such as a string galvanometer, is used. It has also been well established that the temperature coefficient of fine platinum wires is abnormal, and may vary appreciably during experiments if there is any possibility of movement of the wire, so that it is very unsafe to attempt to make temperature measurements by the use of any formula supposed to express the variation of resistance of the wire with temperature. Another apparently unsuspected source of error is involved in the use of a gas of good thermal conductivity, such as hydrogen or helium, in the calibration of apparatus in which heat transfer is involved, and the use of this apparatus for gases such as oxygen or nitrogen, the thermal conductivities of which are much less than that of the gas used in the calibration experiments.

Much greater confidence could be felt in results if experimenters would bear these simple and well established facts in mind.

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[1] Garner and McKie, *Trans. Faraday Soc.*, **22**, 461; 1926. Bull, Hall, and Garner, *J. Chem. Soc.*, 837; 1931. H. S. Taylor, Kistiakowsky, and Flodsdorf, *J. Amer. Chem. Soc.*, **49**, 2200; 1927. H. S. Taylor and Kistiakowsky, *Z. physikal. Chem.*, **125**, 341; 1927. Schwab and Brennecke, *ibid.*, **16** B, 19; 1932.

Hydrogen Peroxide and the Kolbe Reaction

A "RESEARCH Item" in NATURE of March 19 (p. 442) has directed our attention to a paper by Matsuda,[1] in which it is shown that hydrogen peroxide is formed in the course of the anodic oxidation of acetate solutions. The amount of peroxide obtained is correlated with the simultaneous production of ethane by the Kolbe reaction. As a result of a comprehensive study of electrolytic oxidation reactions, now in progress, we have independently arrived at the conclusion that hydrogen peroxide plays a very important rôle in certain anodic processes, although our point of view concerning the origin and influence of the peroxide is fundamentally different from that of Matsuda. It is hoped very shortly to publish the results of some of the experiments on which our views are based.

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[1] *Bull. Chem. Soc. Japan*, **7**, 18; 1932.

Constitution of the *X*-Chromosome in *Drosophila obscura*

THE recent discovery of *Px*, the allelomorph of the "Pointed" mutation in *Drosophila obscura*, *m*1, a sex-linked intensifier, and *m*2, an autosomal modifier, have enabled me to analyse the constitution and possible origin of the V-shaped *X*-chromosome in *Drosophila obscura*.

The great similarity in the morphological expression of Pointed in *D. obscura* and Beaded in *D. melanogaster*, and the similarity of their behaviour in the presence of modifying factors, proves their homology. The difference between the physiological effect of Pointed and Beaded, consisting in the fact that Beaded is lethal when homozygous and Pointed is not, is presumably due to their position in different genic systems.

The comparison of other corresponding genes in *D. obscura* and *D. melanogaster* such as yellow, white and eosin, shows that these genes do not exhibit their effects in the same degree in the two species, presumably because of the different genic systems in which they are placed.

If Pointed and Beaded are homologous, then we may explain their different position in the linkage groups by the translocation of the chromosome segment bearing the gene for these mutations. This assumption receives strong support from the comparative study of the chromosome complements in the related *Drosophila* species. The *X*-chromosome in *melanogaster*, *virilis*, and *simulans* is rod-shaped; in *obscura* and *willistoni* it is V-shaped and large as compared with the autosomes. Lancefield[1] (1922) and Metz[2] (1922) suggested that one arm of the V-shaped *X*-chromosome in these latter species corresponded to the rod-shaped *X* in *D. melanogaster*. If this is the case, it is reasonable to assume that the other arm of the V-shaped *X*-chromosome corresponds to a segment of one of the autosomes in the species with a rod-shaped *X*. This kind of condition would have been brought about by translocation, either of part of an original autosome to the *X*-chromosome or of a part of the *X*-chromosome with an autosome.

Comparative studies of the sex-linked mutations in these different species show that many identical genes, for example, the closely linked yellow-scute-white-Notch series, are transferred from the extreme left end of the *X*-chromosome in *D. melanogaster* to the middle region of the *X*-chromosome in *obscura* and *willistoni*. Recent investigations of the behaviour of Pointed and Pointed-*x*, located in the 'extra' arm of the V-shaped *X*-chromosome, indicate their homology with Beaded in the third autosome of *D. melanogaster*. It is therefore suggested that part of the *X*, namely, the segment to the left of the yellow locus in *D. obscura*, corresponds to part of the third chromosome of *D. melanogaster*.

Further evidence of such a chromosome rearrangement is given by the study of the hybrids of 'Race *A*' and 'Race *B*' in *D. obscura*[1,3] (Lancefield 1930, Koller 1932). The hybrid females are partially fertile and exhibit great reduction in crossing-over at both ends of the *X*-chromosome; the males are sterile. I have shown[3] (1932) that only the ends of the *X*-chromosome differ in the two races (*A* and *B*) of *D. obscura*. This can be explained on the assumption that the translocated segment of the *X*'s has a different origin in the two races, and that these non-homologous portions prevent the chromosomes from pairing and crossing-over.

These facts support the hypothesis regarding the constitution of the *X*-chromosome in *D. obscura*.

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London, S.W.19,
March 10.

[1] Lancefield, D. E. Linkage relation of the sex-linked characters in *Drosophila obscura*. *Genetics*, **7**, 335-384; 1922. A genetic study of crosses of two races or physiological species of *Drosophila obscura*. *Z. ind. Abst. Vererbung.*, **52**, 2/3, 287-317; 1929.
[2] Lancefield, R., and Metz, Ch. The sex-linked group of mutant characters in *Drosophila willistoni*. *Amer. Natur.*, **56**, 211-241; 1922.
[3] Koller, P. Ch. The relation of fertility factors to crossing over in the *Drosophila obscura* hybrid. *Z. ind. Abst. Vererbung.*, **60**, 2/3, 137-151; 1932.

Mutation in Rice

THE incidence of mutation has not been infrequently reported in the common rice plant, *Oryza sativa* L. Most of the reported mutations in this crop plant are without any agronomic merit.

Matsuura,[1] in his monograph on plant genetics, mentions most of the mutations reported in rice. According to him, a case of dominant dwarf mutation originating from a common recessive rice was reported by Sugimoto (1923). Akemine (1925) and Nagai (1926)