the use of six channels in Band 3; and competitive television—approximate transmitter sites and powers as requested by various applicants for licences.

Some of the detailed matter raised in the last part of the report will obviously cause controversy. For example, there is the question of whether the B.B.C. should be granted its request to set up low-power stations on the two free frequencies in Band 3 so as to complete its present national programme or whether it should be forced to use either Band 1 (if this is technically possible) or Bands 4 and 5. Then, as already mentioned, who is to have these two channels for the high-power transmission of a second programme to cover the densely populated regions of Britain, and should this be immediately supplemented by a third channel? From this, one is led to the problem of freeing completely the whole of Band 3; but if television is going to make considerable headway in Britain, even this is not enough, and serious attention will obviously have to be paid to Bands 4 and 5.

Some persons may feel that the actual developments which have taken place so far are such that all this speculation is rather nebulous and that to introduce at this juncture some licensing authority armed with strong powers would be premature because the economic state of Britain in the present conditions of world tension will effectively prevent rapid expansion for many years to come. However, this point of view is refuted by one member of the Committee who, in a minority report, points out that we are already near the point of actually using Band-3 frequencies for a television programme; but because various organizations have been allowed channels on this band for their own private purposes, it is effectively used up, and much money will have to be expended to move them to other frequencies—a financial liability which apparently neither the State nor the organizations concerned are showing much inclination to shoulder.

All this points to the fact that perhaps it would be best in the long run for all concerned if some sort of policy could be formulated now and put in the hands of an effective authority so that the frequency spectrum, which, it seems, is all too small, can be economically shared out in a manner that generally meets with public approval.

AMERICAN PHYSICAL SOCIETY AND THE AMERICAN ASSOCIATION OF PHYSICS TEACHERS

ANNUAL MEETING

THE 1953 annual meeting of the American Physical Society and the twenty-second annual meeting of the American Association of Physics Teachers were held simultaneously at Harvard University, Cambridge, Mass., during January 22–24. In spite of the change of venue from New York City where the past annual meetings had been held, the meetings were well attended with a registration of 1,833 and with more than three hundred ten-minute papers, in addition to longer invited ones, contributed to the various sessions of the two bodies.

At the joint ceremonial session during the afternoon of January 23, the retiring presidential address of the Society was delivered by Prof. J. H. Van Vleck (Harvard University), who took as his subject "Two Barrier Phenomena". In this address he first discussed the barrier which current immigration policies of the United States raises to the entry of visiting foreign scientists, and then described the various theoretical developments which have been required in order to keep pace with the experimental advances in the microwave spectroscopy of ammonia. The Oersted Medal of the Association was presented to Prof. R. M. Sutton (Haverford College), who responded by discussing the heritage of a physics teacher[1], and the eleventh Richtmyer Memorial Lecture was delivered by Prof. E. M. Purcell (Massachusetts Institute of Technology), who took as his subject "Nuclear Magnetism". The after-dinner speaker at the banquet in the evening was Prof. J. A. Stratton (Massachusetts Institute of Technology), who gave an outstanding address on thoughts on technical education stimulated by a visit to Britain, in which he compared education in Great Britain and the United States.

The banquet was also the occasion of the presentation of the first O. E. Buckley Solid-State Physics Prize to Dr. W. Shockley, research physicist at the Bell Telephone Laboratories, for his contributions to semiconductor research. The prize (1,000 dollars), which is administered by a committee of the Physical Society, was established in 1952 under an endowment of a 50,000-dollar trust fund provided by Bell Telephone Laboratories in honour of the Laboratories' former president, O. E. Buckley, who retired recently after thirty-eight years in administrative and scientific posts with the Bell System.

At the business meeting of the Society the following were elected to hold office for 1953: *President*, E. Fermi; *Vice-President*, H. A. Bethe; *Secretary*, K. K. Darrow; and *Treasurer*, G. B. Pegram. A welcome abatement in the rate of expansion of the *Physical Review* was reported by the managing editor, and the treasurer indicated that the present satisfactory position did not call for any further change in the dues and charges.

The twenty-eight invited papers contributed at the scientific sessions of the Physical Society included: a group of three papers by members of the Brookhaven National Laboratory describing new and prospective accelerators at the Laboratory; a separate session in which P. W. Bridgman, G. R. Harrison, G. F. Hull and E. C. Pollard delivered papers dealing with, respectively, recent results at high pressures, échelle spectroscopy, experimental discoveries announced in the programme of the meeting of fifty years ago, and physical studies of viruses; at the symposium of the Division of Electron Physics, individual contributions by M. O'Day (Air Force Cambridge Research Centre) on electron physics in the upper atmosphere, and M. S. Livingston (Massachusetts Institute of Technology and the Brookhaven Laboratory) on the strong-focusing synchrotron; and at the symposium of the Division of Fluid Dynamics, papers on turbulent flow and on phenomena at supersonic speeds. Solid-state physics was represented by contributions by J. A. Hornbeck (Bell Telephone Laboratories) on semiconductors, and P. D. Johnson (General Electric Co.) on luminescence in solids; and in addition to that by F. Bitter on magneto-resonance and magnetic optics, there were several papers dealing with paramagnetic resonance and nuclear resonance. G. Lindström (Nobel Institute of Physics) discussed the establishment of an absolute energy scale in beta-ray spectro-

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scopy, and H. V. Neher (California Institute of Technology) spoke about cosmic rays at high altitudes and latitudes. The only contribution on theoretical physics was by J. Schwinger, who dealt with some formal developments in quantum mechanics. The complete list of invited and other papers, together with abstracts, is given in the minutes of the meeting[2].

The programme[3] of the meeting of the American Association of Physics Teachers consisted of thirty-six contributed papers, two invited papers and two round-table discussions on "Physics beyond General Physics for Non-Physics Majors" and "Undergraduate Laboratory Teaching". The former discussion was mainly concerned with physics requirements for engineering students; there was general agreement that instruction in physics should not be transferred from departments of physics to those of engineering, and the question of the use of the 'slug' and the general topic of units was deferred to the next annual meeting. At the business meeting of the Association on January 24, it was agreed to confer honorary membership on R. Pohl, professor of physics in the University of Göttingen, and on J. H. Keenan, professor of mechanical engineering in the Massachusetts Institute of Technology, and to award citations to H. K. Hughes, for his painstaking work as chairman of the Committee of Letter Symbols; E. C. Kemble, as chairman of the Coulomb Law Committee; T. H. Osgood, as editor of the *American Journal of Physics*; R. R. Palmer, as programme chairman of the Association's meetings in 1952 and 1953; K. Lark-Horovitz, for his teaching activities; and to M. W. White, for his successful efforts on behalf of the Association. The following were elected to hold office for 1953: *President*, P. E. Klopsteg; *President-elect*, M. White; *Treasurer*, F. W. Sears; and *Secretary*, R. F. Paton.

[1] Published in *Amer. J. Phys.*, **21**, 369 (1953).
[2] Published in *Phys. Rev.*, **90**, 333 (1953).
[3] Published in full in *Amer. J. Phys.*, **21**, 401 (1953).

OROGRAPHIC CIRRUS CLOUDS

It has long been recognized that the forced ascent of air over mountains can produce cloud. Only in the past twenty years has it been realized that thin clouds 10,000 ft. or more above the mountains and with no cloud beneath them may owe their existence to the presence of the mountains. Such clouds are not formed by the direct lifting of the lower air up to cloud-level but in the ascending currents of a system of waves which can be produced by the mountain in somewhat the same way that a rock on a river bed produces waves downstream. The wind and temperature structures of the air have to fulfil certain conditions, as Dr. R. S. Scorer, of the Department of Meteorology, Imperial College of Science and Technology, London, has shown. The favourable conditions are an increase with height of both wind-speed and of the temperature lapse-rate. An inversion of temperature in the lower layers of the air followed by a rapid fall of temperature higher up is a favourable arrangement; but a steep fall of temperature with height low down, such as occurs on sunny afternoons, is unfavourable. When the temperature structure is right for waves to form, there must be sufficient water vapour at some height if a cloud is to appear in the ascending currents of the waves at that height.

The Moazagotl clouds which form at 12,000 ft. or more above the Riesengebirge in Germany were found by sailplane pilots to be forming in ascending currents of air and seem to have been the first really high clouds to be recognized as definitely orographic in origin.

Now Mr. F. H. Ludlam, a colleague of Dr. Scorer, claims in the October 1952 issues of *Weather* and the *Quarterly Journal of the Royal Meteorological Society* that some of the cirrus cloud seen over England at heights as great as 20,000 ft. or more is produced in orographic waves. He believes orographic cirrus forms as water particles at a temperature of about − 40° C. The drops soon freeze, and are carried downwind as a trail of ice crystals. Making observations from Dunstable, Bedfordshire, of the azimuth and elevation of the initial points of some cirrus trails and taking the height from the − 40° C.-level in the Meteorological Office upper-air temperature readings, he has been able to relate these initial points to prominent hills such as the Black Mountains, the Long Mynd, Cleeve Hill and the Peak, some of them more than a hundred miles from Dunstable. Sometimes a number of cirrus trails, all at the same height, could be seen streaming each from above the hill responsible for it. A further height check made with good results was a comparison of the movement of details of the trails with the official upper wind observations. In support of his idea he points out that aircraft pilots have observed up and down currents of several metres per second at 10,000–30,000 ft. over the low English hills. Further, the cirrus formation diminishes in the afternoon in accordance with Dr. Scorer's theory of wave formation.

Mr. Ludlam's ingenious and picturesque ideas are not yet accepted by all meteorologists. However, they promise to add a new pleasure to cloud observing—finding the hill over which a cirrus trail begins.

HETEROGENEITY OF DEOXYRIBONUCLEIC ACIDS

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The current belief that deoxyribonucleic acids are intimately concerned in the maintenance and transmission of genetic specificity, for which there is a considerable amount of evidence, leads to the suggestion that preparations of this material may possibly consist of a large number of molecular species differing very slightly from each other in some respect. Chargaff and his collaborators[1] and Wyatt[2] have analysed many deoxyribonucleic preparations with regard to their content of purine and pyrimidine bases, and have found that preparations isolated from the same species have a constant composition, whereas the compositions of preparations from different species vary considerably. There are then three evident ways in which specific differences can be carried by the deoxyribonucleic acid of one species. Either it contains a number of molecules

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