Determination of the Atomic Parameters in Anthraquinone Crystals

THE space group of anthraquinone crystals was found previously[1] to be D_{2h}^{13} $Pmmn$. The estimates of intensities of reflections from a large number of planes published have been utilized for the determination of atomic parameters. The best agreement has been found with the following orientations of the anthraquinone molecules. One molecule is placed with its centre having the parameters $x/a = 0·25$, $y/b = 0·142$ and $z/c = 0·056$. Starting with the molecule placed with its plane parallel to the ab face, the correct position is obtained by rotating it by 1° about the z-axis, by 9° about the y-axis and by 30° about the x-axis. The two oxygen atoms are inclined to the carbon skeleton on the two sides but unsymmetrically. The positions and orientations of the other seven molecules in the unit cell are obtained from the equivalent positions corresponding to the space group D_{2h}^{13} $Pmmn$. The carbon skeleton has a plane structure with true hexagons and C—C distance the same as that in anthracene[2]. This is in very striking contrast to benzoquinone, in which the benzene ring is found to be deformed[3]. The complete details of the parameters and the comparison between the calculated and estimated intensities will be published elsewhere.

In conclusion, I wish to express my sincere thanks to Dr. K. Banerjee for his kind interest in the work.

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[1] Banerjee, K., and Guha, B. C., *Ind. J. Phys.*, **9**, 287 (1934).
[2] Banerjee, K., *Ind. J. Phys.*, **4**, 541 (1930). Robertson, J. M., *Proc. Roy. Soc.*, A, **140**, 79 (1933).
[3] Robertson, J. M., *Proc. Roy. Soc.*, A, **150**, 106 (1935).

Points from Foregoing Letters

DETAILS concerning a natural bridge, formed by drifting materials, across the Nile below the Folar rapids (to which imperfect reference was made by Emil Ludwig in "Life Story of a River") are given by E. J. Wayland. Dr. H. E. Hurst supplies further information concerning the way in which such bridges come into existence, and suggests that pilots of the Imperial Airways who pass near this particular one during their flights might be asked to collaborate by keeping notes of its change with time.

A table of radioactive isotopes of oxygen, copper, gallium, bromine, silver, indium and antimony, the production of which can only be ascribed to the loss, and not to the capture, of neutrons, is given by W. Y. Chang, M. Goldhaber and R. Sagane. The loss of neutrons was brought about by irradiating with gamma rays of high energy produced by bombardment of lithium, beryllium or boron with protons, or by means of neutrons obtained from the same elements bombarded with deuterons.

J. Rotblat has obtained absorption curves of radium C γ-rays in lead, copper and aluminium, measuring the intensity of the γ-rays by the activity of a silver foil exposed to neutrons from a sample of beryllium irradiated by the rays. The curves are exponential and correspond to the mean quantum energy of $1·96 \times 10^6$ eV., showing, in agreement with recent mass data, that only the hardest groups of these γ-rays are capable of extracting neutrons from beryllium nuclei. The divergent results obtained by Gentner are attributed to the back-scattering of slow neutrons.

When beryllium-containing mica is bombarded with slow (25 kV.) deuterons, neutrons are formed which induce radioactivity in silver. These neutrons, according to further experiments by E. Bertl, Prof. R. Furth, F. Oboril and Dr. K. Sitte, arise from the beryllium-deuterium nuclear reaction. The authors describe other experiments intended to determine the energy of the active neutrons, but these have proved, as yet, indecisive. They also give a curve showing the neutrons produced by deuterons of varying energy (0–35 kV.)

The combs of bantam and Leghorn capons can be made to grow, according to Dr. A. S. Parkes, by direct application of an alcohol-acetone-ether extract of pig ovaries, which indicates an androgenic activity of ovarian extracts due apparently to the presence of substances of the androsterone-testosterone group. The author refers to previous experiments which show that the adrenal glands also produce male sex hormones.

Results showing that small amounts of ascorbic acid (vitamin C) can inactivate infective doses of vaccinia virus inoculated into a rabbit testicle are given by I. J. Kligler and H. Bernkopf. Glutathione has a similar effect, but to a lesser degree, and the authors suggest that the action depends upon the oxido-reducing properties of ascorbic acid and glutathione.

Dr. S. Williams describes preliminary experiments on *Selaginella Martensii* and *S. Lobbii* which show that the presence or absence of heteroauxin is an effective factor in determining whether an angle-meristem shall develop as a rhizophore or as a leafy shoot.

A simple method of observing root growth under normal conditions is described by Dr. G. H. Bates. Glass tubes closed at the lower end are let into the soil in holes bored to a slightly larger diameter, and the roots are viewed at intervals by means of an arrangement of a mirror and an electric bulb.

A thermograph showing the falling of air temperature during the solar eclipse on December 14, 1936, at Wellington, New Zealand, is submitted by R. C. Hayes.

The current distribution in a long transmitting aerial, according to Prof. L. S. Palmer and Mr. K. G. Gillard, varies sinusoidally, with current nodes every half wave-length along the two parts of the aerial which are above and below the point of energy input, and the length of one part may be such that the current in the other part is either zero or a maximum. With a long receiving aerial, current nodes occur every *whole* wave-length measured from both ends of the aerial.

Prof. B. C. Guha has determined the atomic parameters of anthraquinone crystals. He finds that the carbon skeleton has a plane structure with C—C distances the same as in anthracene ; and that the C—O bonds are inclined unsymmetrically to the carbon plane.