isomer is plainly right-handed, as judged by optical rotatory dispersion, and the other two, with inverted Cotton effects, are left-handed.

Another finely balanced conformational situation occurs in poly-L-lysine and its homologues. Polylysine, as all the world knows, is a random coil in water at neutral *p*H, but becomes α-helical at high *p*H, when the side chains are deprotonated. Polyornithine, which has a shorter side chain by one carbon, also undergoes such a transition, but achieves only partial helicity. Hatano and Yoneyama (*ibid*., 1392) have prepared the next lower member of the series, poly-γ-diaminobutyric acid, and this exhibits scarcely any helix at all at any *p*H, by optical rotation, circular dichroism and infrared spectrum. Evidently the formation of the polylysine helix depends on the long side chain (a curious result, in that polyalanine, for example, is helical when solubilized in water). When the ϵ-amino groups are blocked with carbobenzoxy functions, the polymers are insoluble in water, but in suitable solvents all are helical, and indeed it is the diaminobutyric acid helix that is most resistant to a helix-breaking solvent. Interside chain associations of differing strengths are postulated to account for the results.

A favourite polymer, the object of much experimentation over the years, is poly-L-proline. It has no internal hydrogen bonds, and exists in a left-handed and a right-handed form, the transition between them involving *cis–trans* isomerization about the peptide bond, which is a slow process. Mattice and Mandelkern (*Biochemistry*, **9**, 1049; 1970) have confirmed the surmise that the random coil also exists, and can be elicited by addition of calcium chloride to the aqueous solution. A theoretical analysis of the solvent-dependent transition between the helical forms, I and II, using the lattice formulation of Schwarz, is given by Gaser *et al*. (*Biopolymers*, **9**, 329; 1970) and the agreement with experiment is a telling demonstration of the capacity of modern theory to cope qualitatively and even quantitatively with conformational transitions in homopolymers.

RADIATION PROTECTION

Reducing the Rads

from a Correspondent

THE problem of protecting workers and the public from any harmful effects of ionizing radiation occupied members of the international radiation protection association at their congress in Brighton on May 3–8.

The congress president, Dr W. G. Marley (UKAEA Health and Safety Branch), said that this was an important and continuing task in the application of radiation for the benefit of mankind. The benefits of avoiding future detriment set against the marginal costs of reducing radiation doses led Mr H. J. Dunster (UKAEA Health and Safety Branch) to define a "justifiable dose". If the cost of dose reductions exceeded a few pounds per man rad he considered that the "justifiable dose" would not be much less than the "supportable dose" which was based only on comparison with radiation and other risks. Several other contributors used the man rad cost—the cost of reducing a man's dose by one rad as an aid to decision making between, say, alternative protection schemes or courses of radiotherapy. The International Commission on Radiological Protection (ICRP) fielded a strong team for a round table discussion on the basis and application of their recommendations. Dr E. E. Pochin said that although the accuracy with which risks were known was only approximate, rules and regulations based on ICRP recommendations were precise. Others referred to the biological insignificance of an individual receiving twice the maximum permissible dose, as recommended by ICRP, in one year.

The ICRP listed fruitful areas for research: on the shape of the dose–effect curve at low doses compared with the ICRP linear model and on the risk of taking particles of high specific activity into the body. There was no doubt that ICRP must continue to provide basic guidance on dose limits.

Dr R. H. Mole (MRC Radiobiology Unit) reported that increasing knowledge and understanding showed that none of the working hypotheses is true in more than a rather limited sense. He said that some of the new knowledge came from continuing the follow up of work on well-established groups of irradiated persons, but there was no more evidence than before of measurable effects from radiation exposure of the order of natural background. Dr W. L. Russell (Oak Ridge National Laboratory) reported mechanisms of genetic recovery which ranged from the repopulation of the spermatogonia in the testis to the more direct recovery arising from the repair of mutational and premutational material at the molecular level.

The natural background still attracts considerable attention although situations studied often involve the exposure of only a very few people. Several contributors, notably Dr M Suomela (Institute of Radiation Physics, Helsinki), reported radiation exposure following the ingestion of water rich in radon-222. There is encouragement for studies of the metabolism of plutonium in the commercial prospects of nuclear power from this element. Suggestions for the treatment of plutonium contamination of the lungs included the use of chelating agents in aerosol form as a convenient long term treatment.

Dr G. M. Obaturov and others from the Ministry of Physics and Power Engineering, USSR, compared the absorbed dose in a human body for neutrons incident from different directions with Snyder and Neufeld's unidirectional data, and concluded that a large correction factor was necessary. A method of applying this correction was suggested by Dr J. Neufeld (Oak Ridge National Laboratory), who proposed a quality index defined as the ratio of the maximum dose equivalent in a phantom (DE_{max}) and a reference dose (D_R) which could be the absorbed dose in soft tissue in an unperturbed radiation field. The quality index would then be used together with the reference dose to predict dose equivalent.

The potential release of fission products to the atmosphere due to reactor accidents requires constant vigilance in the metabolic pathways to man. Nuclides usually considered to be most important are iodine, strontium, caesium and ruthenium. Most speakers agreed that iodine was likely to be the dominant cause of radiation exposure (unless the reactor system is designed to control iodine release). Dr R. Scott Russell (ARC Letcombe Laboratory) said that in most Western countries the critical pathway is still by way of milk from cows and that strontium-89 is likely to be more significant than strontium-90 in the early stages of a release.