Nuclear physics at Glasgow meeting

from a Correspondent

AT the combined Institute of Physics conferences on nuclear structure and high energy physics, which took place at the University of Glasgow on March 27-29, the nuclear structure talks reflected in the main the specific interests of Glasgow workers. Experimental work in Glasgow concentrates on electron scattering, photoreactions and the use of photoreaction neutrons. The principal local activity in nuclear theory is the application of the shell model to fairly light nuclei.

E. Spamer (Technische Hochschule, Darmstadt) discussed the techniques by which the momentum resolution of the Darmstadt linear accelerator is being improved by a factor of five. He emphasised that this makes electron inelastic scattering applicable to the study of a great many more states than hitherto, at higher energies and in heavier nuclei. One would, for example, hope to learn more about the newly detected quadrupole resonance found above the familiar giant dipole resonance in medium nuclei.

R. Owens (University of Glasgow) dealt with photonuclear reactions in the higher energy region in which one hopes to obtain information about high momentum components in nuclear wave functions. This hope has been much deferred, and calculations with short range correlations seem at present to call for a further extension of the energy range in these experiments.

Short range correlations were also a feature of the contribution by J. M. Irvine (University of Manchester) who dealt with low lying levels of the p-shell nuclei. He has used a two-body interaction fitted to scattering deuteron data and a variational method applied to wave functions with both central and tensor correlation corrections, to obtain an effective interaction for use in a large basis shell model calculation with the Glasgow code. With reasonable restrictions on the short range central correlation, and by adjusting the strength of the tensor correlation to fit the absolute binding energy of each nucleus in turn, many other levels can be fitted with no further adjustment of parameters.

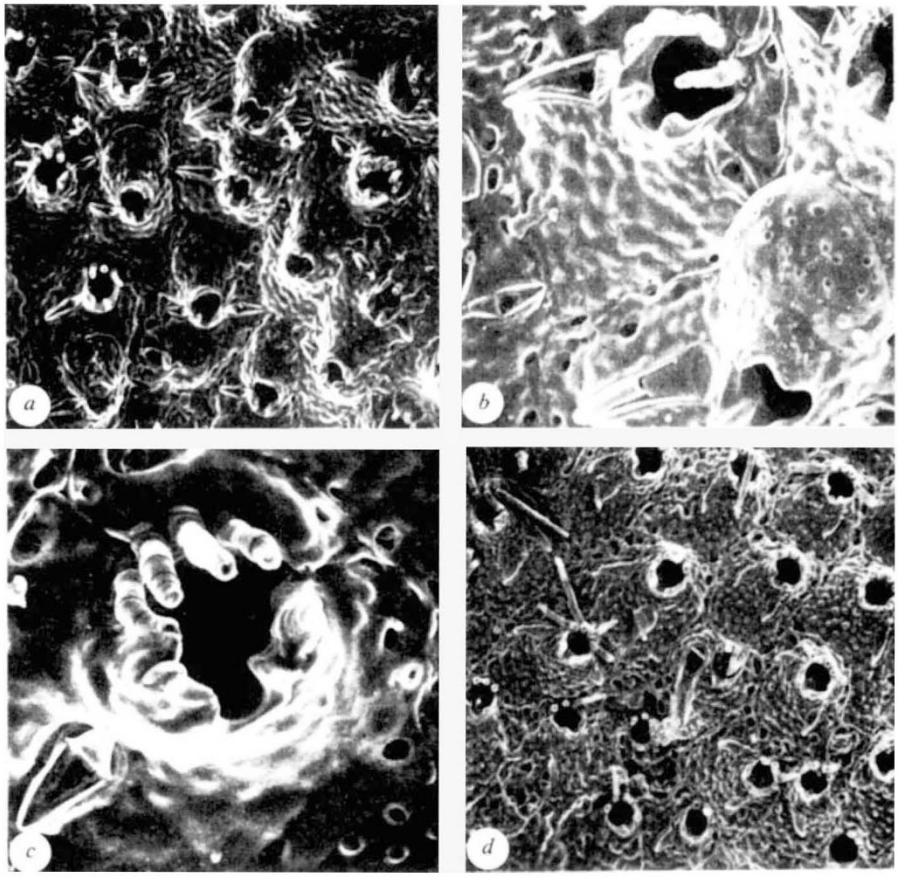
The talk by R. Arvieu (University of Paris, Orsay) also touched on the subject of large scale shell model calculations. He discussed the statistical approach to the shell model, in which one calculates the mean energy and moments of the level density distribution for various configurations. This can be used, for example to learn, in advance of investing in a large shell model calculation, which configurations are most essential and must be retained. H. A. Weidenmuller (University of Heidelberg) also discussed statistical aspects of nuclear physics, but in the more familiar context of the statistical model of neutron resonances. He emphasised that although statistical shell model calculations give the density of levels in a configuration in Gaussian form, as opposed to the semi-circle law of Wigner's random matrix model, the two models agree on the fine structure of the statistics of level spacings. The predictions of these models are well confirmed by data with up to 180 neutron resonances in a particular nucleus. Weidenmuller also discussed recent work at Heidelberg which extends the range of validity of the Hauser Feshbach prescription for average cross sections, and which allows effects of direct reactions to be allowed for in this method.

On the high energy side there was considerable emphasise on photon and lepton interactions although strong interaction physics, particularly at very high energies, also figured strongly. D. H. Perkins (University of Oxford) reviewed the experimental evidence for neutral currents in weak interactions and indicated that the experimental evidence is becoming steadily more convincing and is in good agreement with the Weinberg–Salam–Ward theory as opposed to the long standing Fermi theory which, as for example in beta decay, requires only charged currents.

Two examples of $\bar{\nu}_{\mu}\, e^{-}$ scattering have been recorded in the Gargamelle bubble chamber at CERN and many more events of the type ν+hadron $\rightarrow$ ν+hadron at both CERN and the National Accelerator Laboratory, Batavia (NAL).

Storage rings—both electron and proton—are producing results of fundamental interest and several speakers concentrated on data recently produced by these devices which allow observa-

Smittinid ectoprocts from Hawaii



THE shallow waters round the Hawaiian Islands seem to be havens for the smittinid family of ectoproct bryzoans—the minute sedimentary aquatic animals which usually live in colonies. D. F. and J. D. Soule have found that the Hawaiian species of Smittinidae seem to be isolated specifically from the Indo-Pacific forms and that there are also species differences between the five major Hawaiian Islands. In a comparative study (*Bull. Am. Mus. nat. Hist.*, **152**, 365; 1973), the Soules recognise twenty-eight taxa of which two are new genera and twenty are new species. This figure shows (*a*) colony with tubular peristomes, (*b*) immersed ovicell and part of developing ovicell and (*c*) aperture with spines of *Parasmittina alanbanneri* n.sp.; (*d*) colony with spines on zooecia of *P. serrula* n.sp.