grow very rapidly and give a very large amount of green mass when grown in suitable environmental conditions.

Considering all these facts, I think that our allopolyploid *N. rustica—N. glauca*, as well as the back-crosses and other hybrids between *N. rustica* and *N. glauca* that are studied now in the All-Union Tobacco Institute by N. I. Zhukov might answer the demands of the industry in a short time if the plant-breeding work with these plants is put on a somewhat larger scale.

I shall also mention here that most of the allopolyploid segregates are from perennial plants like *N. glauca*, and the annual parent, *N. rustica*. In autumn 1938, when the temperature dropped at night to —5° C., the leaves of *N. glauca* were severely injured, but the plants were not killed. The same reaction occurred with most of the allopolyploid segregates. A few segregates were, however, less injured than *N. glauca* plant. A single segregate was not affected by —5° C. All *N. rustica* plants were killed by a temperature of —3° C. Amphidiploids *N. rustica* × *tabacum* and *N. glauca* × *Langsdorffii* behaved in a similar way. Autotetraploid plants of *Solanum Lycopersicum* were also more resistant to cold than their diploid forms. Preliminary observations show that a series of polyploid plants are more cold-resistant than their original diploids. This new character permits the polyploid forms to occupy more nordic areas than their original diploids. It seems very probable that polyploidy will help the plant breeders to move some of the existing cultivated varieties and even some forest plants towards more nordic regions by doubling their chromosome numbers.

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[1] Kostoff, D., *Bull. Appl. Genet. Plant. Breed.*, 1935, Ser. II, No. 9, 153–62.

[2] Kostoff, D., *Compt. Rend. Acad. Sci., Moscow*, 1936, **10**, 239–42.

[3] Kostoff, D., *Journ. Genet.*, 1938 (in the press).

[4] Ternovsky, M., Khumura, M., and Zhukov, N. I., *Compt. Rend. Acad. Sci., Moscow*, 1937, **7**, No. 1/2.

OBITUARY

Ravindra Nath Misra (1912–38)

ON the 9th of December 1938, a tragic accident removed from our midst Ravindra Nath Misra, Research Fellow in Botany in the University of Lucknow. Mr. Misra died of burns received by the bursting on him of a flask of alcohol which caught fire while he was trying to light a spirit lamp. He passed away very young, when he was hardly twenty-six and was beginning to carve out for himself a brilliant career in botanical research. Only a few days before his death he was awarded the *Ruchi Ram Sahni Prize* for 1938 for the best research work in Botany.

Ravindra Nath Misra

Mr. Misra became Research Scholar on obtaining his M.Sc. degree in 1936. By himself and in collaboration with Dr. S. K. Pande, he carried out investigations on the liver-worts of this country. He was collaborating with Dr. Pande in the production of a series of monographs—"Studies in Indian Hepaticæ".

Mr. Misra had a tremendous love for mountaineering. He organised several expeditions from the Botany Department of the Lucknow University to far off places in the Himalayas and brought back with him valuable plant collections.

It is difficult to believe that a promising career like his could be cut short so cruelly and with such gasping suddenness. As a man, he had rare qualities: frank, straightforward and untouched by mannerisms. His is a loss to Indian Botany, not only on account of what he could achieve during his butterfly existence, but also because of what he would have achieved if he had been spared. Among his friends he has left a void which cannot easily be filled.

RAJENDRA VARMA SITHOLEY.

REVIEWS

Theoretical Hydrodynamics. By L. M. Milne-Thomson. (MacMillan, Ltd., London), 1938. Pp. 552 + xxii. Price 31*sh.* 6*d.*

Text-books on hydrodynamics are none too common and the appearance of a new one is to be heartily welcomed. The object of the present book, as stated in the Preface, is "to give a thorough, clear and methodical introductory exposition of the mathematical theory of fluid motion which will be useful in applications to both hydrodynamics and aerodynamics". In reviewing a book of this kind one is led naturally to compare it with the only other English text-book on the subject, Ramsey's well-known *Hydromechanics*, Part II, which has served successive generations of students for over quarter of a century. The range covered by both the books is very nearly the same. Apart from differences in the treatment of individual topics, the main point of difference consists in the consistent use of vector methods, which was deliberately avoided in the older text-book. In the present book, after an introductory chapter devoted to the Bernoulli equation and its applications, vectors are introduced and explained in the second chapter and the leading formulæ of vector analysis are developed. The treatment of two-dimensional problems requires the use of the theory of analytic functions and conformal transformations, to which, therefore, is devoted a separate chapter. Next follow seven chapters devoted to the application of conformal mapping to a variety of problems of two-dimensional fluid motion covering standard topics such as sources, sinks and images, flow past cylinders, the theorems of Blasius and of Kutta-Joukowski, the impact of a stream on a lamina and also a few others. Of these latter, special mention may be made of the account of the elementary theory of the aerofoil (which gets a chapter for itself), the extended form of Blasius' theorem, various cases of impinging jets and an account of Levi-Civita's general method of determining the flow past an obstacle, including a derivation of Levi-Civita's elegant expressions for the drag and lift. The remaining chapters devoted to vortex motion, waves, the motion of solids in liquids, etc., need no separate mention. The concluding chapter on viscosity includes brief discussions of Prandtl's hypothesis of the boundary layer and Oseen's linearised equations for slow motions. The value of the book is considerably enhanced by the relatively large number of diagrams illustrating the disposition of the streamlines in the various problems and more especially by the beautiful and striking photographs illustrating the formation of vortices in the motion of an aerofoil and of the Karman trail. Following the best English tradition, large collections of examples are given at the ends of the chapters and should be of invaluable aid both to the student seeking to become a past-master in the tricks of the trade as well as to the examiner hunting for fresh traps to catch the inexpert and the unwary. Of course, the collections naturally include also many problems of greater intrinsic importance. A very short historical sketch, in the form of a list of the leading names (with dates) associated with the progress of the subject, is given at the beginning of the book. It is not a little surprising to find that no mention is here made of Lord Kelvin, whose remarkable researches have contributed so largely to the development of the subject.

As already stated, vector methods are used throughout. It is largely a matter of individual taste what notation one prefers and it is no doubt true that the vector notation contributes to economy in the writing of formulæ, but the author's claim that it "simplifies and illumines" the whole subject seems to the reviewer to be a little exaggerated. Vector analysis is more adapted to give neat general formulæ than to the working out of individual problems; indeed the author has himself remarked (p. 39): "as soon as a problem becomes sufficiently particularised to yield numerical results, it will be found that recourse to co-ordinates will be advisable." The trouble is that in hydrodynamics, we are nearly always interested in such particular problems and relatively rarely in general theory, unlike in electro-magnetic theory for instance, where we have a large body of general theory to which the vector method contributes both elegance and simplicity.

This review began with a comparison of the present text-book with another and it