of artificial fertilizers has been found to be so effective as farmyard manure in steadying crop-yields from year to year, and there was an increase of soil nitrogen to about three times its original value when farmyard manure was used for more than sixty years, while with ammonium sulphate or sodium nitrate the soil nitrogen remained practically stationary.

In the Woburn experiments, with farmyard manure added at the rate of 105 lb. of nitrogen per acre for thirty years and 82 lb. of nitrogen per acre for twenty years since 1876, the total nitrogen present in the soil in 1876 was 0·156 per cent and in 1927 in the barley plots it was 0·151 per cent, showing a small loss of only 0·005 per cent. In this period 4,790 lb. of nitrogen were actually added to the soil, and the crop grown on the soil absorbed approximately 2,450 lb. at the rate of 49 lb. of nitrogen per year. Hence the soil lost 2,450 lb. of the added nitrogen and about 124 lb. of the soil nitrogen, that is, 51·4 lb. of nitrogen per year. In the five years 1927–32, no farmyard or other manure was added to these plots, and three crops were withdrawn; the soil nitrogen fell from 0·151 to 0·123 per cent, showing a dead loss of 114 lb. of nitrogen per acre. It appears, therefore, that the less-marked loss of soil nitrogen in presence of farmyard manure is due to the fact that the loss is actually compensated by fixation of atmospheric nitrogen in the presence of farmyard manure.

Moreover, the Woburn experiments with the dung obtained by feeding decorticated cotton cake, containing 6·6 per cent nitrogen and maize-meal, with 1·7 per cent nitrogen, did not reveal any superiority of the cake-feeding over corn-feeding in the manuring of wheat and barley.

These observations have not yet been explained; but it appears to be clear that the dung of animals having maize-meal and containing smaller amounts of initial total nitrogen fixes atmospheric nitrogen; this makes up for its deficiency of total nitrogen due to the greater percentage of carbon in the maize-meal and its oxidation.

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Chromosome Numbers of British Species of the Genus *Rorippa* Scop. (part of the Genus *Nasturtium* R.Br.)

FOUR species of the genus *Rorippa* occur as members of the British flora, one of them (*R. austriaca*) being an alien[1]. Like many British plants, however, their chromosome numbers have only been determined from European material. These counts are given in Table 1.

TABLE 1

Species	Chromosome number n	$2n$	Author
R. sylvestris (L.) Besser		32	Manton[2]
R. islandica (Oeder) Borbás	8		Jaretzky[3]
R. islandica (Oeder) Borbás	16		Scheerer[4]
R. amphibia (L.) Besser		32	Wulff[5]
R. austriaca (Crantz) Besser		16	Manton[2]

Thus the genus includes both diploid and tetraploid species, and one species, *R. islandica*, has both diploid and tetraploid forms.

In connexion with a survey of the possible relatives of diploid and tetraploid watercress (*Nasturtium officinale* and *N. uniseriatum*)[6], I have counted the chromosome numbers of British specimens of *Rorippa* species. These counts are given in Table 2.

TABLE 2

Species	Chromosome number n	$2n$	Locality
R. sylvestris	24	48	Newry, etc.
R. islandica		32	Thames bank wall, Kew
R. amphibia		16	Thames bank wall, Kew
R. austriaca		16	Waste ground by Thames (Chiswick).
× *R. erythrocaulis* Borbás		24	Thames bank wall, Kew

The discrepancy between the two counts for *R. sylvestris* have been previously discussed[7]. The specimen of *R. islandica* of which the chromosome number was counted was of the type with fruits of normal length. It would be interesting to know whether the type of this species with short fruits (var. *microcarpa*)[8] is the form with a somatic chromosome number of $2n = 16$. My count for *R. amphibia* disagrees with the previous count, and it appears that this species also includes diploid and tetraploid forms, as does *R. islandica*.

The hybrid × *R. erythrocaulis* has been determined from its morphology[9] to be *R. amphibia* × *R. islandica*. Its somatic chromosome number of 24 confirms the suggestion that it comes from the cross *R. amphibia* ($n = 8$) × *R. islandica* ($n = 16$), and it is interesting to note that both the parents still occur in its vicinity. Pollen mother-cells of this hybrid showed 7–8 bivalents and 10–8 univalents.

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Production of Structural Changes in Somatic Chromosomes of *Drosophila melanogaster*

AUERBACH[1,2,3,4] reported that the exposure of adult males to the vapours of allyl isothiocyanate increases the mutation-rate in *Drosophila melanogaster*. About a fifth of the lethals thus produced were found by Slizynska and Slizynski[5] to be connected with cytologically detectable deficiencies, and in addition, there were about 7 per cent of gross structural changes. Auerbach[2] found also that the same chemical treatment of female embryos leads to high frequency of mosaicism, which is almost solely due to somatic crossing-over.

In this connexion an experiment has been carried out using a method described by Slizynska and Slizynski[6] for the production of somatic structural changes observable in salivary gland chromosomes. Freshly laid eggs were divided into three lots. The