tinamide, 20 µmoles magnesium chloride, 3 µmoles 'Versene', 74 µmoles *tris*, *p*H 8·5). The means of these determinations for each cell line studied are given in Table 1, the data being reported as change in optical density/min./mgm. protein. As can be seen, there is more than a ten-fold difference between the deficient and normal lines, this difference having remained relatively constant over the period of observation.

Table 1. ACTIVITY OF GLUCOSE-6-PHOSPHATE DEHYDROGENASE IN EXTRACTS OF CELL CULTURE LINES

Optical density/min./mgm. protein *

Normals				Deficient
1	2	3	4	
0·082	0·085	0·088	0·091	0·008

* Bovine plasma albumin.

Mixtures of deficient and normal extracts in all possible combinations (normal homogenate plus deficient homogenate, supernatant of deficient plus sediment of normal, etc.) gave only additive results, indicating, therefore, that the deficiency of enzyme activity in the deficient culture was not due to the presence of an inhibitor or to the absence of an activator.

This work has thus demonstrated the maintenance in cell culture of a genetically determined difference in enzyme activity. It was supported in part by a grant from the National Science Foundation (*G* 14825).

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An X-ray-induced Strain of Ring-of-12 in *Tradescantia paludosa*

RECIPROCAL translocations are found frequently in many wild and cultivated plants, and are inducible artificially by treatment with X-rays[1]. In the cases of wheat ($2n = 14$), the largest ring $\odot$ 14 was obtained by successive inter-crossing of the translocation stocks, which were produced by X-rays[7,8]. This is a confirmation of one of the processes through which the largest rings arise in some wild plants.

I have succeeded in obtaining a strain showing the largest ring $\odot$ 12 in *Tradescantia paludosa* ($2n = 12$) by repeatedly treating the resting axillary buds with X-rays. Cuttings with all the branches removed were irradiated at 5,000 r. or 10,000 r., that is, the first irradiation. By observing the meiosis in pollen mother cells of the new branches developed from the irradiated resting axillary buds, chromosomally aberrant branches were selected out and cloned by cuttings. In this way 43 reciprocal translocation strains were obtained, namely, $\odot\ 4 + 4_{II}$, $\odot\ 6 + 3_{II}$, $2 \odot 4 + 2_{II}$, and so forth. Some of these primary strains were irradiated for a second time at 10,000 r. in the same way as the first irradiation, and more complicated strains with larger rings were obtained, for example, $2 \odot 6$, $\odot\ 6 + \odot\ 4 + 1_{II}$, and so on. Of these secondary strains, $2 \odot 6$ strain was irradiated for a third time at 10,000 r., and finally a $\odot$ 12 strain was obtained (Fig. 1*a*, *b*). For cytological preparation see a preceding paper[6].

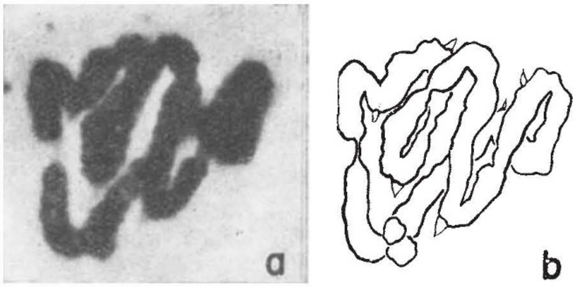

Fig. 1. *a*, Photomicrograph of $\odot$ 12 at meiosis in a pollen mother cell; *b*, the same ring depicted to show catenation relationship. (× 450)

X-rayed cells in the branch primordia showed bridges and fragments at anaphase and micronuclei at interphase. However, there were no branches which are chimerical for the different types of the arrangements. Therefore, the new branches from the irradiated buds must have been developed from a single genetically well-balanced cell, with the standard arrangement or with the reciprocal translocation, all the genetically unbalanced cells being eliminated in the mitotic cycles. The same conclusion was stated in the case of barley spikes developed from the irradiated dormant seeds[2].

In annual plants mainly sexual in reproduction, the large rings cause striking abortion of the gametes, inhibiting further propagation on out- as well as on in-breeding. On the other hand, in the perennial plants which propagate vegetatively, the large rings are easily maintained asexually.

In the genera *Oenothera*[3], *Paeonia*[5], and *Rhoeo*[4] the ultimate rings, $\odot$ 14, $\odot$ 10, and $\odot$ 12 respectively, are well known and extensively studied by numerous workers. Ultimate rings in these perennial wild species may have originated from successive direct translocations as in the present case of *Tradescantia*, or from inter-crossing between the translocation strains as in the case of wheat, or from both these two processes.

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