REEFS

Old and Modern

from a Correspondent

UNDER the auspices of the Palaeontological Society, a well attended meeting on the palaeoecology of reefs was held at the University of Edinburgh on September 9, being one of the events held to celebrate the centenary of the Department of Geology.

Drs D. J. Bellamy (University of Durham) and E. Drew (University of St Andrews) described their work on the zonation of hermatypic corals off the reef front at Aldabra including reference to a major system of channels which are explicable only on the basis that they represent the effect of erosion during aerial exposure of a preglacial formation. Dr P. Garrett (University of Leeds) transferred attention to the reefs of Bermuda and emphasized the complexity of a reef mass formed primarily by coral skeletons, the overlapping growth of which produces internal cavities encrusted with algal and animal growths.

Dr J. Taylor (British Museum (Natural History)) drew attention to the high diversity of shallow water macro-invertebrates in coral reef areas. Reefs present a unique diversity of habitats—a consequence of the resistance their formation presents to the forces of the sea—ranging from exposed reef faces to sheltered sandy and mangrove areas. Computers are now used to obtain objective comparisons of habitats of molluscan species.

Dr C. J. R. Braithwaite (University of Dundee) was concerned with the need for criteria for the recognition of fossil reefs and drew attention to those features of modern reefs which are particularly significant, notably the platform with its superimposed organisms. The fact that recent reefs have grown upon Pleistocene formations presents a major difficulty when comparing these with fossil reefs. Dr B. R. Rosen (University of Newcastle upon Tyne) considered ecological stratification in coralline environments in terms of hard and soft non-living substrates for life on which corals are very differently adapted.

Dr T. P. Scoffin (University of Edinburgh) described conditions of growth in the Wenlock reefs where the most vigorous growth occurs on what was the seaward fringe; colonies are preserved in the condition of growth indicating calm conditions. Dr C. T. Scrutton (University of Newcastle upon Tyne) spoke about the effect of the environment on fossil colonies and indicated that rugose corals were generally less well adapted for life in rough. "high energy", environments than were the probably poriferan stromatoporoids. Drs F. M. Broadhurst and I. M. Simpson followed by Dr J. Miller (all University of Manchester) were concerned with descriptions of limestones of coral reef origin. In the Castleton area of Derbyshire the limestones show marked faunal changes marginally, and the limestones present in knolls around the Clitheroe area, described by Dr Muller, are associated with dense crinoid thickets. Dr D. B. Smith (Institute of Geological Sciences, Leeds) dealt with the well known Upper Permian barrier reefs of the Guadalupe Mounts and compared these with smaller but similar reefs in Durham.

The meeting concluded with a lively discussion on many of the matters raised by the various speakers; a satisfactory definition of the term "reef" proved hard to find. Finally, Sir Maurice Yonge drew attention to some recent work on living corals which is providing some interpretation of the factors controlling the distribution and ecology of reef-building (hermatypic) corals.

FLUID MECHANICS

Pneumatic Conveying

from a Correspondent

THE behaviour of gas-suspended solid particles flowing in pipes is of much interest in modern powder processing industries. For many years this topic of research has also been a satisfying bone for many academic fluid dynamicists to chew on. For the first time a conference has been devoted entirely to pneumatic conveying. The meeting was held at Churchill College, Cambridge, from September 6 to 8, and was sponsored by the British Hydromechanics Research Association in conjunction with the City University of London.

On the applications side, systems for conveying some rather troublesome materials were described; asbestos slurry was the theme of a contribution by Dr D. C.-H. Cheng *et al.* (Warren Spring Laboratory, Stevenage); on-site con-

Messenger Transport *in vitro*

MESSENGER RNAs transcribed in the nuclei of eukaryotic cells have to be transported to the cytoplasm to be translated and there is increasing circumstantial evidence that this transport process is an important regulatory step in the expression of genes. The process is, however, extremely difficult to analyse not least because of the heterogeneity of nuclear RNAs and the biochemical complexity of cell cytoplasm and these factors prompted Raskas, as he describes in next Wednesday's *Nature New Biology*, to attempt to set up an *in vitro* system for the analysis of RNA transport across the nuclear envelope. He elected to use cultivated human KB cells infected with adenovirus type 2 as a starting material because some 18 hours after infection most RNA being made in the cell nucleus is adenovirus specific, and he now claims that, in the presence of an ATP generating system, nuclei isolated from such cells release RNA by a mechanism similar to that occurring *in vivo*.

The release of RNA by isolated nuclei is strictly dependent upon a continuous supply of ATP, without which less than 10 per cent of the RNA leaves the nuclei, and once released the RNA remains precipitable by TCA and presumably, therefore, undegraded. Analysis of the released RNA by centrifugation in sucrose gradients reveals two broad peaks, one sedimenting at about 35S and the other at about 10S. When the salt concentration is increased, the 10S RNA behaves as before but the 35S peak disappears because, Raskas suggests, it consists of ribonucleoprotein complexes which are dissociated at high salt concentrations. The buoyant density of this material is consistent with this suggestion.

Both 10S and 35S components contain viral RNA which will hybridize with adenovirus DNA, and an analysis of the total RNA released by the isolated nuclei in 20 min on polyacrylamide gels reveals RNA molecules long enough to be adenovirus messengers, in addition to low molecular weight RNAs, and the 6S RNA synthesized at late times during adenovirus 2 infections. Raskas suggests that the release of these RNAs *in vitro* is relevant to transport *in vivo* for several reasons. First, the release is specific; significant amounts of nuclear protein and DNA are not released. Second, the size of the released RNAs suggests that a maturation by cleavage goes on inside the isolated nuclei as it does *in vivo*. Third, the release *in vitro* cannot, of course, depend on the synthesis of new ribosomes and studies of intact infected cells indicate that movement of adenovirus RNA into the cytoplasm does not depend on ribosome synthesis. Finally, much of the adenovirus RNA released *in vitro* is in the form of a ribonucleoprotein and the same seems to be true of transport *in vivo*.

There is therefore every reason to believe that further analysis of this *in vitro* system will throw light on the process of RNA transport and, as Raskas comments, one of the first things to do is to analyse the protein components of the 35S ribonucleoprotein material to see if only a few, specific "transport" proteins are present.