eight weeks, shoots of 12 nodes remained vegetative and continued growth on the main axis only; 15-node plants developed flowers after six to eight weeks, 20-node plants after three weeks, and 30-node plants after one week of such treatment.

The observed interactions between temperature and photoperiodic behaviour link the three papers. In chrysanthemum inductive photoperiods may be ineffective at, or when preceded by, low temperatures; dormant seedlings of birch are no longer sensitive to photoperiod after chilling; birch seeds are light-sensitive at 20° C., photoperiodically sensitive at 15° C., and will germinate in the dark after exposure to low temperature; raspberry canes are photoperiodic at 15·5° C. but will initiate flower primordia in any day length at 10° C. The various types of interaction are of considerable interest, and their mechanism merits further study.

The afternoon session was opened by a paper by Dr. van der Veen (Philips Research Laboratories, Eindhoven, Holland) on the influence of coloured light. Dr. van der Veen emphasized the technical difficulties of obtaining light of high spectral purity at intensities sufficiently great to maintain growth, and demonstrated that a very small amount of contamination at certain wave-lengths may be important. Blue light with a small amount of near infra-red may cause internode elongation, whereas pure blue light results in internode shortening; a small amount of infra-red in red light is less important because of the red/infra-red antagonism in many species. Dr. van der Veen emphasized the complexity of the reaction of plants to coloured light, pointing out that response may vary according to the species and to the method of application. The effectiveness of a flash of red light in the middle of a long dark period in promoting flowering in long-day plants and inhibiting flowering in short-day plants is well established. However, the long-day plant *Hyocyamus niger* will not flower in long days in red light alone, but will flower in the same day length when a small amount of near infra-red radiation is added. Variations between species was illustrated by reference to leaf expansion, which is promoted in many species by red light but occurs only in blue light in *Mirabilis*, and to internode extension, which may be increased (tomato) or decreased (pea) by exposure to red light.

Practical plant irradiation was the subject of the final paper by Mr. A. E. Canham (Electrical Research Association), who discussed the relative merits of several standard types of lamp for various applications in horticulture. Lamps may be used in insulated dark structures to replace daylight or in glasshouses, as a supplement to natural daylight when the light intensity is low; different factors must be taken into consideration in the two methods of irradiation. When daylight is replaced entirely, both formative and photosynthetic effects must be considered; the maximum rate of photosynthesis occurs in red light but the formative response to wave-length varies widely with species and, with the present limitation of knowledge, radiation in all visible wave-lengths, with no undue preponderance in one band and with little near infra-red radiation, is recommended. 'Daylight' fluorescent lamps have been found to be most satisfactory in producing 'normal' growth but, because of their low intrinsic brightness, large numbers are required. The formative effects of lamps are less important for supplementary irradiation since daylight will tend to balance the lamp effect, but an unduly high proportion of red or near infra-red may result in elongation and/or leaf epinasty in some species. Providing the formative effect is not unfavourable, economic and practical considerations largely determine the choice of lamp; of the lamp types currently available the high-pressure mercury vapour lamp is generally recommended.

The symposium concluded with a film by Mr. A. G. Sparkes (West End Nurseries, Angmering) showing the use of photoperiodic regulation in practice to achieve flowering of chrysanthemums all the year round. With suitable schedules of lighting, and shading with black cloth, flowers may be cut in every week of the year.

The papers presented at the symposium will be published in *Scientific Horticulture*. D. Vince

A FLORA OF EUROPE

By Prof. N. A. BURGES and Dr V. H. HEYWOOD
University of Liverpool

Historically, plant taxonomy has tended to pass through phases of local exploration, consolidation and regional synthesis, occasionally the whole cycle being repeated at a higher level of knowledge. In Europe, however, taxonomy has never attained this overall regional view. On the other hand, no other continent or part of the world, with a flora comparable in number of species, displays such a diversity of partial Floras, each with independent criteria and more or less strict adherence to national or local boundaries.

With the exception of some areas in Spain and the Balkans, few basic systematic novelties await discovery and description in Europe. Individually, most European countries can now claim that the descriptive-geographical taxonomy of their flora has been satisfactorily achieved. With the new tools of cytogenetics, ecology and biometrics and like disciplines, and with the new ideas inspired by modern genetical and evolutionary theory, much of the work now undertaken by European taxonomists on their own floras is of an experimental or evolutionary nature. Descriptive taxonomy is largely limited to that of the colonies or other territories administered by their parent countries.

There are signs that this local analysis, in the absence of compensating synthesis, may prove detrimental to taxonomy as a whole. The position is such that to answer almost any question on European taxonomy the specialist has to refer to upwards of fifty Floras and countless papers and then synthesize the resultant information. This is time-consuming enough for the professional taxonomist who knows the literature well and who has it available (and

there must be few indeed who would claim this distinction to-day); but for the workers in other fields such as evolution, phytogeography, etc., who are dependent on easily accessible taxonomic data the position is almost intolerable. Only the large national herbaria can afford to stock the necessary literature, and the number of taxonomists with adequate training and experience of European taxonomy as a whole is, rightly or wrongly, so small as to constitute a distinct problem.

Although some works have a wider scope—for example, Hegi's monumental "Illustrierte Flora von Mittel-Europa" and more recently Hylander's "Nordisk Kärlväxtflora", covering Fennoscandia, Iceland and the Faeroes—there is still no overall treatment of Europe.

In an attempt to alleviate this situation, a committee has been formed of British and Irish botanists to consider the possibilities of writing a Flora of Europe, condensing in three or four volumes the essence of the scattered published information about European plant taxonomy. Much progress has been made, and it now seems likely that the proposed Flora has every chance of success. A number of distinguished European colleagues have declared their support and interest in the project and some of them have consented to act as advisory editors. The Linnean Society of London has promised its patronage and the Director of the Royal Botanic Gardens, Kew, and the Keeper of Botany at the British Museum (Natural History) have agreed to assist in an advisory capacity.

The Flora will cover Europe in the normally accepted sense of the word and will connect up with the area covered by Komarov's "Flora of the URSS". The intention is to key and describe briefly all the major taxa of Angiosperms and Gymnosperms that grow spontaneously in Europe. Subspecies will be included, but not as a rule varieties unless they are well marked or have some claim to consideration at a higher taxonomic level. Those taxa which are currently given a binomial in widely used Floras but which clearly do not deserve full specific rank will not be reduced in status in the Flora unless there is strong evidence for such action; normal procedure will be to include them in their original binomial form after the species to which they appear to be most closely related.

The Editorial Committee is: Prof. T. G. Tutin (University of Leicester, *chairman*), Dr. V. H. Heywood (University of Liverpool, *secretary*), Prof. N. A. Burges (University of Liverpool), Prof. D. H. Valentine (University of Durham), Dr. S. M. Walters (University of Cambridge) and Prof. D. A. Webb (University of Dublin, Trinity College).

Further information about the progress of the Flora will be published from time to time in the journal *Taxon*.

OBITUARY

Sir John Simonsen, F.R.S.

WITH the sudden death on February 20 of Sir John Lionel Simonsen passed one of the last of the chemists trained in the Edwardian experimental tradition. He was born in 1884, his father being a naturalized Danish merchant and his mother also originally Danish; John Lionel remained in intimate contact with his Danish relations all his life. He was educated at Manchester Grammar School and then obtained first-class honours under W. H. Perkin, jun., at the Victoria University, Manchester, his contemporaries there including Sir Robert Robinson, Sir Norman Haworth and C. S. Gibson.

His career included both academic and public service, and fell into four main chapters. First, six years research at Manchester, as research fellow and later assistant lecturer. Secondly, seventeen years in India—1910–19, professor of chemistry, Presidency College, Madras; 1919–25, Forest Research Institute and College, Dehra Dun; 1925–27, professor of organic chemistry, Indian Institute of Science, Bangalore. Then, from 1930 until 1942, he was professor of chemistry at the University College of North Wales, Bangor; and finally, until the end of 1952, director of Colonial Products Research, South Kensington, London.

In the laboratory Simonsen's sure technique was a joy to watch; typically his bench carried a few covered conical flasks or beakers, a few stoppered test-tubes, all labelled, and perhaps a distillation in progress; the rest would be an empty expanse of gleaming teak. His 176 published experimental papers —a large output since so many antedated micro-analysis—cover the whole period 1910–42, and much was done with his own rapid, skilful hands. Nearly all this work was on terpene chemistry, that on barbaloin being a notable exception; it included a long series on Indian trees and grasses, and later many papers on Australian oils supplied by A. R. Penfold (these papers always carried also Penfold's name). He was soon an acknowledged authority in the field, and his book "The Terpenes", published in two volumes in 1930–32, became at once the standard work. This edition stopped at the bicyclic series, but the second edition, which covers also the higher terpenes, runs to five volumes and has been written in collaboration with L. N. Owen, D. H. R. Barton and C. W. J. Ross; he lived to pass the proofs of the last volume, and to the end collected references from the Chemical Society library for a third edition.

Simonsen's public services rank alongside his scientific work. It was he and Dr. MacMahon who, by personal letters, started the Indian Science Congress in 1914, with two hundred members; he was its honorary secretary from that beginning until 1926, and its president in 1928; the present membership of thousands is testimony to his foresight. For three years during the First World War he was controller of oils and chemical adviser to the Indian Munitions Board. It was mainly due to him and Sir Robert Robinson that the Microbiological Research Institute was founded in 1944 in Trinidad, as part of his enthusiasm for the development of Colonial resources.

Simonsen received the Kaiser-i-Hind Silver Medal in 1921, and a knighthood in 1949. He was elected a Fellow of the Royal Society in 1932, received its Davy Medal in 1950, was the first recipient of the