the heat of combination with liquid deuterium oxide is given by the equation :

$$Q = 4.576 \cdot \frac{T_2 - T_1}{T_2 T_1} \log \frac{p_2 | \pi_2}{p_1 | \pi_1},$$

where π_1 and π_2 are the vapour pressures of deuterium oxide.

With $T_1 = 298$, $\pi_1 = 22.65$ mm.; and $T_2 = 303$, $\pi_2 = 27.934$ mm.², this gives $Q = 4,437$ gm.cal. This is the value for 2 molecules of liquid D_2O if the reaction is

The corresponding value for ordinary water, $2H_2O$, is 5,560 gm.cal. As would be expected, the value for heavy water is appreciably lower.

Further experiments on this and similar systems are in progress.

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June 5.

¹ NATURE, 137, 707 (1936).

² G. N. Lewis and R. T. Macdonald, *J. Amer. Chem. Soc.*, 55, 3057 (1933); NATURE, 132, 248 (1933).

The Scanning Principle in Television

IN his recent discourse at the Royal Institution¹, Sir Richard Gregory refers to some of the earliest suggestions for systems of television. As perhaps being of some historical interest, I should like to note with regard to scanning—a fundamental principle—that Mr. Llewelyn B. Atkinson in a note, appended to a letter on "Seeing to a Distance by Electricity" in the *Telegraphic Journal and Electrical Review* (Dec. 13, 1889, p. 683), says :

"The idea of using an integrating apparatus for producing the whole image from one element in the time during which the image will remain on the retina was first, I believe, published in the *English Mechanic* about 1881 or 1882, and was then, as far as publication goes, new."

The communication thus referred to was entitled "The Telectroscope, or Seeing by Electricity", and appeared under my initials in the *English Mechanic*, April 21, 1882, p. 151.

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¹ NATURE, 137, 981 (1936).

Points from Foregoing Letters

PROF. J. E. LENNARD-JONES and A. F. Devonshire suggest an explanation of the anomalous reflection and diffraction of helium atoms by lithium fluoride, observed by Frisch and Stern. They show that atoms incident on a solid surface may, under certain conditions, be diffracted *along* and not away from the surface, a process they call 'selective adsorption'. From the observations, they are able to deduce information about the energy levels of adsorbed helium atoms on a lithium fluoride crystal.

The Raman spectrum of the light scattered by sulphur dioxide as a gas, as a liquid and in aqueous solution has been determined by Prof. H. Gerding and W. J. Nijveld. They find a close agreement in the position of the sharper lines of the spectrum of the gas and of the solution, and conclude that the state of the molecules in solution is comparable with that in the free gas.

Prof. E. C. G. Stueckelberg calculates the probability of gamma radiation being formed by the combination of the positive electrons (liberated in certain radioactive changes) with the negative electrons in the outer shell of the atom. He concludes that every emission of positive electrons should be accompanied by weak gamma radiation, but finds that in only one out of 137 cases of decay is gamma radiation emitted.

Diagrams showing the distribution of nuclear spins in atoms of odd mass are submitted by Dr. S. Tolansky. The preponderance of spin of value $\frac{1}{2}$ in the case of nuclei with an odd neutron indicates, according to Tolansky, that neutron spin and orbital moments tend to oppose each other. The author also discusses the relation between nuclear spin and mass defect in atoms of even mass.

E. Pickup directs attention to discrepancies in the calculations of lattice spacings of films containing two crystalline substances, when using the electron

diffraction method, as compared with values obtained from X-ray diffraction. These discrepancies and anomalies may invalidate the results of the electron-wave method for measuring atomic constants.

In order to throw light on the mechanism of the reflection of radio waves in the upper atmosphere, C. Th. F. van der Wyck considers the propagation of electromagnetic waves in a vertical direction, when the electric properties of the medium vary in the same direction, and a magnetic field is present making a definite angle with the vertical. He arrives at an expression for the dielectric constant and the conductivity constant of the medium.

Further observations and sketches of the 'line' seen on the surface of slowly moving water when it encounters an obstacle are supplied by Prof. H. Stansfield. He has noticed the phenomenon in a drinking trough, in front of a raft in a pond, where water from a river with a clean surface passes under floating material accumulated at the bars of a grid, etc.

The root of the African plant *Tephrosia macropoda* has a toxic action upon the bean louse *Aphis rumicis*. Dr. J. T. Martin attributes this insecticidal action to the presence of the fish-poisoning compound rotenone and to allied substances which he has isolated from the roots. He believes that a variety of the plant sufficiently rich in these substances could be obtained to be of value in the control of local insect pests.

Dr. S. Smith and G. M. Timmis write that ergosine, a dextrorotatory alkaloid which they recently obtained from ergot, changes on treatment with acids to a levorotatory isomer, which they propose to call ergosinine.

The appearance in large numbers of sand-worms belonging to the genus *Saccocirrus* at Departure Bay, Western Canada, is recorded by E. Berkeley.