

When corrections for the controls are properly applied the relation between crossing-over and temperature is seen to conform to a simple U curve (Fig. 1).

This mistake came to my notice in 1927, but having no first-hand interest I was content to communicate the error to colleagues more specifically interested in genetics of *Drosophila*. It has recently, however, been brought to my notice that the mistake is still a source of trouble. Besides having been reproduced in a number of text-books, the supposed maximum at 13° is of some importance in correlating these data with observations on the effect of temperature both on contraction of muscles (Plough¹) and on chiasma frequency in *Acrididae* (White²).

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¹ H. H. Plough, "The Effect of Temperature on Crossing-over in *Drosophila*", *J. Expt. Zool.*, **24**, 147-209 (1917).
² M. J. D. White, "The Influence of Temperature on Chiasma Frequency", *J. Genetics*, **23**, 203-215 (1934).

Tetraploidy and Hymenoptera

A COMMUNICATION¹ from B. R. Speicher has directed attention to certain genetical data which do not seem to favour my suggestion² that the 'pre-conjugation' phenomena observed in the gametogenesis of the honey bee and of *Cynips kollari* may be interpreted in terms of derived tetraploidy. Now while I admit that the findings of the experiments of Dzierzon, Michailoff and Newell, as quoted in Mr. Speicher's letter, do suggest a simple condition of female diploidy and male haploidy, the facts are by no means fatal to a theory of derived tetraploidy-diploidy based on cytological observations. It has recently been shown that tetraploid hybrids do not necessarily exhibit independent segregation of chromosomes in gametogenesis and also that gametic viability in these forms is often differential, and only those gametes carrying one complete genom or the other are functional. It is thus possible for an organism to behave *genetically* as a diploid while in its gametogenesis traces of a different cytological condition may be shown. Genetical methods, therefore, may not be infallible criteria of evolution.

In this connexion, it should be observed that, in my original communication, the phenomena under discussion were regarded as vestiges in the evolutionary sense. At the same time it may be noted that there is probably conflict in the use of the terms tetraploidy, diploidy and haploidy, as employed by geneticists and by cytologists.

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¹ B. R. Speicher, *NATURE*, **138**, 78 (1936).
² F. Greenshields, *NATURE*, **137**, 662 (1936).

Refractive Indexes of Ordinary and Heavy Ammonia

MEASUREMENTS of the refractive index of light and heavy ammonia were performed in continuation of former investigations¹. The interferometer and the experimental arrangements were the same as before with the exception that this time one tube was made

of glass and the other of quartz. A discharge tube containing hydrogen, a mercury lamp and a sodium lamp served as sources of light. The spectral lines in question were separated out by means of a monochromator from Winkel-Zeiss.

NH₃ (or ND₃) were produced by adding ordinary water drop by drop (or heavy water, 99 per cent, from Norsk Hydro-Elektrisk Kvælstofaktieselskab) to magnesium nitride. The drying and purification of the gas were performed in a manner similar to that described in the paper dealing with ordinary and heavy hydrogen selenide. The pressure of the gas was between 25 cm. and 28 cm. of mercury, the temperatures between 15° and 20° C. The reduction of the refractive index to the normal conditions and the state of an ideal gas was performed by using the coefficient of dilatation at constant pressure:

$$\alpha_{15,H} = 0.00366 + 0.000182 \frac{H}{76}$$

For the quantity φ which gives the deviation from Boyle's law the value 0.015 was used from the "International Critical Tables".

The results of the measurements are to be found in the accompanying table.

$(n_0 \div 1) \times 10^6$.

| $\lambda \times 10^8$ cm. | 6562.9 | 5893 | 5461 | 4916 | 4358 |
|---------------------------|--------|-------|-------|-------|-------|
| NH ₃ | 373.6 | 375.7 | 377.7 | 381.4 | 386.3 |
| ND ₃ | 369.4 | 372.6 | 374.1 | 378.2 | 383.3 |
| Δ | 4.2 | 3.1 | 3.6 | 3.2 | 3.0 |

The refractive indexes of NH₃ are in good agreement with the measurements of C. Cuthbertson³, while the measurements of S. Friberg³ and E. W. Cheney⁴ are perceptibly higher.

The method used by the measurements of NH₃ and ND₃ being completely consistent, the differences found between n_0, NH_3 and n_0, ND_3 are to be regarded as real in all circumstances.

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¹ O. E. Frivold und O. Hassel, "Brechungsindex u. Molrefraktion des SeH₂ für die D₂-linie", *Z. phys. Chemie*, **B**, **27**, 316 (1934).

² O. E. Frivold, O. Hassel und T. Skjultad, "Brechungsexponent u. Molrefraktion des Selenwasserstoffs u. des Selendeuterids", *Phys. Z.*, **37**, 134 (1936).

³ Loria, "Lichtbrechung in Gasen".

⁴ *Z. Phys.*, **41**, 378 (1927).

⁵ *Phys. Rev.*, **20**, 292 (1927).

Range of Action of Surface Forces

THE letter by Bowden and Bastow, published in *NATURE*¹ (as well as their communication to the Royal Society²), not only may give, but already has given, rise to the view that the rigidity of thin water films observed by myself has not been confirmed by the above authors³.

A thorough discussion and comparison of Bowden and Bastow's data with mine renders it manifest, however, that there is no contradiction between our respective results. Indeed, it has been shown by my data that the rigidity of water is