published, to comment upon this aspect of the problem would be purely hypothetical.

Genetical data showing the inadequacy of the chromosome aberration hypothesis to explain Series-*A* fatuoid phenomena have already been published.[3] Recently, on the basis of cytological investigations of material supplied by Prof. Huskins, Nishiyama [4] has corroborated my conclusions in respect of Series-*A* fatuoids, namely, that they arise by mutations occurring in the *C* chromosome.

The validity of the chromosome aberration hypothesis as such does not necessarily arise in these discussions; the point at issue is its applicability as an explanation of the origin and behaviour of Series-*A* fatuoids, sub-fatuoids, and semi-fatuoid types which show regular and simple Mendelian segregation and possess normal ($2n = 42$) chromosome numbers.

A theoretical case for opposite conclusions can very probably be made out, based upon the assumption of some form of chromosome duplication, but until the occurrence of the latter is substantiated, there are no convincing reasons why we should depart from the principle of complex gene mutation as first postulated by Nilsson-Ehle.[5]

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[1] Philp, J., NATURE, **129**, 796, May 28, 1932.
[2] Jones, E. T., NATURE, **129**, 617, April 23, 1932.
[3] Jones, E. T., *J. Genetics*, **23**; 1930.
[4] Nishiyama, I., *Japanese J. Genetics*, **7**; 1931.
[5] Nilsson-Ehle, H., *Hereditas*, **11**, 401; 1921.

Inheritance of Fluorescence in Rye-Grass

I AM engaged on the cytology and genetics of perennial rye-grass (*Lolium perenne* L.) and Italian rye-grass (*L. multiflorum* Lam.). It is commonly believed that many plants intermediate between these two species are a result of hybridisation, and it was the object of the work to investigate this hybridism. In the course of the investigations, the inheritance of fluorescence of roots under ultra-violet light[1] has been studied. The fluorescent character which is found in Italian rye-grass and strains of 'false' perennial but not in true perennial rye-grass offered an opportunity for rapid classification of types.

Twenty-eight parent plants were tested for fluorescence after allowing tillers to grow roots on filter paper. Sixteen of these were 'non-fluorescent' and twelve were 'fluorescent'. These plants were self-pollinated by using cellophane bags, and the work was carried out under controlled conditions in the glasshouse. The seedlings resulting from the self-pollination were examined for fluorescence. Of 1459 seedlings tested from the 'non-fluorescent' plants, all except one (probably a contamination) were 'non-fluorescent'. Nine of the 'fluorescent' plants gave 100 per cent 'fluorescent' seedlings, the total number tested from these plants being 885. The remaining three 'fluorescent' plants produced both 'fluorescent' and 'non-fluorescent' seedlings. One of these gave 191 'fluorescent' and 65 'non-fluorescent' (a ratio of 2·94 : 1), another 126 and 40 (a ratio of 3·15 : 1), and a third 8 'fluorescent' and one 'non-fluorescent'. Insufficient seeds to give a significant result were obtained from this plant. The first two results, however, appear to indicate that fluorescence depends on a single Mendelian factor, and that the two parent plants are heterozygous for this factor.

The relationship between fluorescence and some botanical characters of the plants is of interest. The flowering glumes of the 'non-fluorescent' plants were awnless and the leaves conduplicate in the bud. The flowering glumes of the plants which produced 100 per cent 'fluorescent' seedlings were awned and the leaves convolute in the bud, although, as is usual in *L. multiflorum*, the basal flowering glumes of the lower spikelets were often awnless. The three parent plants which produced both 'fluorescent' and 'non-fluorescent' seedlings differed from one another in awn characters. One was awnless, in the second there were a few flowering glumes with very short awns, while in the third some of the flowering glumes produced either short or well-developed awns. They were similar, however, in that in each case the leaves in the bud were conduplicate.

This work is being continued.

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[1] Gentner, "Prak. Bla. f. Pflanzenbau und Pflanzenschutz", 1929; Linehan and Mercer, *Sci. Proc. Roy. Dublin Soc.*, 1931; Foy, *N.Z.J. Agr.*, 1931.

A New Method for Mitochondria

I HAVE recently found that quinone (parabenzoquinone) has an intense fixative action upon mitochondria. It is best to treat tissues for an hour with quinone dissolved in saline first, and then to transfer them to any fixative one may choose. I have found this much preferable to using quinone-saline alone or mixing it with any other fixative. The quinone may be at any concentration from 0·05 per cent for delicate tissues (such as kidney) to 0·5 per cent for liver. Plenty of fluid should be used. The saline should be roughly isotonic with the blood of the animal used, but if the quinone is used at 0·5 per cent, it is as well to make the saline 0·1 per cent less concentrated than usual, so as to avoid having the fluid hypertonic. Surprisingly enough, Carnoy's fluid is one of the best fixatives to use after quinone. I have used the formula without chloroform.

It is remarkable that one hour's treatment with such a weak solution as 0·05 per cent of quinone should render the mitochondria insoluble in the fixative which is regarded as the most destructive of them. Bouin's fluid is also excellent after quinone-saline. One may stain with iron hæmatoxylin, or by Altmann's or Benda's method. In using Altmann's method, a convenient differentiator is one part of absolute alcohol saturated with picric acid to seven parts of 30 per cent alcohol, used cold. If one uses Carnoy's fluid and follows with Altmann's method, one may fix one's tissue in the morning and have finished slides of mitochondria in the evening. No special mordantage is required for subsequent staining in Benda's alizarin and crystal violet, which gives good results after Carnoy's fluid.

The technique has been worked out mostly with the liver of the newt and the liver and kidney of the guinea-pig. No advantage has been found in substituting other quinones for parabenzoquinone.

Full details of the technique, with an account of the research leading up to it, will be published in the *Quarterly Journal of Microscopical Science*.

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