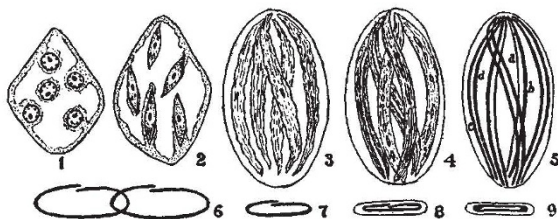


characters are transmitted by specific particles of chromatin incorporated in the chromosomes at definite sites.

Very briefly to summarise the observations, we have, in the accompanying figure, 1, lobule of spermatids; 2, nuclei enlarge into spindle-shaped bodies; 3, spindles elongate into weakly basophil cords with sinuous outlines and showing the vanishing karyosome; 4, spermatid cords or straps become vacuolated in a longitudinal line and ultimately divide into two; 5, the members of each pair of cords condense into threads of intensely basophil chromatin; 6, a



pair of threads separating from each other and becoming spirally curved; 7, shrinkage of spermatozoon; 8, 9, formation of capsule. Thus, a lobule produces about twice as many spermatozoa as spermatids.

The longitudinal splitting of the cords is far from being a regular process; sometimes it is not in the mid-axis, and one member of the pair (5) is thin (*a*) and the other thick (*b*), while at other times the two members may be more or less similar to each other (*c*, *d*). In this connexion it must be added that in the genus *Saitis* there is a strong evidence that three, or even more, spermatid threads may arise from a single spermatid strap. All the chromatin threads, whether relatively thick or thin, appear to form perfectly normal spermatozoa.

From the very exacting nature of the chromosome hypothesis, with the enigmatical genes arranged in serial order along the chromosomes, it would seem to be essential that the spermatid cords should split with mathematical accuracy into identical halves, but the processes outlined above are altogether inconsistent with any great precision in the subdivision of the chromatin substance in the formation of the spermatozoa.

A detailed account of the observations will be published shortly, and in the meantime, granting their validity, it would be very interesting to hear how it is proposed to reconcile them with the current chromosome hypothesis of heredity.

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Silicon Transformer Steel Residue.

In his book "Applied X-Rays" Dr. G. L. Clark publishes some very interesting photographs showing the connexion between the magnetic hysteresis loss and the grain size of 4 per cent silicon steels. He takes the grain size to be inversely proportional to the number of spots produced under given conditions on a Laue photograph, and quotes a formula connecting this number with the magnetic hysteresis loss of the steel. The fewer the Laue spots, the less is the hysteresis loss.

Dr. G. Shearer, Mr. C. Wainwright, and myself some time ago obtained Laue photographs of samples of 4 per cent silicon transformer steels of different hysteresis loss which showed little difference in the number of diffraction spots, and what difference was to be observed tended to be contradictory to the

above generalisation. Further, no appreciable trace of orientation, which might have accounted for the anomaly, was found.

Whilst the grain size must always be large for a steel of small hysteresis loss, it would appear that for closer comparison of magnetic value the straightforward interpretation of the Laue photographs can be misleading, and that other factors must be involved.

Such a factor is suggested by the following preliminary account of an observation made in the course of a recent X-ray study of steel residues, obtained by the method of Arnold and Read, in which the iron is removed by electrolytic dissolution. The residues of six samples of silicon transformer steels, which, examined by the Clark method, gave anomalous indications of hysteresis loss, were investigated. Three of these steels were good in that their hysteresis losses, measured at a maximum flux density of 10,000 lines per sq. cm. were only 1.19, 1.16, and 1.19 watts per kilogram respectively. The other three were relatively bad with hysteresis losses of 1.78, 1.90, and 2.28 watts per kilogram respectively. It was found that the residues of the bad steels gave a spectrum which was purely that of cementite, Fe_3C . On the other hand, two of the good steel residues were amorphous, showing no diffraction pattern whatsoever, and the third gave only a few weak lines of some substance which was not cementite.

It is suggested, then, that a difference like this will correspond to a difference in the value of the steel. I have already shown that the state of subdivision of the carbide residues of steels is generally the same as the state of subdivision of the carbides when in the steel itself, so that the differences in aggregation of the particles observed by means of the X-ray photographs of the silicon steel residues will correspond to similar differences among the carbides whilst in the steel. It is hoped soon to pursue the matter further.

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Transmission of Potato Leaf-Roll.

In the course of experiments on potato leaf-roll in progress at this College, proof has been found that *Myzus circumflexus* (Buckton) is an efficient transmitter of this disease. There is also some evidence that another aphid, *Macrosiphum gei* (Koch), can transmit leaf-roll feebly, but a definite opinion must await the completion of notes on the appearance of the progeny of infested plants.

Myzus circumflexus, with us, has proved to be almost as reliable a transmitter as *Myzus persicae* (Sulz.), but there is a curious lag in the development of symptoms when the former aphid is used, so that plants infected with leaf-roll by means of *M. circumflexus* will still be in the 'primary' stage when those infected by *M. persicae* show rolling in lower as well as upper leaves. Apart from the difference in the rate at which symptoms develop in infested plants, there is little to choose between the two species in their efficiency as transmitters.

The discovery is of interest in several directions. It corrects the growing tendency amongst plant-virus workers to regard the relation of *M. persicae* to leaf-roll transmission as specific and unique. At the same time, the difference in the response of a plant according to the species of aphid by which the inoculum is carried will tend to concentrate attention on the precise rôle played by the insect in virus transmission. I have been unable to find any record of the occurrence of *M. circumflexus* on field potatoes in this country, so that, even if it does occasionally visit the