absorption curves support the view that the amino-group reacts, but only to a small extent.

The absorption spectra of the azo-derivatives of various intact proteins (casein, paracasein, α-casein, gelatin, pepsin, fibroin) and their acid hydrolysates have been examined. The extinctions at 363 mμ were found to increase with amino-nitrogen. A considerable amount of useful information about the constitution of a protein and the accessibility of its coupling groups can be obtained from a single absorption spectrum of this type, which is very much more sensitive than the ordinary ultra-violet absorption curve.

In applying the reaction to the determination of amino-groups in proteins and their degradation products, the main difficulty involves assessing the contribution of the imidazole, phenolic and imino-groups to the absorption at 363 mμ. However, in various possible applications of a comparative nature, such as following the course of hydrolysis, deamination, the action of a proteolytic enzyme or of peptide synthesis, such interference may not be relevant. The principal advantage appears to lie in the simplicity and rapidity with which the determinations can be made. The high values given by glycine in the Van Slyke manometric method of determining amino-nitrogen and the uncertainties in the interpretation of formol titrations emphasize the desirability of developing other methods of determining free amino-groups. A full account of these studies will be published elsewhere.

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Half-value Periods for the Decay of Aluminium-26, Aluminium-25 and Nitrogen-13

The decay of the positron-emitters aluminium-26, aluminium-25 and nitrogen-13 was measured using a nine-channel scaler, which recorded the counts received from a Geiger–Müller tube in nine successive equal periods. These periods were 2 sec. each for the two aluminium isotopes and 200 sec. each for the nitrogen isotope. The isotopes were produced by resonant capture of protons by magnesium-25, magnesium-24 and carbon-12, respectively. The proton beam was switched off when counting began, and the switching from one channel to the next was done by an electronic timer, accurate to one part in a thousand.

The half-value periods were calculated from these results using the rigorous treatment given by Peierls[1] and were as follows: aluminium-26, 6·68 ± 0·11 sec.; aluminium-25, 7·62 ± 0·13 sec.; and nitrogen-13, 602·9 ± 1·9 sec. The half-life measurement for nitrogen-13 is in fair agreement with those of 10·2 ± 0·1 min. and 10·1 min. obtained by Cook *et al.*[2] and Siegbahn and Slätis[3], respectively. Earlier published measurements ranging from 9·93 to 11·0 min. have been listed by Ward[4].

There has been some confusion previously in the measurement of the half-value periods of aluminium-26 and -25, due to the use of unseparated magnesium targets[5] and the fact that the two half-lives are of comparable value. In the present work separated magnesium-25 and -24 targets were used. The magnesium-24 targets were bombarded with protons of energy 418 keV. and the magnesium-25 targets with protons of energy 392 keV. Protons of these energies had previously been found to produce resonances on magnesium-24 and -25 isotopes respectively. It was also found that the yields from magnesium-24 for 392-keV. protons, and of magnesium-25 for 418-keV. protons, were each negligible.

Bradner and Gow[6] have observed half-lives of 6·3 and 7·3 sec. after bombarding separated magnesium-26 and -25 targets respectively with high-energy protons from a linear accelerator. These half-lives are ascribed to aluminium-26 and -25 produced by (p,n) reactions at this high energy, and are in each case somewhat lower than those obtained in the present work. The half-life of aluminium-26 has also been determined by Perlman and Friedlander[7], who obtained a value of 7·0 sec., and Allan and Wilkinson[8], who obtained a value of 7·0 ± 0·2 sec. Wäffler and Hirzel[9] obtained a value of 7·2 sec. and Katz and Cameron[10] one of 6·5 ± 0·1 sec.

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Heat Transfer from Water to Ice by Thermal Convection

Heat transfer may be described by the coefficient α occurring in Newton's law of cooling, the other factors being the surface and the temperature difference. For bodies determined by one dimension, for example, a sphere of diameter D in an infinite fluid of conductivity λ, it is better to use the dimensionless Nusselt number $Nu = \alpha D/\lambda$.

By submerging a sphere of ice in water of temperature $T\infty$ (° C.) and studying the gradual decrease of its diameter or its change of weight in the course of time, we have found the experimental points, as shown in the graph. As the phenomenon is evidently related to the anomalous expansion of water, we take the coefficient of expansion to be a linear function of temperature $\beta = p + 2qT$, with $p = -64{\cdot}3 \times 10^{-6}$, $q = +8{\cdot}51 \times 10^{-6}$, and T being measured in deg. C. For the sake of brevity, we here omit a number of