4,000–8,000 chromosomes can be analysed *per* week by a single worker. Spontaneous rearrangements are extremely rare.

A third chromosome breakage study applicable only to oocyte testing involves detachment of attached X-chromosomes (4, 5). A simple phenotypic difference permits rapid classification of the normal from the exceptional progeny. The spontaneous frequency of detachment is of the order of 1 *per* 1,500 gametes. Probably 10,000–15,000 chromosomes from an array of oocyte stages can be tested *per* week *per* person. The mature oocyte is perhaps the stage of greatest sensitivity to chromosome damage as indicated by irradiation studies.

All of the last three mentioned tests need not be counted "by hand". The investigator can screen for the exceptional flies and the rest can be counted rapidly and accurately by an electronic fly counter (*6*).

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Mammalian methods

Cytogenetics and somatic cell genetics.—In appraising any method for mutagenicity testing, it is important to be clear as to what we are asking of the method. After this, the advantages and disadvantages of any test system can be better assessed. With a cytogenetic test system, we are seeking for morphological evidence of damage to the genetic material. With this in mind, some of the obvious advantages are the wide number of species, including human, that can be examined by these methodologies; the fact that it can be performed on both *in vivo* and *in vitro* systems; the genetic material is being observed directly, and the tests can be accomplished relatively rapidly with limited expense. Disadvantages include the fact that it needs a well-trained examiner for accurate results; there are possibilities of subjective errors; procedures need to be standardized, at least within certain limits, in order to have the tests reproducible from laboratory to laboratory; and there isn't complete agreement on definitions and classification of breaks and gaps and the various abnormalities. How-