

Ala-Tau shows two roots going deep into the Mohorovičić discontinuity. The granitic layer shows no roots, but the Mohorovičić discontinuity repeats, with some distortions and with greater amplitudes, the surface relief. It is noteworthy that the foci of all natural earthquakes in the district originate near the basaltic layer, and that the large negative gravity anomaly (up to 250 mg.) in the district depends mainly on the form of the Mohorovičić discontinuity and not on the granitic layer. The *GSZ* method of deep seismic sounding has thus been used in the U.S.S.R. to study the peculiarities of relief of the internal crustal layers of the Earth (sedimentary, granitic, basaltic), especially in mountain regions; to study these surfaces near deep geological faults; and to give a quantitative physical explanation of the peculiarities of the regional gravitational field. At the Vienna meeting E. Tillotson described the work of Dr. M. N. Hill, of Cambridge, and his co-workers, who use explosions at sea in order to determine the structure of the sea bed. In this method use is made of sono-radio buoys. Prof. H. Menzel and his colleagues at Hamburg intend to follow this method in order to elucidate the very interesting geological structures between Germany and Denmark on one hand, and Norway and Sweden on the other.

Reports from countries represented at the meeting, and also twelve papers, were read concerning the proposed seismo-tectonic map of Europe and the making of the European Earthquake Catalogue. This project is now locally well advanced, and the collection and correlation of the data were placed in the hands of Dr. M. Bâth, of Upsala, with the assistance of six colleagues strategically placed in Europe. It is intended, when the map has been completed, to shade it to show the different degrees of seismicity.

Six papers were read at the Vienna meeting, and a good deal of discussion took place, concerning short-period seismographs for the registration of near earthquakes. One paper, presented by Prof. W. Hiller, concerned the new short-period seismographs with magnetic amplification for recording on smoked paper, the prototypes of which have been set up in Stuttgart. The European Seismological Commission recommended the standardization of the constants of short-period electromagnet seismographs so far as local circumstances permit. Each instrument should have a period (T_m) of the movement of the ground corresponding to a maximum sensitivity between 0.6 and 1.0 sec., and damping coefficients α and β of the pendulum and galvanometer for the seismograph without equivalent reaction, greater than or equal to 0.6. It was left to a small committee under Prof. F. Gassman, of Zurich, to investigate the best methods of testing short-period instruments by shaking-table experiments.

Three papers on microseisms were read, and the Commission passed a resolution requesting the Seismological Commission of the International Geophysical Year to give as soon as possible all the necessary directives for making as complete an investigation as possible of microseismic activity during the International Geophysical Year. Prof. K. E. Bullen, of Sydney, president of the Section of Seismology and the Physics of the Earth's Interior, then gave a lecture on his present tentative views concerning the structure of the Earth with its mantle, core and inner core, and the structure of some of the planets.

Additional members of the European Seismological Commission were then agreed upon from Czechoslovakia, Lebanon, Poland, Rumania, Switzerland (in place of Dr. Wanner, deceased) and the U.S.S.R. Officers elected were: *President*, Prof. P. Caloi (Rome); *Vice-President*, Prof. W. Hiller (Stuttgart); and *Secretary*, Elie Peterschmitt (Strasbourg). The next meeting of the Commission will be held in Utrecht during Whitsuntide 1958.

ERNEST TILLOTSON

RADIO-FREQUENCY PHYSICS

CONFERENCE IN GENEVA

THE 'Colloque A.M.P.E.R.E.' (Atomes et Molécules par Études Radio-Électriques) is an organization inspired by Prof. R. Freymann, of the University of Rennes, which was set up soon after the end of the Second World War as a means of ensuring fruitful contact between French research workers interested in any branch of physics that is concerned with the use of radio frequencies (including the microwave region). It was also part of an effort to re-establish scientific research in France, which had suffered very heavily in the War and was quite unfamiliar with the great advances made during the years of hostilities. The subjects at the annual conferences include dielectric constant and loss, magnetic permeability and loss, nuclear magnetic resonance, quadrupole magnetic resonance, paramagnetic resonance, ferromagnetic resonance and associated effects, and microwave spectroscopy. Although primarily a French organization, interest in it has become more general, and it would now be better described as European, although, of course, any scientist is welcome. It has been a matter of considerable pride and satisfaction to the French-speaking members that all the conferences have employed French as the principal language. I feel that this—and the colloquium itself—has helped to give the French renewed confidence and has contributed in some measure to the present renaissance of scientific research in France. It has also made many English-speaking persons appreciate the difficulties which the prevalent use of English at scientific conferences poses for many scientists.

A pattern is being established in which the annual conference is held alternately in France and elsewhere in Europe. This year's conference was held during March 21–23 in the Institute of Physics of the University of Geneva and was attended by some hundred and fifty scientific workers. That for 1957 will be held in St. Malo, Brittany, and will be organized by Prof. R. Freymann.

A special effort was made to widen the appeal of the conference this year in view of the fact that it marks the tenth anniversary of the discovery of nuclear magnetic resonance absorption. General lectures outlining the history and present situation in nuclear magnetic resonance were given by Prof. C. J. Gorter (Leyden), "Vingt années de recherches aux Pays-Bas sur les résonances magnétiques"; Prof. M. Grivet (Paris), "Exposé sur les travaux effectués par l'équipe française de résonance nucléaire"; Prof. L. Giulotto (Pavia), "Exposé sur les travaux récents effectués au Laboratoire de Pavia dans le domaine des temps de relaxation nucléaire"; Prof. R. A. Ogg (Stanford), "Application à la chimie

de la résonance magnétique nucléaire"; and Prof. A. Lösche (Leipzig), "Quelques travaux sur la résonance paramagnétique nucléaire effectués à Leipzig". A lecture by Prof. C. H. Townes (Columbia) on the measurement of time by spectroscopic methods was an apt illustration of the application of many of the ideas and techniques discussed during the conference.

Some fifty papers were presented in six sessions, fairly evenly distributed over the subjects mentioned above and representing contributions from some thirty laboratories. Preprints of almost all the papers were available before the conference; authors were allowed fifteen minutes for presentation of the gist of their papers, and the matter was then thrown open to discussion. As is usual at these conferences the discussions were unusually free and frank and therefore most valuable to all concerned. It is perhaps conducive to a free exchange of views at such a meeting that the discussion itself is not recorded or published.

It is evidently impossible to mention each paper in detail, and I am obliged to pick out the ones which seemed of more than usual interest. The first two sessions on dielectric constant and loss included several papers on measuring techniques. There were also two papers on mixtures, which still present many difficulties, by J. M. Hough and J. A. Reynolds (Hull) and by G. P. de Loor (The Hague). Study of the dielectric properties of hydrogen-bonded liquids (R. Arnoult *et al.* (Lille) and C. Brot (Paris)) continues to produce interesting results. G. Offergeld (Brussels) described dielectric measurements on a series of methacrylate polymers. R. Freymann and his group (Rennes) presented papers on dielectric effects in various solids and particularly in selenium and zinc sulphide, showing the effect on dielectric properties of illumination at 3650 Å. They also showed that one of the dielectric absorption regions in solid camphor is in reality due to fenchone impurity.

The third session, on electron resonance of various types, included several papers on free radicals and particularly on DPPH. R. Gabillard (Geneva) and J. Berlande (Paris) described ingenious uses of electron resonance in the control and measurement of magnetic fields in particle accelerators. Measurements on ferrites still attract considerable interest in view of their great technical importance; several papers in the fourth session were concerned with these and in particular with the Faraday effect (F. Mayer, of Grenoble), the behaviour in the resonance region (J. Pauleve, of Grenoble), and the effect of losses (J. Snieder, of The Hague). In the fifth session, J. Winter and J. Brossel (Paris) described electron resonance experiments on optically oriented sodium atoms in which they observed absorption bands at multiples of the usual Larmor frequency. D. Dautreppe and B. Dreyfus (Grenoble) discussed the effect of hydrostatic pressure on the pure quadrupole resonance frequency in *p*-dichlorobenzene; the effect found is readily interpreted in terms of the effect of the pressure on the libration frequency of the molecule in the lattice.

In the last session G. E. G. Hardeman and N. J. Poulis (Leyden) presented new results on the relaxation time for proton magnetic resonance in the antiferromagnetic crystal, hydrated copper chloride, and showed that the relaxation is due to interaction with the copper ions. W. G. Proctor (Basle) described experiments in which the nuclear resonance signal of

sodium in sodium chloride is modified by subjecting the sample to ultrasonic radiation at double the Larmor frequency. J. G. Powles (London) discussed the correlation between mechanical, dielectric and nuclear resonance absorption processes in polymers. G. J. Béné, R. Beeler and D. Roux (Geneva) showed that paramagnetic resonance can now be used to measure magnetic field strength down to about 0.05 oersted using metal-ammonia solutions, which have very narrow lines. H. H. Staub (Zurich) has measured the nuclear relaxation time for the rare gas xenon and found a satisfactory explanation in terms of nuclear quadrupole interactions during interatomic collisions.

The success of the conference was due in large measure to the excellent organization of Prof. Extermann, Dr. Béné, Dr. Denis and Miss P. Cottier. A report of the conference is being published in the May issue of the *Archives des Sciences*, and copies can be obtained from the Institut de Physique, Université de Genève, price 25 Swiss francs.

J. G. POWLES

PELAGIC MOLLUSCA: SWIMMERS AND DRIFTERS

THE Malacological Society of London held an open discussion meeting in the rooms of the Linnean Society on the evening of March 14, with Prof. Alastair Graham (University of Reading) in the chair. Invitations had been issued to the staff and students of biological departments, and there was a large attendance, mainly from scientific institutions in or near London, and also from Reading, Oxford and Swansea.

Dr. J. E. Morton (Queen Mary College, London) introduced the subject of pelagic Mollusca with an account of pelagic prosobranchs. Prosobranchs became pelagic in two instances, both of them in the order Mesogastropoda. The three families, together known as the Heteropoda (Atlantidae, Carinariidae and Pterotracheidae), are actively swimming carnivores, and the family Ianthinidae are passive drifters. These two groups illustrate strongly contrasting modes of attaining the pelagic life. In the Heteropoda, the emphasis was upon the lightening and eventual loss of the now unnecessary shell, and the development of lightness and buoyancy, with the tissues becoming jelly-like and the heavy viscera restricted to an insignificant mass. The mantle cavity was fully retained in *Atlanta* and eventually lost in *Pterotrachea*. The foot was transformed into a gracefully undulating fin, and there was considerable speed of movement. Large eyes were developed, with great visual acuity. The shape of the body became fusiform, the higher families losing the planorboid spiral form of *Atlanta*. They are reminiscent of small translucent serpents, moving rapidly, and with the sharp teeth of the buccal mass taking a strong hold of smaller planktonic prey.

The Ianthinidae adopted a pelagic life in a very different way from the Heteropoda. The shell—though lightened—remains of normal size, and forms a globular body whorl with a short apex, vivid violet in colour, floating mouth uppermost. The animal has no special locomotor organs and drifts at the surface, buoyancy being conferred not by jelly-like tissues but by a raft secreted by the foot. In *Ianthina ianthina* this consists of a bubbled mass of air-filled