tendency of the university is towards technical and professional education, often for the purpose of examinations, enabling the scientific and natural history societies to provide, in addition to opportunities for research, the scientific background for those who wish to stand and stare. In this work his own Department could, and is anxious to, co-operate.

By a happy coincidence it was announced during the Congress that the award of O.B.E. had been conferred upon the president of the Richmond Scientific Society, Miss E. M. Wakefield, deputy keeper of the Herbarium and chief mycologist in the Royal Botanic Gardens, Kew, for her services to science.

STANDARDIZATION OF UNITS OF MEASUREMENT IN CIVIL AVIATION

By W. J. V. BRANCH

Air Navigation Commission, International Civil Aviation Organisation, Montreal

LAST year it was announced that the Montreal headquarters of the International Civil Aviation Organisation had obtained agreement on a plan to standardize the dimensional units used in air/ground communications in civil aviation and that this agreement has been implemented by a considerable number of countries (see *Nature*, July 2, 1949, p. 17). It is as yet impossible to say what final success this plan will have; but it is of interest to note some trends which are developing in the process of its implementation, and the following table shows the percentage of countries which have adopted units of the Organisation.

PERCENTAGE ADOPTION (BY COUNTRIES) OF THE FINAL I.C.A.O. (WORLD STANDARD) UNITS

		per cent
(1) Distances	Nautical miles	74
(2) Horizontal speed	Knots	74
(3) Wind direction and speed	Degrees and knots	89
(4) Altimeter setting	Millibars	89
(5) Temperature	Centigrade	95
(6) Time	24 hours, the day beginning at midnight G.M.T.	100
(7) Altitudes, aerodrome dimensions and short distances	Metres	55
(8) Vertical speed	Metres/second	55
(9) Cloud height	Metres	55
(10) Visibility	Metres or kilometres	58
(11) Weight	Kilogram	57

These figures refer to countries of which the practices in this respect are officially known; for example, the figure of 74 per cent for the distance units represents only thirty-two countries. It must also be emphasized that these figures do not necessarily reflect accurately the relative frequency with which the various units are used, since the percentages are related to countries and do not take into account the relative contributions and importance to world aviation of each of the countries. Thus, though the available records show that only 12 per cent of the countries employ statute miles for the measurement of distance, the statute mile is nevertheless widely used for this purpose, since one of the countries using it, the United States, accounts for a very large percentage of the air miles flown.

It would seem that the first six units listed are quite certain to gain final world adoption. Probably the most interesting trend is the widespread agreement to use nautical miles and knots as the units for distances and horizontal speed—a clear indication of the desire of the metric countries, which would, of course, prefer to use kilometres, to co-operate in this experiment. It seems probable that even in those countries which have not yet adopted these two units, the gradual pressure of world practice, the extent of which is indicated by the figure of 74 per cent, will lead to its adoption in countries which do not at present use these units.

An examination of the last five units shown in the table indicate that in their case the final position is much less certain. Generally speaking, the difficulty in adopting these units arises from the proposal to use metres in place of feet, and the continued vitality of the foot unit in opposition to a great deal of scientific opinion is quite remarkable. The outcome of the struggle between the foot and the metre will probably decide, for a considerable time, whether the world can agree on a single system of units for one of its most international services, that is, aviation, or whether there will have to be at least two major systems of units in general use.

EARTHQUAKES DURING JANUARY–MARCH

DURING the first quarter of 1950 there were four earthquakes of instrumental magnitude 7 or greater, sixteen of magnitude 6–7, and numerous smaller shocks. The four with magnitude 7 or greater occurred on January 2 in the Queen Charlotte Islands region ($M = 7$); on January 12 in the Fiji Islands region ($M = 7$); on February 28 off the north coast of Hokkaido, Japan ($M = 7\frac{3}{4}$); and on March 27 off the south coast of Sumatra ($M = 7$). Fortunately all these had epicentres in uninhabited places, and only the Japanese shock was felt. Also during the three months three earthquakes had foci at depths of 500 km. or deeper, seven had foci of 100–500 km., and the rest had shallower foci. The three deep-focus earthquakes occurred on January 12, as mentioned above, in the Fiji Islands region ($d = 500$ km.); on February 23 in the Sea of Okhotsk ($d = 500$ km.); and on March 16 again in the Fiji Islands region ($d = 600$ km.).

Many minor shocks were felt during the three months. During January the following earthquakes and tremors were felt: on the 3rd of the month at Andinclaroby, Madagascar (Modified Mercalli Scale intensity 4); on the 4th in central Italy; and on the 6th in Lisbon. On January 9 at 19h. 40m. 33s., G.M.T., an earthquake with epicentre near lat. 51·1° N., long. 1·9° E. was felt at several places along the Straits of Dover. People at Dover felt a severe tremor; and at St. Margaret's Bay, Kent, a slight tremor was felt and a noise like an explosion was heard, while at Deal doors and windows rattled and people felt chairs move. On the other side of the English Channel the tremor was felt at Calais where also plates were shaken from tables; but the tremor was not felt at Dunkirk or at Boulogne. On January 13 a tremor was felt at Mansourah-Les-Biban, Algeria (*M.M.* intensity 4); on the 16th of the month one was felt at Bucharest (*M.M.* intensity 4); on the 21st another in Central Chile; and on the 29th one was experienced at Walliser–Hochalpen (*M.M.* intensity 4). On January 31 an earthquake with epicentre at lat. 43° N., long. 0° 13′ E. near Campan in the Hautes

Pyrénées was felt strongly (*M.M.* intensity 7) at Beaudéon and with lesser intensity at other places near by.

During February the following earthquakes and earth tremors were felt: on the 22nd of the month at Stoss in Mittelwallis (*M.M.* intensity 5); on the 25th in the Iles Ithoque and Leucade (*M.M.* intensity 4); on the 26th with slight damage at Ventura, California; and on the 28th, as already mentioned, off the north coast of Hokkaido, Japan. During March earthquakes were felt at the following places: on the 7th at Ilo-Ilo in the Philippine Islands; and on the 8th at Coblenz, Bonn, Cologne, Andernach and in the Ahr Valley. The earthquake of March 7 occurred at 02h. 07m. 46s., G.M.T., from a focus having an epicentre at lat. 10° N., long. 124° E.; it had instrumental magnitude $6\frac{3}{4}$.

Collective reports have been received from the central stations at Strasbourg, Washington, D.C. (United States Coast and Geodetic Survey) and Zurich; and individual reports from the observatories at Belgrade, Cleveland (Ohio), De Bilt, Durham, Kew, Pasadena, Perth (Western Australia), Stuttgart, Toledo and Trieste.

PREPARATION OF SPECIMENS FOR THE ELECTRON MICROSCOPE

THE primary physical advantage of the electron microscope lies in its greatly increased resolving power, as compared with other forms of microscopy. Hence it finds a place as a research tool, supplementary to optical methods, in all those fields of investigation and routine testing which involve the examination of details smaller than a micron in extension. In the ten years or so since it became generally available, it has found innumerable applications. There are now about five hundred instruments in use throughout the world, in a variety of laboratories, but mainly in those engaged in biological and metallurgical research. A correspondingly wide variety of preparative techniques has been devised, and these must meet the special limitations imposed by the low penetration of electrons in matter and the consequent necessity of using specimens rather less than the wave-length of light in thickness and of desiccating them before observation. Great advances have been made since the Second World War, especially in the cutting of very thin sections of biological material and in preparing replicas of massive specimens, such as metals.

Until now, no collected account has been available of these techniques of electron microscopy, although there have appeared several works on the instrument itself. The omission has been due partly to the difficulty of treating a subject which is in rapid development, and partly to the great breadth of field to be covered. The need for such a compilation was discussed by the Electron Microscopy Group in 1945, and on the proposal of Sir Charles Darwin it was decided to initiate a collective effort towards its production. Dr. D. G. Drummond, of the Shirley Institute, Manchester, was entrusted with the task of editing it. The co-operation of the chief laboratories in Great Britain engaged in electron microscopy was readily obtained, and it was possible to circulate a typescript draft for criticism by the end of 1947. It was used in the summer schools in the subject held in the Cavendish Laboratory, Cambridge, in 1948 and 1949, and benefited from this 'pilot run' as well as contributing greatly to the success of the courses. The editor then prepared an enlarged and amended version, which has now been published as the March issue of the *Journal of the Royal Microscopical Society**, an arrangement which has permitted a high standard of production at a moderate cost. The editor and Society are to be congratulated on the appearance as well as on the content of the monograph in its final form.

Systematic treatment is accorded to the techniques which are basic to most applications of the electron microscope, followed by detailed attention to individual special fields: small particles, micro-organisms, surface replicas, tissues, sectioning and staining. There is also a short consideration of the most important instrumental matters: the determination of magnification and resolving power, and photography. The text is thus obviously of the greatest value to users of the instrument, but it will also be of interest to the non-specialist, in showing what is now possible of examination. For example, replica methods are now applicable not only to metals, but also to the surfaces of ceramic materials, porous materials such as wood, biological tissues, and crystals, including those of proteins. Similar progress has been made in the cutting of biological sections sufficiently thin (0·1–0·2 micron) for electron microscopy, through refinement of the existing types of microtome and attention to embedding-materials and cutting-temperature.

The scope of the book is confined to preparative methods and related techniques. It does not attempt to deal with the operation and maintenance of the electron microscope, a subject on which there is at present no manual. Nor is it concerned with the range and significance of the researches so far carried out with it. However, these aspects are well discussed in the "Symposium on Metallurgical Applications of the Electron Microscope" (Monograph and Report Series No. 8, Institute of Metals) and in R. W. G. Wyckoff's "Electron Microscopy", which deals mainly with biological work.

In its chosen field, the new manual fulfils admirably an important gap. In addition, its appearance is significant in showing how far the increasing complexity and range of application of scientific techniques may be reduced to order and interpreted by collective effort. Such a work is and could only be produced by some form of co-operation—and a form which is rather different from the team-work which is now usual on large research projects. The activity of the Electron Microscopy Group has comprised the practical teaching of the subject in the summer school, which is to be repeated this year, as well as the compilation of "The Practice of Electron Microscopy"; a comprehensive bibliography has also been assembled, by similar collaborative methods, and will shortly be published. If it has to be said that the instrument itself was invented and perfected in Germany, and that the United States possesses the greatest number of them, it is yet creditable that Great Britain is foremost in the exposition of such a widely useful technique, which has extended the resolving power of optical methods almost to atomic dimensions. V. E. COSSLETT

* The Practice of Electron Microscopy. Edited by D. G. Drummond for the Electron Microscopy Group of the Institute of Physics. (London: Royal Microscopical Society, 1950.) 21*s*.