

Veterinary Surgeons, who approved of the Bureau's scheme of accreditation of breeders but emphasized the dangers of enlarging colonies beyond the limits of the personal care by the owner—for example, the increased danger of infection, and the possibly less careful treatment by subordinate staff. The operation of demand versus supply may be leading to price competition and the consequent annihilation of the smaller breeder whose contribution is useful and often very good. Prof. Glover maintained that cost in research work is indeed watched carefully, but the use of expensive animals as well as the cheaper ones has to be investigated in order to discover the best animal for the purpose in view. Commercial firms benefit by the experience of research workers when they take up large-scale production and test their own products. To overcome the difficulty of having a surplus of young animals at a time of year when they are least wanted, he suggested that a large proportion of these young animals in the glut season should be put to breeding so that the total production in the less good breeding season should, in fact, be increased. He thought that decentralization is distinctly advantageous, but that institutes run by universities on not too large a scale by competent scientific workers would afford a chance of studying animal husbandry and animal diseases; the institutes could train really good technicians, and each institute might specialize in one or two particular species. The linking-up of such institutes would obviously be valuable. Prof. Glover pleaded for more investigations into epidemics in animal colonies, particularly those of commercial breeders. A well-qualified research worker associated with some institute where he would have contact with clinicians, bacteriologists, etc., would be able to do most valuable work on animal epidemics.

Dr. C. C. N. Vass, representing the Physiological Society, emphasized the fact that expenditure on animals must be faced. Often the difficulty in experiments on cats and dogs is to get them of a known age. If this could be done by paying a higher price, it must be paid, and, since such an animal might be under observation for two years, the high price would be justifiable and in fact almost negligible.

Dr. H. J. Parish, representing the Pathological Society, agreed to the need of using healthy animals at almost any cost, particularly for such long-time experiments as are involved in work on prophylactics, which work, it might be stressed, is often done for the benefit of animals and not only for human beings.

Dr. S. J. Folley, representing the Biochemical Society, asked if the possibility of using rats in place of cats and dogs has been considered as carefully as possible; but Dr. Vass replied that, for teaching purposes, the rat is often too small an animal.

In reply, Dr. Lane-Petter said that if breeders' colonies are to be larger, they should be housed in separate small buildings; that prices are becoming stabilized; that putting surplus stock in the summer to breeding purposes would be workable; and that, if institutes for animal breeding should be set up by universities, they cannot be expected to produce all the animals needed. He mentioned again the work of the Bureau in visiting commercial breeders and in giving advice on the healthy running of the colonies.

Great appreciation of Dr. Lane-Petter's paper was expressed, and it was unanimously decided that it should be published *in extenso* or even enlarged, if possible in one of the scientific review journals.

STUDY OF THE BRITISH FLORA DURING 1952

THE discovery, in remote parts of Scotland in recent years, of easily recognized plants such as *Kaenigia islandica* L. and *Diapensia lapponica* L.¹ is sufficient indication that there are still large areas in the British Isles awaiting botanical investigation. During 1952 two more species of northern distribution well known in Scandinavia have been added to our flora.

The finding by Sir Christopher Cox of *Artemisia norvegica* Fr. in north-west Scotland in August has already been announced². Known only from Norway and the northern Urals, it belongs to a circumpolar group of closely related species which are very unlike representatives of the genus previously known from Britain. The other outstanding addition to our list of native species in 1952 is that of a sedge which appears in current Scandinavian literature as *Carex pulchella* (Lönnr.)³⁻⁵. It is allied to *C. serotina* Mérat (*C. Oederi* auct.), and has been brought to the notice of workers in Britain by Miss E. W. Davies (University College, Leicester). During the summer she found it in several localities in Perthshire and north-west Scotland, and there are specimens in herbaria collected earlier. For reasons of nomenclature she proposes to publish the discovery under an appropriate name which is not the one by which it is known in Scandinavia.

At the annual exhibition meeting of the Botanical Society of the British Isles, arranged in the lecture room of the British Museum (Natural History) (by kind permission of the trustees) on November 29, *Artemisia norvegica* was represented by Norwegian material exhibited by the Department of Botany of the Museum, and *Carex pulchella* by Scottish material in an exhibit prepared by Miss Davies.

Another addition claimed during the year is *Cakile edentula* (Bigel.) Hook. from the coast of north Scotland, the Outer Hebrides and Shetland⁶. Löve has shown that while the British *Cakile maritima* Scop. (which is diploid) ranges around the whole coast of Europe and the Mediterranean, the tetraploid North American *C. edentula* occurs in Iceland and the Azores⁷. D. E. Allen (University of Cambridge) exhibited at the meeting British material determined as representing the two species, with drawings illustrating the characters of the leaves and fruits. A sedge from Ben Lawers which appears to be allied to *Carex parallela* (Læst.) Sommerf.⁸ shown by N. Y. Sandwith (Royal Botanic Gardens, Kew), and an unnamed *Euphrasia* from Caithness displayed by Dr. E. F. Warburg (Department of Botany, University of Oxford) may, on further investigation, also prove new. An interesting hybrid between *Rumex conglomeratus* Murray and the naturalized South American *Rumex cuneifolius*, Campd., collected by Dr. F. R. Elliston Wright at Braunton Burrows, North Devon, and shown by J. E. Lousley, is apparently new to science.

The exhibition also included examples of important re-discoveries or extensions of range. One of the most interesting of these was *Ononis reclinata* L. collected last June by Miss H. M. Bigwood on the limestone of the Gower Peninsula. The locality is likely to be the one at which it was found by D. Sharpe on September 18, 1828⁹, where, in spite of searches by competent botanists, it has not been seen since that date. The only other stations on the mainland are the well-known one in Devon, and the

Mull of Galloway, where it has not been found for many years. During 1952, *Arenaria norvegica* Gunn. was found by E. C. Wallace on basalt scree in what is only the second station on the mainland—the locality is in the Watsonian vice-county Westernness, 97. He also showed *Draba rupestris* R. Br., *Saxifraga rivularis* L., *S. nivalis* L., *Carex atrata* L. and other rare plants new to west Ross-shire. Miss F. E. Crackles exhibited the scarce grass *Calamagrostis neglecta* (Ehrh.) Gaertn. from Leven Canal, south-east Yorkshire, together with specimens of a putative hybrid with *C. canescens* (Weber) Roth., which grew with it¹⁰. A surprising extension of range was that of the fern *Dryopteris cristata* (L.) A. Gray from Dungeness, shown with other recent discoveries in Kent by F. Rose (Bedford College, University of London). *Limosella subulata* Ives, previously known only from Glamorgan and the vicinity of Portmadoc, was shown as living material from near Towyn, Merioneth, by Miss C. M. Goodman.

Additions to the list of British plants and to our knowledge of their distribution are of considerable interest; but the intensive studies of species, or groups of species, now being carried out represent work of greater fundamental importance. This work is being furthered by the introduction of new techniques over a wide field. It is a healthy sign that workers are adapting methods used in industry and other branches of science. Two exhibits at the 1952 meeting demonstrated the use of punched cards for statistical investigations. One of these, by P. C. Sylvester-Bradley (Department of Geology, University of Sheffield), illustrated the methods to be used in "The British Rose Survey" which he is organizing in collaboration with Dr. R. Melville. It is intended to enlist the help of a considerable number of assistants to score the characters of bushes in random colonies of roses. The characters are to be recorded on a 'Wilmott grid', and analysed by means of the Powers-Samas system of punched card coding. By this means it is hoped to ascertain the degree of 'reticulation' present.

An ingenious card-index system for ecologists was demonstrated by F. Perring and R. G. West (School of Agriculture, Cambridge). This is an attempt to simplify the task of sorting large quantities of ecological data, and the authors have in mind the possibility of such cards being stored in a national repository. Some thirty-five ecological features of the habitat are recorded by clipping out holes around the edges, while there is space in the centre of the card for listing 715 species of plants. By manipulating the cards it is possible to select all those showing any given combination of ecological factors. Watsonian vice-county numbers are used as part of the reference.

The co-ordination of characters within two 'varieties' of *Lathyrus nissolia* L. was shown by Miss M. J. Herbert and J. M. F. Cannon in an interesting three-dimensional graph-model. Three co-ordinates were employed: mean leaf ratio, pod axial diameter, and pod variation index, and the position on the graph of specimens examined was indicated by beads suspended on threads. Those representing "var. A", with a coloured bead to show the characters of the Linnean type specimen, were separated by a wide gap from those of "var. B", which is var. *pubescens* Beck. A map of the distributions in Europe showed that they occupy separate geographical areas, while living cultures indicated differences in the rate of growth.

Dr. H. G. Baker (Department of Botany, University of Leeds) exhibited *Limonium humile* Mill and *L. vulgare* Mill; these show pollen and stigma dimorphism. The former is monomorphic and self-compatible, and the latter dimorphic and self-incompatible—maps showed the relationship between the British and allied monomorphic and dimorphic species. Mrs. Y. Heslop-Harrison demonstrated variation in *Nymphæa alba* L. Dissections made from material collected in widely scattered localities over the British Isles seemed to indicate that the separation of *N. occidentalis* (Ostenf.) Moss is unjustified. An exhibit by P. T. Yeo (University College, Leicester) of *Euphrasia vigursii* Davey suggested that, while this puzzling plant appears on morphological grounds to be a hybrid between *E. anglica* Pugsl. and *E. micrantha* Rehb., it grows in places where it could not have arisen by direct crossing. O. Buckle and Dr. C. T. Prime illustrated the distribution of *Arum neglectum* (Townson) Ridley in Sussex with a map and fresh material. Prof. T. G. Tutin (University College, Leicester) exhibited *Poa annua* L., *P. infirma* H.B.K. and *P. supina* Schrad., with hybrids between *P. annua* and the other two species. Of the first species he also showed three genetically different ecotypes which he has in cultivation. A. H. G. Alston (Department of Botany, British Museum (Natural History)) exhibited the hybrid ferns *Asplenium* × *Breyneii* Retz. and *A.* × *murbeckii* Doerfl. synthesized from their parents by Dr. Meyer, with specimens found wild for comparison.

During 1952 the first original British Flora¹¹ for a generation was published, and the influence of this was to be seen in several of the exhibits. Dr. E. F. Warburg (Department of Botany, Oxford), one of the authors, showed some of the little-known segregates described in the Flora. D. E. Greenwood (Botany School, Cambridge) illustrated the distribution of two of these, *Salix cinerea* L. and *S. atrocinnerea* Brot., in the Cambridge district with useful observations on the correlation of characters. Miss S. Littleboy showed work on *Galeopsis tetrahit* L. and *G. bifida* Boenn.

Poa palustris L. has been known in Britain since 1879. M. E. D. Poore and Dr. S. M. Walters (Botany School, University of Cambridge) showed maps marked with the stations from which it is known, and considered the evidence for its status. The localities now include Woodwalton Fen, where it is abundant, but unrecorded until 1950, and Wicken Fen, where it has only recently been verified though doubtfully identified material was collected there in 1941. Dr. Walters also had exhibits illustrating the distribution of *Alchemilla minor* Huds. sec. Wilmott, and, with Miss M. E. Bradshaw, the detailed distribution of species of *Alchemilla* in Teesdale. Other exhibits from the Botany School were: *Cardamine hayneana* (Rikli) Junge by D. E. Allen, *Galium pumilum* Murr. by K. M. Goodway, and *Alisma plantago-aquatica* L. and *A. lanceolatum* With. by C. A. Priestley. Further exhibits of small groups included: hybrid carices by Miss E. W. Davies, the affinities of *Catabrosa aquatica* L. by M. Borrill, and *Ranunculus flammula* L. by Miss P. A. Padmore (all of University College, Leicester); autogamous *Epipactis* in Britain and Scandinavia by Dr. D. P. Young, and *Helianthemum canum* (L.) Baumg. by Miss M. E. Griffiths. K. J. F. Park showed some interesting northern species of *Euphrasia*, Dr. A. Melderis (Department of Botany, British Museum (Natural History)) demonstrated hybrids of the

British *Elytrigia*, and G. O. Allen exhibited British charophytes.

An exhibit of considerable general interest, by W. T. Stearn (Department of Botany, British Museum (Natural History)), illustrated "The creation of new species through hybridisation resulting from man's activity". This included the species which have arisen from *Tragopogon pratensis* L. and *T. porrifolius* L., and the well-known *Spartina townsendii* H. and J. Groves. From the European Herbarium of the Museum were shown type-specimens of *Limonium* and *Rubus*, and material of special interest in connexion with recent field meetings of the Botanical Society. The Library of the Museum provided unpublished illustrations of the British Flora by Miss B. O. Corfe, F. H. Round, E. F. Bedford, Miss Margaret Knox and Miss Ellen Hawkins. J. E. Raven, P. D. Sell and Dr. C. West exhibited a series of specimens of little-known British *Hieracia* set out side by side with paintings by Mr. Raven of the same specimens before they were dried. Mrs. H. N. Clokie (Department of Botany, University of Oxford) had an exhibit dealing with Jacob Bobart the elder (1599-1679) and Jacob Bobart the younger (c. 1640-1719).

Limitations of space prevent reference to other exhibits, and the selection has been made on the basis of those which indicate the development of our knowledge of the British flora. It is evident that much of the current research is being carried out by younger workers. Many of them wisely restrict their studies to a single species, or to a small group of species, and these are being investigated in greater detail and from more aspects than would have been possible only a few years ago. Scope for the investigation of the British flora is still great. The record of discoveries and progress of research during 1952 is highly satisfactory.

J. E. LOUSLEY

¹ Lousley, J. E., *Nature*, **168**, 934 (1951).

² *Gardeners' Chronicle*, **132**, 112 (1952).

³ Lid, J., "Norsk Flora", second edition, 170 (1952).

⁴ Lindman, C. A. M., "Svensk Phanerogamflora", 152 (1926).

⁵ Raunkjær, C. (Ed. K. Winstead), "Dansk Ekskursions-Flora", 59 (1942).

⁶ Allen, D. E., *Watsonia*, **2**, 282 (1952).

⁷ Löve, A. and D., "Studies on the Origin of the Icelandic Flora", 1, Dept. of Agriculture Reports, Series B, No. 2, 1 (1947).

⁸ Sandwith, N. Y., *Watsonia*, **2**, 279 (1952).

⁹ Groves, H., and Groves, J., *J. Bot.*, **45**, 280 (1907).

¹⁰ Crackles, E., "The Naturalist for 1952", 183 (1952).

¹¹ Clapham, R., Tutin, T. G., and Warburg, E. F., "Flora of the British Isles" (1952).

NATIONAL PHYSICAL LABORATORY, TEDDINGTON

ANNUAL REPORT FOR 1951

THE annual report for 1951 of the executive committee of the National Physical Laboratory, Teddington, was presented to the meeting of the general board held on May 23 last and has since been published*. It consists of a general survey of the activities of the Laboratory and its various supervisory committees, together with more detailed individual reports, prepared by the respective superintendents or officers-in-charge, of the work undertaken by the ten Divisions, the Electronics Section and the Test House of the Laboratory.

* Department of Scientific and Industrial Research: National Physical Laboratory. Report for the Year 1951. Pp. 77. (London: H.M.S.O., 1952.) 3s. net.

The most important change during the year under review was the transfer of the Engineering Division to the new laboratories of the Mechanical Engineering Research Organization at East Kilbride. Other changes include the closing down of the Statistics Section of the Mathematics Division in order to concentrate on the construction and operation of the Division's two new machines, the ACE (automatic computing engine pilot model) and a 20-integrator differential analyser. No progress was made with the provision of a new ship tank and cavitation tunnel, and the Froude ship research sub-committee has expressed its deep concern at this lack of progress in the provision of what it considers to be equipment essential for the future development of the ship-building industry in Great Britain. An interesting development was the appointment of a small sub-committee to consider the possibilities of the utilization of solar energy.

The report states that, at the extensive series of open days, held during May 23-29, 1951, some 3,400 scientific research workers from universities, government departments and industry were invited to visit the Laboratory. On the two days prior to the meeting of the general board, a symposium on recent developments and techniques in the maintenance of standards was held¹ and the proceedings of this symposium have recently been published². Other meetings held during the year included discussions on the properties of iron, on flaw detection and, with thermometer manufacturers, on the types of thermometers which the Laboratory should undertake to test.

The Laboratory took part in several exhibitions of scientific instruments, including the Royal Society soirées, the Physical Society annual exhibition, and the French scientific instrument exhibition at Paris. During the year an illustrated book, "Jubilee Book of the N.P.L.", describing the past and present work of the Laboratory, was published³. Other publications were the first booklet, entitled "Gauging and Measuring Screw Threads", in the series "Notes on Applied Science", and No. 1 in the short series of pamphlets dealing with the units and standards of measurement employed at the Laboratory⁴. The Laboratory has continued to receive many scientific and technical visitors from abroad, and both the director, Dr. E. C. Bullard, and senior members of the staff have paid visits to countries overseas to attend conferences or to exchange information with workers in other organizations. In addition to the names of the members of the general board, executive committee and sub-committees, the report lists the names and positions of the senior staff and includes a bibliography of the numerous scientific papers published by the staff during 1951.

The individual reports of the various sections of the Laboratory make interesting reading. The Aerodynamics Division, mainly concerned with problems connected with the design and performance of high-speed aircraft, reports much work in progress on delta and swept-back types of wings. A new high-speed laboratory was under construction, and two high-speed wind tunnels, one 36 in. by 14 in. and the other 25 in. by 20 in., together with a low-turbulence pressurized wind tunnel (8 ft. by 6½ ft.) were being planned. In the Electricity Division two fresh determinations of the ohm, by reference to the primary standards of mutual inductance and frequency, have been made. These agreed with each other to within one part in 10⁶, although they differed from the last set of absolute determinations, made