

some) at the late prophase of the maturation divisions in the spermatocytes. These are well shown in iron-acetocarmine preparations. The writer found that the six largest bivalents showed 23 cases with one node to 19 with two nodes. The smallest five bivalents had only one node each. At each node it was obvious, as had been previously demonstrated by others, that one chromatid from each homologue seemed to pass to the other side, while the other chromatid remained on the same side.

In *Hyacinthus orientalis*, where there are eight bivalents at the reduction metaphase, the four largest showed one or two nodes, while the four small ones had only one node. Out of 116 examples of the four largest bivalents, 62 had one node and 54 had two



Fig. 1.—Bivalent chromosomes in *Hyacinthus*.

nodes. Examination of these nodes showed that one chromatid appeared to pass obliquely across to the other side, while the other chromatid remained on the same side. Also, as in *Chortophaga*, the planes of the V or ring-shaped portions on different sides of a node were more or less at right angles.

The best working hypothesis for these cases seems to be segmental interchange between the chromosomes (crossing-over between genes). Crossing-over is known to occur in some monocotyledons, such as *Zea*. In chromosome I of *Drosophila*, if we calculate the number of nodes which should be seen in the prophases of the maturation divisions of the ova, to correspond with the determined proportions of no, single, and double crossing-over determined by breeding experiments, we find that the results are not far from those given by *Chortophaga* and *Hyacinthus*.

Fig. 1 shows three bivalents of *Hyacinthus*, the central one having two nodes and the other two one node.

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#### Magnetic Double Refraction.

THE action of a strong magnetic field in causing a liquid to become birefringent for light rays transverse to the field was first observed by Cotton and Mouton in nitrobenzene, and was later detected and measured by the same authors in many other carbon compounds of the aromatic series and in some inorganic liquids (*Annales de Physique*, 28, 209-243; 1913). In a recent paper (C. V. Raman and K. S. Krishnan, *Proc. Roy. Soc., A*, Jan. 1927) it has been shown that the large value of the Cotton-Mouton constant in aromatic compounds indicates that the benzene ring, which is known from observations on light-scattering to be optically anisotropic, has also a very pronounced magnetic anisotropy. Observations on light-scattering in carbon compounds of the aliphatic series indicate that the molecules of these substances are optically anisotropic to an extent which, though smaller than in the aromatic series, is yet very marked (K. S. Krishnan, *Phil. Mag.*, 50, 697; 1925). It accordingly seemed very probable that the compounds of the aliphatic series should also exhibit magnetic

anisotropy and give a measurable double-refraction in strong magnetic fields.

As Cotton and Mouton did not in their papers report any observable magnetic double refraction in carbon compounds of the aliphatic series except in some isolated cases, we decided to make a systematic re-examination of the subject. A large electromagnet capable of giving 25,000 gauss in a column of liquid 32 cm. long was available to us. By securing the most favourable optical conditions and taking careful precautions to eliminate any disturbance from the Faraday effect or suspended colloidal particles, we have succeeded in definitely establishing the existence of magnetic birefringence in every one of the liquids examined, the list including many hydrocarbons, alcohols, ethers, and esters belonging to the aliphatic series. New pole-pieces are now in course of construction for our electromagnet, with which we hope to reach a field of 40,000 gauss in a liquid column of the same length and to make an extended series of quantitative measurements of magnetic birefringence. There is good reason to believe that such measurements will prove of value in elucidating problems of molecular structure.

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#### An Important Virus Disease of *Lilium longiflorum* and its Varieties.

IN the course of work on the diseases of lilies I have shown by means of controlled experiments that an important disease occurring on *Lilium longiflorum* Thunberg and its well-known varieties of commerce, 'Lilium giganteum' (*L. longiflorum* var. *takesima* Duchartre), 'Lilium formosum' (*L. longiflorum* var. *insulare* Hort. apud Mallett), and 'Lilium Harrisii' (*L. longiflorum* var. *eximium* Baker), belongs to the group of filterable virus diseases and is transmitted by the aphid *Aphis lili* Takahashi (very close to *A. gossypii* Glov.). The identification of the insect was made by Dr. F. V. Theobald.

The symptoms are a marked downward curling and slightly chlorotic appearance of the leaves. Affected bulbs produce only a flattened rosette, hence the name 'yellow flat' given to the disease.

The disease occurs commonly among bulbs of oriental origin. Rigid government inspection has reduced its incidence in the Bermuda lily fields of 'Lilium Harrisii' to a practically negligible quantity.

Details will be published in due course.

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#### Salaries of University Lecturers.

PROF. H. E. ARMSTRONG'S recent reference in *NATURE* (Mar. 19, p. 432) to the salary attached to a lectureship in organic chemistry in the University of Sydney may create misapprehension unless it is pointed out that the general scale for lecturers in all subjects at Sydney is £350, rising by yearly increments of £40 to a maximum of £700 per annum. There is little doubt that the conditions for lecturers at Sydney are distinctly more favourable than those prevailing in many, if not most, of the universities of Great Britain.

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