A NEW DISEASE OF THE DAHLIA*

(*Note.*—The following article was written when the disease of dahlias caused by *Entyloma dahliae* was first recorded in England, in 1928. Specimens of the disease have been recently received from a bungalow garden in Kotmale and the article is now reproduced in order to warn growers of dahlias that the disease is present in Ceylon. Prompt action on the lines suggested below will prevent the disease from gaining a firm foothold in the Island and will help to keep out a troublesome and unsightly disease.

The illustration in the original paper could not be reproduced satisfactorily and the plate illustrating the article is from a photograph of diseased leaflets obtained locally.—M.P.)

IF one consults the relevant foreign plant disease literature it will be found that the Dahlia is subject abroad to attack by a considerable number of fungi and by some bacteria. In our own phytopathological books and papers, however, this plant, as a host for fungus attack, is conspicuous by its absence, and complaints are rarely received. Sclerotinia Sclerotiorum, (Lib.) de Bary, has however, been recorded as destroying Dahlia roots in storage in this country, just as it destroys Jerusalem Artichokes, Carrots, etc., but even this disease is not very common.

Our growers of Dahlias, therefore, will regret to learn that their former freedom from fungous diseases is now threatened by the recent appearance in our midst of a new disease which promises, if allowed to run unchecked, to cause considerable trouble. It takes the form of a leaf-spot, which usually becomes pronounced on the older leaves (including the stalks) when the season of growth is fairly well advanced, and when the plants are beginning to flower.

The spots are evident on both sides of the leaves. They are rounded in outline, except where they abut against a substantial vein, and have a well-defined margin. They vary from about one-sixteenth to one-quarter-of-an-inch in diameter, and when numerous they coalesce, forming rather large, irregular blotches in which, however, the original individual spots may still be recognised. At first the spots are pale green or yellowish in colour ; as they get older and enlarge, the centre of each spot becomes grey or brownish-grey, owing to the death of the tissue ; and at this stage the spots show the

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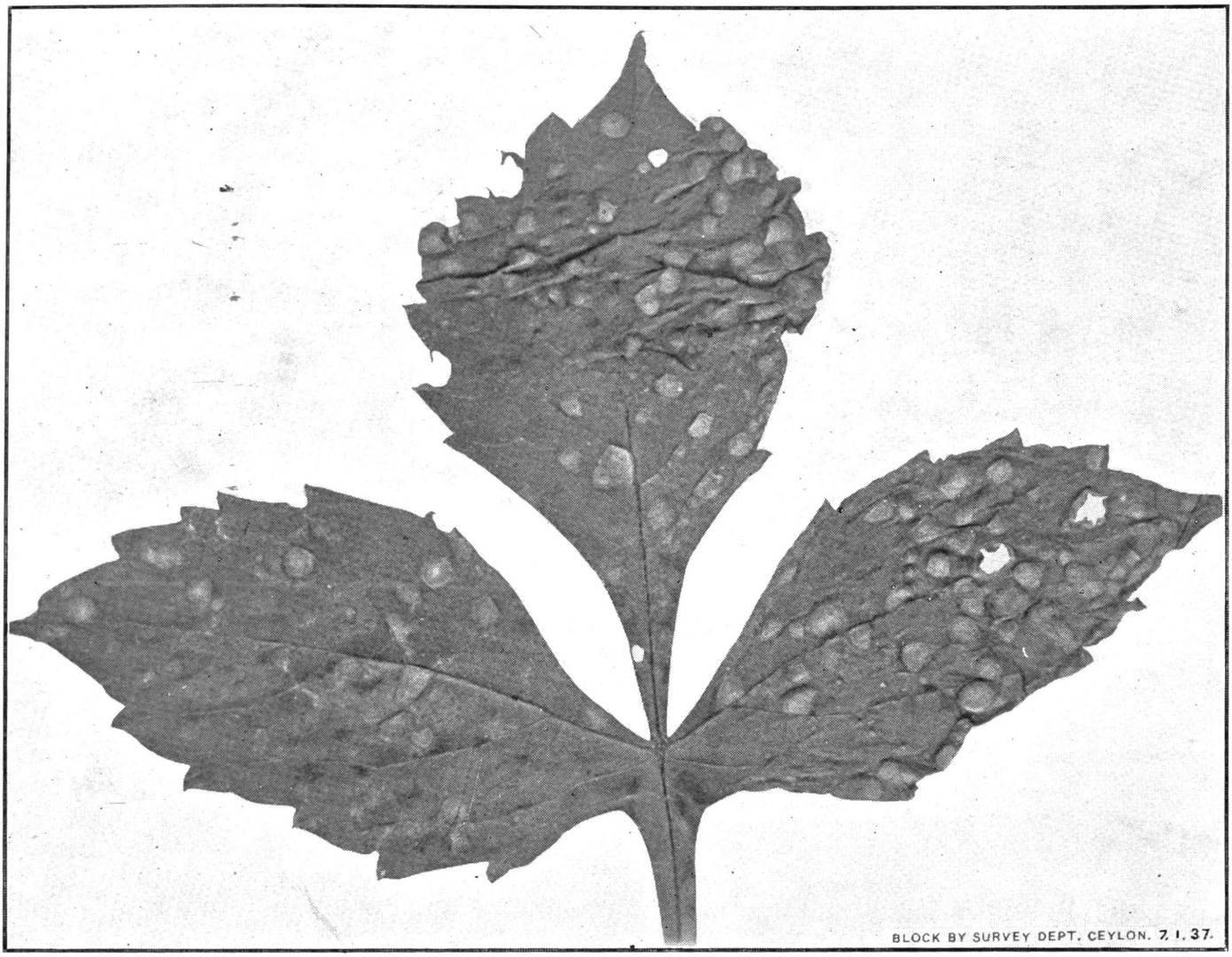
central dead tissue surrounded by a sort of halo, well seen if the affected leaf be viewed by transmitted light. Finally, the spots turn wholly brown, or greyish-brown, and have a darker brown line running round the margin. In leaves that have yellowed, the spots are very conspicuous, the more so since they are sometimes surrounded by, or situated near, a certain amount of tissue that still retains its green colour. No mould growths or fungus fructifications are readily visible on either the upper or lower surfaces of the spots ; and the central dead tissue becomes quite brittle when dry and often falls out partially or completely, thus giving the leaf a shot-hole appearance.

The various shades of greens and browns exhibited by leaves attacked in such a fashion are notoriously difficult to represent by photography, but the accompanying illustration is an attempt to show the state of affairs produced by this disease in a case of rather advanced and severe attack. It will be clear that not only is the appearance of the plants rendered very unsightly, but the loss of green food-manufacturing tissue is bound to act adversely on the vigour of the plants in the long run.

The fungus that causes the disease is one of the smuts and has been named *Entyloma dahliae* by Sydow. True, the symptoms produced are not at all like those one is accustomed to associate with smut attack, such as malformations and the production of masses of black, soot-like powder in some part of the host, *e.g.*, the smuts of Cereals, or those of the Onion, Gladiolus, Anemone and Violet. Nevertheless, in its mode of life and reproduction, *Entyloma dahliae* closely resemble other smut fungi, and several members of the genus are responsible for the production of spots on the leaves of various plants, notably Lesser Celandine, Poppy, Golden Saxifrage, Forget-me-not, Scentless Mayweed and Marigold.

Microscopical examination of the affected tissue of the Dahlia leaf discloses the presence of numerous light brown, smooth, thick-walled, approximately spherical spores, that have been derived from a sparse, somewhat evanescent mycelium or spawn. These spores arise and remain between the cells and on germination, each produces a tubular outgrowth which proceeds to the surface of the leaf. Having arrived there, the tip of the tube projects slightly through a stoma (or breathing-pore) and develops a crown, or rosette, of mycelial segments from which secondary spores, or sporidia, are produced in considerable numbers. These sporidia may conjugate, and secondary sporidia are produced from them. It is by the distribution of these sporidia and secondary sporidia—they are easily wafted away or splashed by the rain to other parts of the same leaf, or to other leaves—that the disease is spread during the season. Damp weather and a shady position are favourable to the disease, which, under such conditions, may reach almost epidemic proportions. The spores lying within the tissue of the spots may germinate as soon as they are ripe, but many of them remain as resting spores after the leaf has died, and they germinate the following season. Dead, affected leaves



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should therefore be looked upon as the source from which the disease reappears each season. Cactus Dahlias are said to be more susceptible to attack than Pompons ; and, while no varieties derived from Dahlia variabilis are known to be absolutely immune, yet those derived from D. Merckii have apparently remained free from the disease.

Entyloma dahliae was first found by Pole Evans, in Natal, in 1911, on D. variabilis, and it was described and named by H. and P. Sydow in 1912. Its presence in Europe was first detected by Sternon, in Belgium, in 1918. It was noted in Holland in 1920, in France in 1922 or 1923, in Germany in 1924, and Czechoslovakia in 1926. It appears to have been seen in England at least a year ago, for, according to information received, it was sent to Mr. J. Ramsbottom from Worplesdon in 1927 ; but up to now its presence does not appear to have been recorded by publication.

The first specimens of the disease that the present writer had the opportunity of inspecting were received at the Ministry of Agriculture's Plant Pathological Laboratory in August last from Mr. J. Rees, Adviser in Agricultural Botany, University College, Cardiff ; and they were obtained from the Duffryn Gardens, St. Nicholas, Glamorganshire. It was stated that the disease had been present there for the past two or three years, and appeared to be causing considerable damage. A second case was reported in September last by Mr. W. Buddin, adviser in Mycology at the University of Reading, who had diagnosed it on plants submitted to him by Mr. A. J. Cobb, University Lecturer in Horticulture, from Shinfield, near Reading. Doubtless it exists in other centres and, attention having once been aroused, the disease will probably be recognised in them and dealt with.

The object of the present note, indeed, is to direct attention to this new disease, so that it may be dealt with so promptly as possible, if and when it puts in an appearance. The situation at present cannot be described as alarming, but it would certainly appear that the disease is capable of causing much trouble, and if it can be "nipped in the bud," so much the better. The method of controlling it is the old-fashioned and often despised one of collecting and destroying (preferably by fire) all the spotted leaves, including any that may remain attached to the plants when lifted for winter storage, since they contain the resting spores of the fungus. Those who do not apply this simple rule of garden hygiene in their work must not be surprised if the disease, like others, gets out of hand with them.

No exact experimental attempt to combat the disease directly by spraying appear to have been made, but, in Germany, spraying with Bordeaux mixture, or with lime-sulphur solution, has been recommended. Such spraying should be carried out at intervals during spring and early summer, and preferably after removal and destruction of any spotted leaves that may be present. Liming and digging the soil deeply have also been recommended, while Dahlias should be planted so early as is feasible and safe in an open, airy situation,

avoiding over-crowding, and in a position so far removed as possible from one in which the *Entyloma* disease may have appeared during the previous season.

(*Note.*—Since the above article was written, workers in England have shown that the disease can be controlled by spraying with a standard fungicide, such as Bordeaux mixture or lime-sulphur. In Ceylon, where the seasonal variation of temperature is not so marked as in temperate climates, spraying would be necessary throughout the year, if the disease were once established and if the growers wished to keep it completely controlled. Growers of dahlias, therefore, are warned to keep a sharp look-out for the disease and, should it appear, are requested to inform the Mycologist, Department of Agriculture, Peradeniya, who will be pleased to assist them to stamp out the disease before it becomes too widespread to be eradicated easily.—M.P.).