are represented. This limiting value of 4 is less than might have been expected, and this fact suggests that the contribution of the side-chains to any reflexion is small, probably due to their large thermal motion.

In addition, the theory predicts (as can also be shown by a simpler approach) that meridional reflexions can occur only on layer lines which involve Bessel functions of order zero ; that is, at reciprocal spacings of multiples of $1/1 \cdot 5$ A.$^{-1}$. This had previously been pointed out by Perutz[3] when reporting the strong meridional $1 \cdot 5$-A. reflexion.

We have therefore no doubt that the structure of poly-γ-methyl-L-glutamate is based on a helix of eighteen residues in five turns and 27 A., or a helix which approximates to this very closely. As the structure proposed by Pauling and Corey[2] satisfies these conditions and is also stereochemically very satisfactory, it seems to us highly probable that it is correct.

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Determination of the Atomic Mass of Phosphorus by a Nuclear Reaction Method

THE Q-value of the reaction $^{31}P(d,n)^{32}S$ has been determined by the photographic plate method and used to calculate the mass of phosphorus-31. This reaction is suitable for the purpose, since an accurate redetermination of the mass of sulphur-32 ($31 \cdot 982218 \pm 0 \cdot 000025$ m.u.) has been recently reported by Nier[1] using a double-focusing mass-spectrometer.

A thin (60-keV.) phosphorus target deposited on a thick gold backing was bombarded by deuterons of incident energy $8 \cdot 13 \pm 0 \cdot 05$ MeV. The neutrons emitted were detected by using photographic emulsion 600 μ thick. From measurements of the ranges and orientations of the recoil protons in plates exposed at two angles ($0°$ and $40°$) of emission, the energy spectra of the emitted neutrons were obtained. The Q-values calculated for the long-range neutron group at the two angles of observation agree well, and give $Q = 6 \cdot 81 \pm 0 \cdot 08$ MeV. Using the mass of neutron and deuteron as given by Bainbridge[2], we found the mass of phosphorus-31 to be $30 \cdot 98375 \pm 0 \cdot 00009$ m.u., which agrees, within the experimental errors, with the value of $30 \cdot 9843 \pm 0 \cdot 0005$ m.u.

obtained by Aston[3] from the mass-spectroscopic measurements of the mass difference of the CF—P doublet.

Further confirmation is obtained from the work of Peck[4] on the reaction $^{30}Si(d,n)^{31}P$ and that of Strait, Van Patter, Buechner and Sperduto[5] on the reaction $^{31}P(d,\alpha)^{28}Si$. The Q-values of these reactions are $4 \cdot 56 \pm 0 \cdot 13$ MeV. and $8 \cdot 17 \pm 0 \cdot 02$ MeV. respectively. Using the mass of silicon-29 and silicon-30 as reported by Duckworth, Preston and Woodcock[6], and the mass of the alpha-particle as given by Strait et al.[5], the mass of phosphorus-31 is found to be $30 \cdot 98378 \pm 0 \cdot 00021$ m.u. and $30 \cdot 98359 \pm 0 \cdot 00014$ m.u respectively. Both these values are in agreement with our result of $30 \cdot 98375 \pm 0 \cdot 00009$ m.u.

Also, from the present determination of the mass of phosphorus-31, the masses of phosphorus-30 and -32 have been calculated from the Q-values of the reactions $^{31}P(\gamma,n)^{30}P$ and $^{31}P(d,p)^{32}P$, as reported by McElhinney, Hanson, Becker, Duffield and Diven[7] and by Strait et al.[5] respectively. The mass of phosphorus-30 is found to be $29 \cdot 98808 \pm 0 \cdot 00022$ m.u. and that of phosphorus-32 is $31 \cdot 98423 \pm 0 \cdot 00009$ m.u.

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Configuration of the Uranyl Ion

X-RAY crystallographic data[1,2] indicate that in solid uranyl salts and metallic uranates the UO_2^{++} ion is linear, and if this configuration is retained, only one frequency corresponding to the symmetric ν_1 vibration should appear in the Raman spectra of uranyl salt solutions. Actual observations[3-5], however, have shown at least two fundamental frequencies, at about 860 cm.$^{-1}$ and 200 cm.$^{-1}$, which have been assigned to the symmetric ν_1 and bending ν_2 vibrations respectively. Satyanarayana[4] found also a weak line at 909 cm.$^{-1}$, corresponding to the asymmetric ν_3 vibration. These results suggest that the UO_2^{++} ion in solution is bent, a conclusion supported by the infra-red spectral measurements, in which the ν_1 frequency, forbidden for a linear model, has always been observed. Both Crandall[5] and Satyanarayana have suggested that the ion might be linear in solution, local forces being responsible for the appearance of forbidden frequencies in the spectra. Hitherto, no experimental evidence has been put forward in support of this contention.

Assuming a linear ion, and taking the uranyl fluoride structure as a guide, the uranyl ion in solution is probably hexahydrated, the six water molecules forming a puckered ring around the equator of the ion as the F$^-$ ions do in the UO_2F_2 crystal lattice[2]. The angle between the OH_2 and the UO_2 groups will be about $73°$. A complexing anion