

apparatus under the theme of "Ways of using Visual Aids in the Classroom".

Social activities at the conference included a summer schools reunion supper, a section luncheon, an Association tea, and the largest annual dinner yet held, at which Prof. P. W. Bryan, Mr. F. Spencer Chapman and Mr. Charles Armour were the guests. On January 6 the Association met jointly with the Royal Geographical Society to hear Mr. F. Spencer Chapman describe his "African Journey"; and this terminated the more formal part of the conference. On the last day, however, an interesting series of excursions had been arranged to places of geographical interest. Conducted visits were paid to St. Albans, Rothamsted Experimental Station, the Port of London, the Ordnance Survey and Messrs. George Philips Map and Globe Works.

The new year is entered upon with considerable changes among the officers of the Association. Mr. T. C. Warrington is now retiring after many years of service as honorary auditor and honorary librarian, and these two offices will in future be filled by Mr. W. R. A. Ellis and Mr. L. J. Jay. Mr. L. S. Suggate becomes president for 1955, while Mr. R. C. Honeybone takes over from Prof. W. G. V. Balchin the post of honorary conference organizer. Prof. L. Dudley Stamp, Prof. E. G. Bowen and Prof. W. G. V. Balchin have been elected trustees of the Association.

W. G. V. BALCHIN

SCIENCE MASTERS' ASSOCIATION ANNUAL MEETING AT NEWCASTLE UPON TYNE

MORE than four hundred science masters met in King's College, Newcastle upon Tyne, during the week between Christmas and New Year for the annual meeting of the Science Masters' Association. The world-wide reach of the Association is shown by the fact that teachers were present from Ceylon, Nigeria, Uganda and Natal; also present were Mr. Withers, secretary of the Education Section of the Federation of British Industries; Dr. Dewar, representing Imperial Chemical Industries, Ltd.; and Mr. Obourn, an American observer from the Paris headquarters of Unesco.

The first evening was the occasion of the presidential address by Dr. C. I. C. Bosanquet, rector of King's College. This was delivered to a crowded audience in the large lecture theatre of the new Chemistry Building, remarkable for the excellence of its acoustics and of its air-conditioning system. Dr. Bosanquet's address was entitled "In Praise of Natural Philosophy" and was a plea for the broadening of the school curriculum for both the science and the arts specialists; the scientist, he said, is at present given a training only in a series of unrelated subjects, and the arts specialist is deprived of any further acquaintance with the great processes of Nature. Dr. Bosanquet quoted figures which showed that while the number of pupils taking science in schools is steadily rising, the number taking arts is almost stationary; and there is still a considerable proportion of boys in the public schools doing little or no science at all. As an example of the synthesis involved in the term 'natural philosophy', Dr. Bosanquet dealt at some length with the life of

Thomas Young, who was equally good at so great a variety of subjects. Dr. Bosanquet wants it to be possible for a student on reaching the university to change over from an arts course to a science one and vice versa. He concluded by emphasizing the necessity for inculcating a sense of responsibility in the young scientist; he thought that wars are less likely to come from irresponsible rulers than from the apathy of those they rule; the young scientist should understand clearly that, in any future war, his chance of remaining unhurt is small.

Among its many activities, the Association administers a trust fund for the presentation of a lecture on science and citizenship, usually given every second year. This year the lecture was by Dr. Eric James, High Master of Manchester Grammar School, and it will live long in the memories of those who heard it as a great occasion in the history of the Association; an excellent speaker giving out constructive thought at white heat in a splendid theatre to another crowded audience made it a remarkable experience. Dr. James took the view that the scientist cannot be a neutral technical expert, and must take full responsibility for the consequences of his work. Even if that work be apparently without any practical application whatever, he still owes the opportunity to do that work to the social structure in which he lives, and he can therefore not afford to be indifferent to circumstances affecting that structure.

Dr. James expressed concern at the consequences of television, the "most politically significant invention since printing", since it creates masses of uncritical observers, and might prevent the heretic and the oddity, on whom progress depend, from having any public voice at all. He thought also that as more and more of the best brains become involved in scientific pursuits, there is a grave risk that the level of ability in political administration may fall; and it is therefore essential that the scientist should have an education making him capable of taking over the work of government.

The more strictly scientific activities during the meeting included lectures by members of the science and applied science faculties of King's College. Notable among these was one entitled "Demonstrations in Optics", by Prof. W. E. Curtis, who is an outstanding example of that not too common combination, high ability as a scientist and great skill as a showman; all his very large number of experiments were most beautifully presented.

On the same morning, Prof. W. F. K. Wynne-Jones gave a lecture on the presentation of physical ideas in chemistry, and Prof. A. D. Hobson followed up a lecture on the marine fauna of the British Isles with an afternoon visit for members to the Marine Laboratory at Cullercoats.

The second full day began with a lecture by Dr. R. McWeeny on the impact of quantum theory on the teaching of physics and chemistry; one by Prof. T. S. Westoll on "Living Fossils"; and one by Prof. G. S. Rushbrooke on some characteristic features of twentieth-century physics. Prof. Westoll's lecture, on a semi-palaeontological subject, marks a somewhat unusual departure for the Association, and indicates a steady broadening of its subject-matter. King's College has plans for a large new department of geology, in view of the importance of that study to the north-eastern area of Britain.

The two main afternoons were occupied by visits to many different industrial organizations, such

visits being indeed a strong point of the meeting, since the North East includes so many types of heavy and light industry. The sites visited included the Wilton and Billingham works of Imperial Chemical Industries, Ltd., the Pyrex glass works at Sunderland, two coal mines, factories making springs and pumps, works for gas, soap and mining machinery, the Ediswan lamp and valve factory, Parsons and Marine Engineering Turbine Research and Development Association, Reyrolles switchgear works, and the premises of Associated Lead Manufacturers, and of the Grubb Parsons Optical Co., Ltd. A visit was also made to the Radiochemical Laboratories at Durham, where accurate analyses of small quantities of rare gases are performed. Samples of gas from the upper atmosphere, taken in the United States by means of rockets, are sent to Durham for analysis.

The meeting also included discussions on M.K.S. units, on science teaching in secondary modern schools, and on science and religion.

The final morning again began with lectures, by Dr. S. L. Ranson on the metabolic activities of cellular particles, Dr. J. H. Wilkinson on small-scale organic preparations, and Mr. P. C. G. Isaac on public health engineering.

During the meeting, all the science and engineering laboratories of King's College were open, and members, manufacturers and publishers again gave their usual exhibitions; the manufacturers and publishers expressed great satisfaction at their excellent housing in the new Chemistry Building.

Special exhibitions were also arranged by the Northern Lighting Bureau of the Electric Lamp Manufacturers' Association and by the British Iron and Steel Federation. For the former, the area representative, Mr. R. J. Fothergill, had prepared a fascinating experimental display, including, in a corridor, an illuminated sign, the light from which detected whether one's shirt had been washed in particular detergents. For the Iron and Steel Federation, Capt. J. F. W. Mudford, area training organizer, had a comprehensive collection of all the Federation's educational literature, together with specimens and static models of its productions.

The social side of the meeting was catered for by an evening concert in King's Hall, preceded by a reception at which members and their ladies were welcomed by the Lord Mayor and Lady Mayoress of Newcastle upon Tyne, the Rector of King's College, and the Chairman of the Association and Mrs. Dyball. The playing in of the Lord Mayor by the Northumbrian pipes of Mr. Jack Armstrong was a touch characteristic of the locality; and the concert, which included piano solos by Miss Margaret Evans, Northumbrian songs by Mr. William Robinson, and pipe music by Mr. Armstrong, was much appreciated.

The Association is deeply indebted to all those who helped with the preparation of the meeting, and especially to the registrar, Mr. G. R. Hanson; to Prof. W. F. Cassie, who arranged the tours of the engineering laboratories; and to Dr. Chalmers Burns, director of music, who obtained the artistes for the concert.

It may be permissible to quote the final comment of a witty member from a famous Scottish public school, who said that he was going home "a wider and a humbler man; wider in that he had been fed so well, and humbler in that he had learnt so much".

W. H. DOWLAND

THE BRITISH FLORA DURING 1954

THE flora of the British Isles has been the subject of such thorough investigation, as compared with most other countries, that advances in knowledge can now be expected mainly from the application of new techniques and from the closer study of small groups. These were the approaches adopted by most of the exhibitors at the annual exhibition meeting of the Botanical Society of the British Isles, arranged in the lecture room of the British Museum (Natural History) on November 28. It was evident that cytology and careful analysis of variation are still yielding some of the most interesting results, and that the study of hybrids is proving of far greater importance than was supposed a few years ago.

One entirely new development was illustrated by H. J. M. Bowen (Radiobiological Research Unit, Atomic Energy Research Establishment, Harwell). By means of activation analysis—the ashes being irradiated with neutrons in the Harwell pile, and the radioactive strontium then separated from all the other elements by conventional methods—he has determined the amount of strontium present in material from about forty species of plants. He finds that plants growing on ordinary soils contain 1–50 parts per million of strontium, but in the limited areas in Britain where the soils contain large concentrations of this element (as the sulphate, celestite; or as the carbonate, strontianite), plants are found to contain up to 2 per cent or more of strontium by dry weight. All the species examined were found to be accumulators. The Avon Gorge is one of the areas where considerable concentrations occur in the rocks, and the concentrations in some of the rare species found there (for example, *Arabis stricta* 1.06 per cent, *Anisantha madritensis* 1.16 per cent) are also high. Further investigation may show that the distribution of certain plants may be related to concentrations of strontium.

A number of very interesting hybrid grasses were exhibited. Dr. A. Melderis (British Museum (Natural History)) showed *Festuca rubra* × *Vulpia membranacea*, which was collected by several members on the Society's field meeting at Southport, and later by Miss M. McCallum Webster on dunes at Sandwich. In both places it evidently occurred in some quantity. A similar hybrid was exhibited by C. E. Hubbard (Royal Botanic Gardens, Kew) from Vazon, Guernsey. He also showed *Agrostis stolonifera* × *A. semiverticillata* from Vazon, *Festuca arundinacea* × *Lolium perenne*, and a variegated form of *Poa annua* from a shrubbery at Kew. With N. Y. Sandwith (Royal Botanic Gardens, Kew) he exhibited *Agropyron repens* × *Hordeum secalinum* (× *Agrohordeum langei*), collected by Mrs. C. I. Sandwith in 1945 from Shirehampton.

Two other hybrids exhibited which are new to the British list were *Carex binervis* × *C. punctata* from rocks near Barmouth, shown by P. M. Benoit, and *Mentha aquatica* × *M. rotundifolia* (*M.* × *maximiliana*), collected by Miss B. M. Sturdy near Penzance, and shown by R. Graham. J. D. Lovis (University of Leeds) provided an interesting demonstration of ferns. *Asplenium adulterinum* is a tetraploid species ($2n = 144$), intermediate in morphology between *A. viride* and *A. trichomanes*, and is found on serpentine rocks in central Europe and Fennoscandinavia, where it usually grows with one or