

respect to other vitamins, such as vitamin A and vitamin D?" Yew at least is firmly in Pauling's camp and it will be interesting to see what response there is to his provocations.

## MOLECULAR BEAMS

### Scattering Branches Out

from a Correspondent

MEMBERS of what was described by Professor D. R. Herschbach (Harvard University) as the "lunatic fringe", who first reported molecular beam scattering results at the Faraday Discussion on inelastic collisions in 1962, were in a confident mood at the Chemical Society Faraday Division general discussion on molecular beam scattering held in University College, London, from April 16-18. This confidence stemmed from new techniques which make it possible to study some of the problems in chemical reaction and energy transfer which arise in the main stream of chemistry. These developments include the liaison, if not yet the marriage union, of spectroscopic and scattering methods, as in the laser-induced beam fluorescence experiments described by Dr R. N. Zare (Columbia University), as well as the reports from many laboratories describing experiments with a broad range of atomic and molecular species. This latter feature was in particular contrast to the position at the last Faraday Discussion on this topic in 1967 when beam experiments had to include at least one alkali atom because of detection difficulties with other species.

The measurement of intermolecular forces by beam methods was one of the topics discussed at the conference; interest here is now centring on the forces between energetically excited or otherwise chemically labile species. Unfortunately there are few quantum computations of such potential surfaces with which these measurements may be compared.

Professor J. P. Toennies (Max-Planck Institute, Göttingen) described measurements of the angular distribution of rotationally excited  $H_2$  resulting from collisions with fast  $Li^+$  ions. The distribution of rotational states was resolved by measuring the associated change in the velocity of the  $Li^+$  ion using a time-of-flight method. This is a new achievement for, until recently, techniques were insufficiently sensitive to permit any information about the angular distribution to be obtained. Interestingly, the results presented were not in accord with the rather precise quantum calculations available for this system.

Most of the meeting was, however, concerned with the use of molecular beam methods to explore the dynamics

of chemical reaction. Professor D. R. Herschbach (Harvard University) discussed the results of experiments involving four participating atoms such as  $CsBr + ICl \rightarrow CsCl + IBr$ . Depending on the precise reactants, the angular and energy distributions found for the product varied from those expected from a long-lived collision complex decaying with a statistical distribution of the energy into the product molecules, to those characteristic of a specific short-lived interaction. The transition between these two types of behaviour correlate with the shape of the complex predicted by molecular orbital theory. Reaction by way of a long-lived complex was also reported for systems such as  $F + C_2H_4 \rightarrow C_2H_3F + H$  (Dr Y. T. Lee, University of Chicago). These were especially interesting because the energy distribution did not follow that expected statistically from the RRKM model for unimolecular reactions. These results suggest that the assumption inherent in this model, that chemical reaction is slow by comparison with a rapid internal randomization of the reaction energy in the complex, may be incorrect. This possibility was discussed by several speakers and the suggested use of information theory methods to characterize the degree of non-statistical behaviour found favour. Further light on this problem came from Monte Carlo trajectory calculations extended over the life of four-atom complexes (Na Br KCl); for this strongly coupled system, the statistical approximation seemed fairly good.

The reaction between alkali metal atoms and alkyl halides, a molecular beam "chestnut", continued to be of interest to theoreticians and experimentalists alike, the latter still comfort-

ably in the lead. The quantity of information available concerning these reactions is now so large that it is extremely difficult to find potential surfaces capable of reproducing, using Monte Carlo calculations, all the observed features. A successful surface would now be almost uniquely constrained.

The conference concluded with a summary contribution from Dr J. C. Polanyi (University of Toronto), who related present achievements and future prospects to the pioneering work in the 1930s of his father, M. Polanyi, who was present in the audience.

## TECHNIQUES

### Archaeological Dating

from a Correspondent

SUBJECTS of interest to both archaeologists and scientists were discussed at the meeting on archaeometry and archaeological prospection in the Clarendon Laboratory, University of Oxford, from March 29 to 31.

Descriptions of new developments in instrumentation for geophysical survey based on electromagnetic and resistivity principles were described emphasizing the greater sensitivity and general portability now attainable. Methods of rapidly displaying the results of the measurements for archaeological evaluation were explained by Drs E. T. Hall (University of Oxford) and I. Scollar (Bonn Museum) who showed the desirability of presenting data as punched paper tape suitable for use with a computer programmed for pattern recognition and/or image enhancement.

It was natural, at Oxford, that much

## Messenger RNA Activity in $\beta$ -Thalassaemia

HUMAN  $\beta$ -thalassaemia has been characterized by decreased or absent synthesis of the  $\beta$ -globin chain in erythroid cells and the defect has been localized at the polysome level. In *Nature New Biology* next Wednesday (May 23) Dow *et al.* report their studies of the activity in a cell free system of mRNA isolated from polysomes or whole cell lysates of the blood of patients exhibiting different levels of  $\beta$ -chain synthesis.

Using a Krebs II ascites cell free system with rabbit reticulocyte ribosomal initiation factors, Dow *et al.* demonstrate that addition of 10S RNA isolated from polysomes of non-thalassaemic cells led to the synthesis of both  $\alpha$ - and  $\beta$ -chains in relatively equal amounts ( $\alpha/\beta$  ratio of 0.79-1.0). This compared well with the  $\alpha/\beta$  ratio of whole blood cells. When, however, 10S RNA from polysomes of  $\beta$ -thalas-

saemic blood was tested in the cell free system, a marked decrease in  $\beta$ -chain synthesis occurred ( $\alpha/\beta$  ratios 1.8-3.6). Again the ratios were similar to those obtained with whole cells. The results were the same when 10S RNA was extracted from whole cell lysates rather than polysomes. Because the ratio of  $\alpha/\beta$  chain synthesis is the same whether extracted RNA or whole cells are used, it is probable that mRNA, if present in  $\beta$ -thalassaemic cells, is either decreased or abnormal.

Previous workers who arrived at this same conclusion used a pool of cells of two  $\beta$ -thalassaemic patients or the cells of siblings or an individual patient as the source of mRNA. Dow *et al.* now confirm this result in a number of unrelated patients exhibiting a range of  $\beta$ -chain synthesis including no  $\beta$ -chain formation.