

Classification of chromosomal defects is not standardized at the present time. Various factors are used in different classification methods, and a brief appendix of some of the types of classifications is included.

Some difficulties that have arisen in the past, as a differentiation between gaps and open breaks, or the degree of significance of open breaks vs. rearrangements, would seem on the basis of present information not to be as big a problem as was once imagined. Gaps and breaks both seem to increase in parallel in most of the systems studied up to now, so any method of differentiation between the two, as long as it is standardized, is adequate to compare control with experimental material, even though it is arbitrary. Similarly, the difference between open breaks and chromosome rearrangements would appear to be whether or not cellular DNA and/or protein synthesis is inhibited, or can continue. In the absence of DNA and/or protein synthesis, healing is inhibited, and it is the healing that permits rearrangement. Many of the materials that have been shown to produce only open breaks in acute studies, are seen to progress to chromosomal rearrangements when chronic studies are carried out allowing a recovery period. This difference stresses a need to carry out a portion of the studies in a cytogenetic test system after the test substance has been removed and a recovery period allowed.

In summary, cytogenetic studies would certainly seem to be one of the best screening methods for testing of mutagenicity, but should be used in conjunction with other additional methods. Cytogenetic testing reveals a variety of damage to the genetic material in addition to mutation, as well as a high correlation with mutagenic events when both parameters are tested. It offers *in vivo* and *in vitro* methods for a wide variety of species including the human. When cytogenetic studies are a method employed for screening, standardization of procedures, high quality of preparation, and reading of coded slides are essential for best results.

*Classification of chromosome breakage.*—Unfortunately, there is no single classification of breakage, since different characteristics of breaks have been used by various authors to classify them. This leads to some confusion and redundancy, but in general, the various classifications are consistent, one with the other. The characteristic that has been used to classify has frequently depended on the type of study under way and the information sought.

One of the main characteristics used to classify chromosome breaks has been whether one or both of the two chromatids of the chromosome are involved in the defect. If both chromatids are involved, the defect is called a chromosome break, while if one chromatid is involved it is