

and with citation of specific examples the mechanism of correlation in plant development; Prof. J. Heslop Harrison similarly dealt in broad outline and in some detail with certain concepts of the action of growth substances in flower morphogenesis; and Dr. P. W. Brian gave an interesting account of morphogenetic situations in which the gibberellic acids were more or less directly involved. Also in the category of more general surveys, Dr. L. C. Luckwell outlined the very considerable scope for work on the factors controlling the growth and forms of fruits, and outlined some of the contemporary studies and achievements.

Among the many investigations of growth and form presented to the meeting, it was interesting to note that the algae (Dr. E. M. Burrows), fungi (Dr. N. Robertson) and mosses (Dr. J. H. Tallis; Dr. E. Lodge) had attracted their share of attention, as, indeed, they well might. Perhaps the most evident omissions were papers dealing with the contributions of tissue- and organ-culture techniques to morphogenesis; little was said about the action of physical factors in morphogenesis and, with some exceptions, genetical factors tended, on the whole, to be taken for granted and treated, as it were, in passing.

Considerations of space do not admit of detailed reference being made to the many papers contributed to the symposium. A high standard of interest was certainly maintained throughout. In the circumstances, the scope and vitality of contemporary work on the many aspects of morphogenesis in British universities and horticultural institutes may perhaps be indicated by citing the titles to which reference has not already been made: effects of environment on leaf development in *Impatiens parviflora* (Dr. A. P. Hughes); some factors affecting the production of stolons in the potato (Dr. A. Booth); the study

of apical development in relation to etiolation (Dr. G. R. Lane and Mr. R. D. Butler); the experimental investigation of the pteridophyte life-cycle (Mr. P. R. Bell); changes in leaf arrangement in individual fern apices (Dr. E. G. Cutter); some growth responses to gibberellic acid (Dr. M. Y. Stant); the effect of very long days on the flowering of winter rye (Prof. F. G. Gregory and Dr. Olive N. Purvis); some effects of environment and hormone treatment on reproductive morphology in *Chrysanthemum* (Dr. W. W. Schwabe); floral morphogenesis in *Primula bulleyana* (Dr. F. Cusick); problems of juvenility and flowering in trees (Prof. P. F. Wareing); temperature-induced meristic and other variation in *Cannabis* (Dr. Y. Heslop Harrison and Miss I. Woods).

A complete number of the Linnean Society's *Journal of Botany* is being devoted to publishing the contributions to the symposium, and the papers are already in the hands of the printers. As it is anticipated that there will be a larger demand than usual for this number of the *Journal*, all those who are not Fellows or Associates of the Society, and who wish to have copies, should write for particulars, as soon as possible, to the General Secretary of the Linnean Society, Burlington House, Piccadilly, London, W.1. Early publication will not only make available a fund of valuable contemporary information but is also likely to provide a useful stimulus to further effort in this fascinating and central field of botanical science.

The officers of the Linnean Society are to be thanked for rendering a signal service by sponsoring the meeting. Thanks are also due to Prof. Heslop Harrison and Mr. P. R. Bell, who were responsible for the inception and arrangement of the symposium, and they are to be congratulated on the success of its meetings.

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## SCIENTIFIC COUNCIL FOR AFRICA SOUTH OF THE SAHARA

THE report\* of the Secretary-General to the ninth meeting of the Scientific Council for Africa South of the Sahara, held at Accra during August 7-16, which surveys the activities of the Council during the year, is supported by lists of forthcoming meetings and of publications in 1958, and by particulars of the conclusions and recommendations of the Conference. Among the general conclusions of the Conference may be noted the Council's view that the Foundation for Mutual Assistance in Africa South of the Sahara will become one of the most active elements of the Commission for Technical Co-operation in Africa, and the emphasis placed on the very careful examination of each request for technical assistance in Africa in order to determine the best way of meeting it effectively. The Foundation now incorporates the earlier organization for the exchange of scientists and technicians.

Concern is again expressed at the accelerated rhythm of useless destruction and inconsiderate exploitation of Nature and natural resources, and the attention of Governments is directed to the need for agreement at inter-African level in the protection of this common economic and scientific inheritance. Such protection must be based essentially on a policy

of rational utilization, and the Council recommended the urgent establishment of a committee for the conservation of Nature and natural resources in all African territories where no such organization exists; the appointment of an inter-African scientific correspondent responsible for ensuring liaison between the various territorial committees, to follow the evolution of common problems, and to keep the Commission and the Council informed; and the preparation of a charter for the protection of natural resources applicable to all territories in the African continent. The protection visualized by the Council comprises the management and supervision of areas which are properly exploited so that the amount of products consumed is commensurate with real social and economic needs and the possible renewal of resources; the establishment of adequate protective areas as indispensable reserves of flora and fauna; and the establishment of national parks and special reserves to protect certain resources of particular interest or value, which would otherwise become extinct or be rapidly exhausted.

Some change in the functions and activities of the Inter-African Bureau of Soils is recommended to the Third Inter-African Soils Conference to meet in the autumn of 1959, and the establishment of a panel of correspondents is recommended, as a matter of urgency, to cover physical oceanography, marine

\* Scientific Council for Africa South of the Sahara. Publication No. 32: Ninth Meeting of the Scientific Council, Accra, 1958. Pp. 173. (London: Secretariat, C.C.T.A./C.S.A., 1958.)

biology, the technology of fishing and the treatment of sea products. An inter-African scientific correspondent for oceanography and sea fisheries should be appointed to activate this Panel. Subject to confirmation by the Commission, the Council decided to call a meeting of specialists in 1959 to study research and related work in Africa on viruses and rickettsiae common to man and animals, with particular reference to modes of transmission, host species and reservoirs and methods of control. The Council also recommended that the Commission should give closer consideration to the economic aspects of the technical problems with which it is dealing and that the Commission should undertake comparative studies of limited subjects of economic and financial interest, for example, the effect of demographic changes on economic development, and comparative studies of methods applied to encourage private investment and of methods for the stabilization of prices of agricultural products.

The most important development during the year, in respect of the Commission for Technical Cooperation in Africa, stressed in the Secretary-General's report, is the establishment of the Foundation for

Mutual Assistance in Africa South of the Sahara. This Foundation will cover the provision of experts, advisers or the technical advice of specialized bodies; the provision of training facilities, for example, by organizing training centres in Africa of interest to several African countries; and the offer of equipment for research and education. However, the proceedings at the ninth meeting of the Scientific Council, the Secretary-General's report, with its survey of activities in soils and agriculture, in veterinary and medical science, in cartography, and in social, technological and economic matters, illustrate even more strongly the important place which the Scientific Council has already come to occupy in the development of Africa South of the Sahara and its inherent advantages in enabling European scientists, institutes and technical departments to continue to play their part in supplying the scientific and technical assistance needed in Africa. Neither the work of the Council nor its opportunities are as yet sufficiently known and the Bulletin, "Science-Afrique", the twelfth number of which appeared in September 1958, is a valuable supplement to this annual report for distributing information both about the Commission and the Council.

## THERMAL REACTIONS OF HIGHLY FLUORINATED CYCLOHEXADIENES\*

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HIGHLY fluorinated *cyclohexa-1:3-* and *-1:4-* dienes may be prepared from polyfluorocyclohexanes<sup>1-3</sup>, by dehydrofluorination using aqueous alkali<sup>1,2</sup>, ion exchange resins (Banks, R. E., Bevan, W. I., and Musgrave, W. K. R., unpublished results) or pyrolysis (Banks, R. E., and Tipping, A. E., unpublished results). The first aim of the work reported here was the conversion of fluorocyclohexa-1:4-dienes into the more reactive and potentially more useful 1:3-diene isomers. Further, it was hoped that the 1:3-dienes might be sufficiently unstable with respect to the related fluorobenzenes to make possible new syntheses of aromatic compounds from them.

We now wish to report two new thermal reactions of highly fluorinated *cyclohexadienes* by which both these objectives have been achieved. When these compounds are heated to temperatures in the range 250–600° C., in the absence of a reactive metal surface, isomerization is the predominant reaction. When the dienes are heated to similar temperatures in the presence of various metals, defluorination is the predominant reaction and fluorobenzenes are formed. These reactions may be carried out in a flow system or batchwise in pressure vessels.

\* British Patent Application Nos. 29173/58 and 29174/58 (September 11, 1958).

We have found that both octafluorocyclohexa-1:3-diene and octafluorocyclohexa-1:4-diene are converted into a mixture of the dienes by passage through a tube heated to temperatures in the range 400–600° C. The best results were obtained using an unpacked nickel tube which had been 'aged' by carrying out several preliminary experiments, so as to avoid defluorination by the clean metal surface. The contact times required to bring about this and other isomerizations are of the order of 5 min. or less. The compositions of the mixtures produced are not greatly dependent on either temperature or contact times, and it is probable that they are close to equilibrium compositions. It is reasonable to suppose that the equilibrium constant for an isomerization will have only a small temperature coefficient, since the energy differences between the isomers should presumably be of the same order as those between conjugated and non-conjugated hydrocarbon dienes, and these would appear to be small. This is suggested by a comparison of tabulated values of heats of hydrogenation of olefins<sup>4</sup>.

This isomerization reaction is general for highly fluorinated dienes. Thus, treatment of 1H-heptafluorocyclohexa-1:3-diene<sup>1,2</sup> at 260° C. yielded a mixture of the starting material, 1H-heptafluorocyclohexa-1:4-diene and 2H-heptafluorocyclohexa-1:3-