

of the New World cultivated group, was later provided by my demonstration<sup>2</sup> that a gene could be transferred from an Asiatic to a New World cotton by repeated back-crossing.

Genetical confirmation is now available regarding the existence in the thirteen-chromosome North American species of genes which have alleles in the cultivated cottons with  $n=26$  chromosomes. Hybrids between *G. barbadense* L. (Sea Island) and the wild species *G. aridum*, *G. Armourianum* and *G. trilobum* were found to be weakly fertile on the male side. After making two successive back-crosses of the hybrids with *barbadense* or *hirsutum*, fertility was completely restored, and the following transferences of genes from the wild to the cultivated species were effected:

1. Normal ( $C^r$ ) from *aridum* to *barbadense* ( $c^r$ ).
2. Normal ( $C^r$ ) from *Armourianum* to *barbadense*. ( $c^r$ ).
3. Normal ( $C^r$ ) from *trilobum* to *barbadense* ( $c^r$ ).
4. ( $S^E$ ) Petal Spot from *aridum* to *barbadense* and *hirsutum*.
5. ( $S^AR$ ) Petal Spot from *Armourianum* to *barbadense*.

The slight impairment of dominance of the crinkled heterozygotes of *aridum* and *trilobum* which persists in the second back-cross of *barbadense* crinkled,

suggests that the normal alleles of these species may not be identical with the *barbadense* normal allele, but may differ in dominance potency. If they prove to differ in this way, they will resemble the weaker normal alleles at this locus established to be present in upland cotton (*G. hirsutum* L.).

The genes for petal spot of *aridum* and *Armourianum* respectively appear to be different from the petal spot genes of either *barbadense* or *hirsutum*, but their relationship with the spot genes of these species has not yet been elucidated.

To sum up: it is now established on genetical as well as cytological grounds that the New World cultivated cottons are amphidiploid in origin and that thirteen-chromosome species from both Asia and North America have played a part in their formation. My previous hypothesis<sup>2</sup> that the New World group originated in late Cretaceous or early Tertiary time in a former Polynesian land mass also receives further support.

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<sup>1</sup> *Ann. Bot.*, 47, 227 (1933). *J. Genet.*, 28, 407 (1934). *Emp. Cotton Grow. Corp.*, Rept. 2nd Cong., 46 (1934). *J. Genet.*, 30, 447. *J. Agric. Res.*, 51, 1047.

<sup>2</sup> *J. Genetics*, 30, 465.

### Points from Foregoing Letters

Dr. G. W. Brindley and P. Ridley discuss the two kinds of asymmetry found in certain metals having a hexagonal structure—symmetry of the lattice vibrations and asymmetry of the atoms. It is pointed out that in ruthenium the atomic asymmetry is of a different type from that found in zinc and cadmium.

A new equilibrium diagram for the system iron-carbon has been prepared by Dr. I. Iitaka. The author claims that it eliminates the difficulties of the 'single' diagram by assuming  $Fe_3C$  to decompose on solidifying or on separating from austenite, and overcomes those of the 'double' diagram by omitting super-cooling.

Photographs showing the scattering of lithium ions by sodium vapour and by a red-hot nickel target (at grazing angle) are submitted by A. G. Emslie, who also supplies an explanation which, he considers, establishes the wave nature of the lithium ions.

By photographing AIO blue-green and CN violet bands simultaneously in the same arc, gross intensities of both have been measured by Dr. N. R. Tawde and S. A. Trivedi by the methods of photographic spectral photometry. Vibration temperatures have been calculated and compared with the available rotation temperature data on these molecules.

Intense cooling of copper and of iron anticathodes changes the character of the X-rays which they emit. Prof. K. Prosad and A. T. Maitra find that the intensity of the copper  $L_\alpha$  line is decreased at liquid oxygen temperature. The  $L$ -lines shift relatively to one another, and there are indications of changes in width.

Prof. M. Dole suggests a formula for calculating the surface tension of strong electrolytes which gives calculated values in satisfactory agreement with those found experimentally for potassium chloride solutions, including the observed decrease in surface tension at low concentrations. The formula is obtained by postulating a small number of surface

locations where negative ions can be adsorbed from the interior of the solution with a large diminution of potential energy.

Two methods for measuring the viscosity of mono-molecular films are described by Prof. W. D. Harkins and R. J. Myers: one, in which the film flows through a transverse slit in a barrier confining the film, and another method depending on the vibration of a ring the inner circumference of which is in contact with a pure surface while the outer is in contact with the film. A table giving viscosities of fatty acid films shows that the viscosity increases rapidly with the length of the molecule.

Prof. F. Urban and Dr. M. D. Eaton describe several reactions between lactoflavin, cytochrome *c* and the "complex porphyrin" of Coulter (prepared from diphtheria toxin). The authors infer that the porphyrin ring of cytochrome *c* can oxidize the compounds in Coulter's complex (which are responsible for the absorption bands at 574  $m\mu$  and 563  $m\mu$ ) only when the iron atom of cytochrome *c* is in the divalent (reduced) state, and not when it is in the trivalent state.

The oxidation of the male sex hormone, dehydroandrosterone, by osmic acid to produce the *cis* form of androstanone-triol, by addition of two hydroxyl groups, is described by Prof. M. Ushakov and A. Lutenberg.

Dr. W. A. Waters finds that when benzene-diazonium chloride decomposes in acetone in presence of chalk, benzene and chloroacetone are formed, and if metals such as lead, antimony or mercury are present, these are attacked. The reactions are explained by supposing that free neutral radicals are liberated as the diazo compound decomposes.

From the products of oxidation of  $\beta$ -boswellinic acid (one of the principal constituents of frankincense) Dr. J. C. E. Simpson concludes that the compound is a  $\beta$ -hydroxy-acid.