years) has been passed. The Drogheda report has established beyond question the national importance of the Council's work and the efficiency with which it is carried out. It has also established the importance of continuity of planning and finance, and of stable and secure conditions of service. To implement the recommendations to that end would be comparatively inexpensive and is imperative, irrespective of whether or not the Government is prepared to provide the additional resources which would enable the Council to seize the opportunities in Asia and Africa, the reality of which is amply confirmed in the present report.

Since the report was published, the Government has stated in the House of Commons that it proposes to provide an additional £100,000 in the present and next financial years for the expansion of the overseas information services. In particular, it is proposed to strengthen the information services in South-East Asia, the Middle East, Latin America and Canada; to improve the Central Office of Information Press Service and the supply of films for use overseas; to strengthen the Council offices in South-East Asia and Japan, establish new offices in Kuwait in the Persian Gulf and in British Honduras and re-open an office in Persia. Full participation by the Government in the growing cultural activities of the Brussels Treaty Organization and of the Council of Europe is also proposed.

PHYSIOLOGY OF STOMATA

THE seemingly evergreen topic of the physiology of stomata has evoked a number of further contributions by contemporary investigators. M. Shaw and G. A. Maclachlan (Canad. J. Bot., 32, 6, 784; 1954) have studied the carbon dioxide fixation in stomatal guard cells. By exposing the epidermis of species of Tulipa, Hordeum, Tradescantia and Allium, in which only the stomatal guard cells possess chlorophyll, to radioactive carbon dioxide, followed by microautoradiography, they have demonstrated the selective uptake of carbon dioxide by the guard cells in the light. A less intense uptake was observed in the dark with Allium, Sedum, Tulipa and Vicia. The rate of guard-cell synthesis, which was estimated for Tulipa gesneriana, appeared to be too low to account for the increase in osmotic potential caused by illumination. These investigators note that since the opening of stomata is promoted by low carbon dioxide tension, even in darkness, the removal of free carbon dioxide, or an effective lowering of its tension, by guard-cell activity, is probably more important in stomatal opening than the direct photosynthesis of osmotically active solutes in the guard cells.

In a new theory of the mechanism of stomatal movement, W. T. Williams (J. Exp. Bot., 5, 15, 343; 1954) advances the ideas that the important movement is that of closure, that this is a positive or active process, and that the carbohydrate changes so frequently reported are secondary, 'stabilizing' changes, probably not directly linked to the main The evidence for this conception of stomatal process. activity is discussed and some of its implications considered. It is accepted that stomatal movements are primarily the result of turgor changes. In expounding the theory the author directs attention to the many remarkable parallels between the move-

movement in Mimosa, in which it is held that the rapid expulsion of water from the cells of the pulvinus is effected by way of contractile vacuoles, and to the movement of water in protozoa and unicellular algæ. In these micro-organisms this water movement is energy-assisted—a process which allows for the movement of water as distinct from solution, inde-pendent of osmotic gradients. To quote the author on the subject of stomata : "If dark induced loss of turgor is an energy-assisted process, how, during the ensuing hours of darkness, is it maintained ? Must water be continuously pumped out to maintain the flaccid condition ? It would appear so: for the theory postulates that the turgid condition is osmotically the position of rest, to which the cell must return if contractile forces are withdrawn-as occurs in light, or even, in response to an autonomic stimulus, in the unchanging darkness'

E. W. Yemm and A. J. Willis (New Phyt., 53, 3, 373: 1954) have made a study of the diurnal movements of the stomata of Chrysanthemum maximum by means of porometer measurements of leaf resistance and by examination of epidermal strips. The amounts of sugar and starch in the epidermis and mesophyll were estimated. A highly significant correlation was demonstrated between the starch content of the guard cells and pore-width or leaf The opening of stomata in the morning resistance. was associated with a decrease in starch and an increase of sugars in the epidermis together with a fall in the water content of the leaf. The stomata closed when the water deficit exceeded 5 per cent of the water content of the fully turgid leaf. The closure was associated with an increase of starch in the guard cells; but there was no corresponding fall in the sugars of the epidermis. The total carbohydrates of the epidermis showed a distinct diurnal fluctuation which was in some respects like that of the mesophyll. In the light of this investigation the authors suggest that the diurnal movements of these stomata under natural conditions are mainly determined by the water relations of the leaf tissues and carbohydrate changes in the guard cells.

AN EXPERIMENT ON THE INHIBITION OF THERMAL CON-VECTION BY A MAGNETIC FIELD

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THE character of the thermal instability of a layer The character of the thermal hast from below has of incompressible liquid heated from below has been the subject of both experimental and theoretical investigation since Benárd's¹ discovery of cellular convection in those circumstances. The principal results established by these investigations are: (1) that a layer of fluid heated below first becomes unstable when the Rayleigh² number, $R = \frac{g\alpha\beta}{m} d^4$

(where g denotes the acceleration due to gravity, d the depth of the layer, β is the adverse temperature gradient which is maintained and α , \varkappa and ν are the coefficients of volume expansion, thermometric con-