimuli may modulate the expression of the genetic information and, in the genesis of tumors, cells may be rendered receptive to such stimuli by the renewed activity of otherwise quiescent cells that accompanies wound healing. Such stimuli are held to operate through chemical triggers which affect the role of auxins (as substances that largely control cell enlargement), or of those substances (cytokinins) that control cell division, or again through their mutual interactions. In the outcome, the stimuli to abnormal growth give rise to a baffling array of growth forms in which the growth is either determinate (described as self-limiting) or indeterminate (non-self-limiting or tumorous) in character. Chapter 9 shows that such diverse growth responses as those that are induced by insects (i.e., the formation of characteristic galls), the tumors that are caused by viruses or by unusual and hybrid genetic constitution or by bacterial pathogens or symbionts can all be brought within the scope of a uniform treatment. Thus abnormal growth may occur when otherwise repressed parts of the genetic system become derepressed. The challenge remains, however, that the control mechanisms need to be prescribed in detail for both abnormal and normal growth.