

represent both fundamental and combination frequencies. It is interesting to point out in this connexion that combination frequencies calculated in this way, when not in agreement with the values of previous workers, can still be built up either entirely with their values or jointly with our own.

The importance of this new technique for the study of Raman spectra lies in two directions. First, with the use of sunlight the time of exposure is considerably cut down, so that very faint lines can also be brought out; secondly, small shifts of faint Raman lines, which generally are masked by the strong incident spectrum, can be calculated.

Since the minute traces of potassium permanganate used to produce the absorption bands in the various substances do not seem to affect their modes of vibration concerned in the Raman effect, their action and that of didymium salts in glass may very appropriately be referred to as 'optically catalytic'. Workers on the Raman spectra of glass have also noted previously that small quantities of metallic oxides present in different varieties of glass do not alter their Raman lines.

There are other points connected with the method which throw an interesting light on the nature of the relations observed. For example, the work of Merton² and Taylor³ on the absorption bands of

solutions of potassium permanganate in different solvents shows that the differences of wave numbers between successive bands, for any solution, are not really constant, although their mean value is usually taken to represent the frequency of the MnO_4 ion as affected by the particular medium of the solvent. On the view taken in this paper, these discrepancies between the differences of wave numbers of the successive absorption bands are real, and are due to the fact that the actual positions of the absorption bands are conditioned by the appearance of Raman lines representing either fundamental or certain combination frequencies of the solvent medium, at certain definite wave-lengths constituting the fluorescent spectra of the substance under examination.

No results are given here as they would occupy too much space. They will be published with full experimental details elsewhere shortly.

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¹ *Z. Phys.*, **93**, 324 (1935).

² *Trans. Chem. Soc.*, **99**, 637 (1911).

³ "Molecular Spectra and Molecular Structure", Faraday Soc. Disc. No. 790, pp. 860-63 (1929).

Points from Foregoing Letters

THE first quantitative measurements of the abundances of the elements in the planetary nebulae are derived by Mr. T. L. Page from the intensities of 'forbidden' lines in the spectra of these objects. An explanation is sought for the surprisingly high abundance of neon and argon relative to oxygen, as compared with their proportions in the composition of the earth.

A variety of radioactive bromine has been detected, by Dr. C. H. Johnson and F. T. Hamblin, which possesses a half-period of some twenty-four hours. The authors consider that it is either an activated bromine nucleus or a new isotope.

The absorption of neutrons (belonging to Fermi's group C) by boron and by cadmium at ordinary and at low temperatures has been determined by a group of investigators from the Ukrainian Physico-Technical Institute. They conclude that the absorption curve of cadmium has a selective character. The results for boron do not agree with the 'inverse velocity law', but that may be due to a deviation of the silver detector from the $1/v$ relation.

G. L. Mack writes that he has failed to confirm the increase of ascorbic acid (vitamin C) when cabbage is boiled, as reported by Guha and Pal. The amount, he says, is no greater than that obtained by alcohol extraction or after treatment with hydrogen sulphide. The author concludes that practically all the apparent increase is due to the inactivation of an oxidizing enzyme, and not to the hydrolysis of an ascorbic acid ester.

E. Baldwin and Dr. D. M. Needham find that the electrical tissue of the ray, *Torpedo*, contains enzymes analogous to those found in the muscular tissue of that fish, and also in the jaw-muscle of the sea-urchin, *Sphaerechinus granularis*. They deduce that both muscle and electrical organ derive their energy from the same chemical sources and through the same chemical mechanism.

In a stock of fruit-flies with very rough eye surface, accompanied by an inversion in the X-chromosome (originally induced by X-rays), Dr. H. Gruneberg has observed the appearance of animals with normal eye surface and without chromosome inversion. This is claimed to be the first clearly demonstrated case of complete reversal of a gene rearrangement.

A. Levan reports that crosses between two strains of chive (*Allium Schœnoprasum*) containing 16 and 24 chromosomes respectively gave offspring containing mostly 16 chromosomes when the mother plant contained 16, while when the mother plant contained 24, the chromosome number in the offspring varied between 16 and 24 (except 20), the most frequent being 17.

Dr. M. Schlesinger finds that his pure bacteriophage preparations are intensively stained by Feulgen's reagent, whilst bacteria and bacterial debris treated in the same way remain unstained.

Graphs showing the relation between the Clausius Mosotti function, P (proportional to the polarizability of the molecule) and the density, the pressure and the change in kinetic energy of the internal motion of the molecules, ΔK , are given by Prof. A. Michels, C. Michels-Veraart and A. Bijl, from calculations based upon recent data for carbon dioxide. They find a nearly linear relation between the polarizability and the pressure, also between polarizability and ΔK .

Previous work of Prof. K. Prosad and D. K. Bhattacharya on didymium glass, of which the wave-lengths of absorption bands were taken as the incident exciting lines for the study of the Raman spectra of glass with very satisfactory results, has now been extended to a number of organic liquids and to nitric acid solution. Absorption bands in these liquids were produced by adding traces of potassium permanganate.