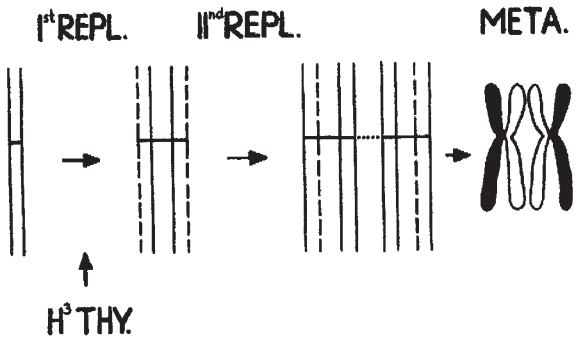


Fig. 2. Schematic representation of position of sub-units in endo-reduplication. Tritiated thymidine added during first replication. Broken lines: labelled sub-units, labelled chromatids of diplochromosomes in metaphase (indicated in black) in outward position

the rest show in most cases one labelled chromatid outward and one inward and only very rarely are both inward chromatids labelled. If the labelled chromatids are distributed at random, in 25 per cent of diplochromosomes both should lie outward, in 50 per cent one inward and one outward, and in the other 25 per cent both should lie inward. The actually observed preference of the outward position of both labelled chromatids indicates that in spontaneous endo-reduplication also this is the original position which can only be disturbed by secondary movements of the chromosomes such as, for example, those caused by spreading in the course of preparation.

The sub-units which were newly synthesized with first replication are seen on second replication to be old sub-units of the outward situated chromatids (Fig. 2). There must be a certain direction in replication bringing newly synthesized sub-units into a defined position. They are also forced to move outward, that is in a direction opposite to that of the centromeric connexion of the original sub-units, when the next replication takes place. It is possible that the centromere has some influence on the position of newly synthesized sub-units. Also chromosomal proteins or 'linkers' connecting DNA strands or segments[7,8] could serve as a frame which allows segregation and replication of DNA molecules only in a given direction.

*Note added in proof.* After this communication had been submitted for publication, K. Walen (*Genetics*, **51**, 915; 1965) reported observations on the position of chromatids in endo-reduplicated cells of *Potorous tridactylis*, quite similar to our findings in human material.

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## Chromosome Abnormalities in Lymphatic Leukaemia in Cattle

The specific change in the chromosome complement reported by Gustavsson and Rockborn[1] in three cases of overt leukaemia in cattle is extremely interesting, but care should be taken in identifying the chromosome changes with the neoplastic condition. This may not have been the intention of the authors, but it is an important distinction for the following reasons:

(1) We have studied the chromosomes in more than twenty cases of lymphosarcoma (lymphatic leukaemia) in cattle, nine of which have been reported[2], and in only two cases, one described by us[2] and the other by Basrur *et al.*[3], have similar chromosomal changes been observed; namely, an additional submetacentric chromosome and a minute chromosome in place of one of the small acrocentric chromosomes.

(2) In the three cases reported by Gustavsson and Rockborn, all the mitoses from the peripheral blood leucocyte cultures showed the same chromosomal change. This would be unusual if the chromosomal change was associated with the neoplasia, because in our experience, even when chromosomal changes occur in the peripheral blood leucocytes of cattle with lymphosarcoma, a number of cells with apparently normal karyotypes are always present in cultures to which phytohaemagglutinin has been added.

(3) The finding of the same chromosomal change in cells from the bone marrow and kidney of the foetus of one of the cows and in peripheral blood leucocytes of the three cows would seem to offer further evidence that the chromosomal change was generalized and not confined to the cells of the lymphatic system or associated with the neoplastic condition. Chromosomal analyses of other cells from the cows, for example, bone marrow cells and fibroblasts, in addition to the peripheral blood leucocytes, would have helped to throw light on the significance of the change in the chromosome complement and on the possibility that it may have been inherited.

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# GENETICS

## Periclinal Nature of the Ivy-leaf Sport in Potatoes

The use of X-ray treatment[1] can produce from periclinal chimeras of potatoes (*Solanum tuberosum* L.) a small frequency (about 5–10 per cent) of plants which have at least the two outer layers at the growing point ($L_1$ and

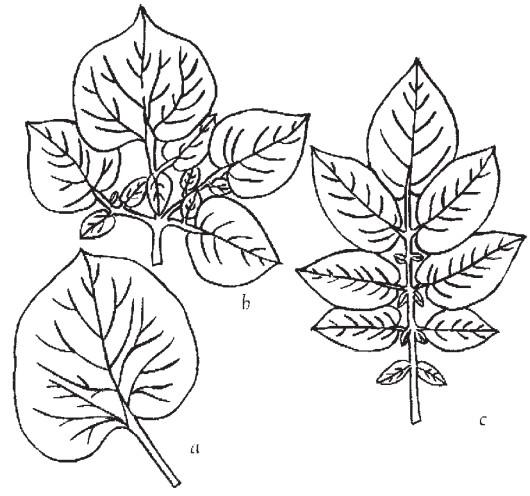


Fig. 1. *a* and *b*, Leaves of ivy-leaf 'Doon Star' sport; lower, simple, and upper, compound respectively; *c*, pinnate leaf on shoot of plant produced by X-ray treatment of the sport. (All × *c*. 1/3)