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SPONTANEOUS VEGETATION AND FUTURE SELECTION WORK IN THE TROPICS [1])

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During the first decades of this century our knowledge of agricultural crops has perhaps most benifited by the research work carried out by VAVILOV, SCHIEMANN and their numerous co-workers who have systematically tried to discover the origin of these plants.

VAVILOV coined the term "gene centres", and although its original meaning is at present sometimes contested, it has stimulated research into the origin of our grain crops and horticultural crops. It was SCHIEMANN who performed the elaborate work on the origin of the Central European crops, thereby often bringing together comparative morphological, genetical and even archeological data.

For agricultural practice the numerous expeditions, started about 1910, have been of the utmost importance; their aim was to collect from the original areas plant material which is more or less distantly related to the familiar crop families in the temperate regions, and to import the living plants in special gardens. Without these results much of the modern selection work on grain crops, potatoes, etc., would have been non-existent and would even have been totally impossible in the not so distant future.

Other countries have carried out similar work on the pattern of the great Russian institutions which founded vast type collections and herbaria: thanks to SALAMAN and co-workers England possesses in the gardens of her Cambridge institute a first-rate collection of potato varieties, — species and material of kindred species. Similar collections have also been made in numerous countries in the northern temperate hemisphere and occasionally in the southern hemisphere. They are either private (cf. VILMORIN) or annexed to official institutes; if required, material for selection purposes may be obtained from these collections.

Now that the present century is well into its second half, it becomes abundantly clear that the above-mentioned pioneers chose the right time for starting such collections. Although a number of unviolated areas which may be con-

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sidered as "population reservoirs" will still be available for some time to come, the steadily accelerating process of opening up and reclamation, especially in the Near East and Central Asia, together with the institution of monocultures and its inherent combat against "weeds", will greatly restrict the availability of the so-called "wild" species.

A typical instance is the continual impoverishment of the wild flora of the Netherlands : in this case, however, only a few of the victimised species may be considered as of direct economic importance or as relatives of such species, nor does Holland, which is only a small spur of the Central European area without any mountainous massif, have any endemics of plant types which are lacking elsewhere in the hinterland. But the process of impoverishment of the flora in this small country is symptomatic of what is taking place all over the world. Elsewhere, and not least in the tropics, the vegetation alters at a rapid pace owing to the steadily progressive action of man, and typical landscapes are giving way to regular crops sown and maintained with the aid of modern accessories.

Hitherto attempts have been made to save the "gene reservoirs" actually present in tropical and subtropical regions (Beltsville (U.S.A.), Havana, Indian experiment stations) but this has only been done locally, and even then only in a few cases.

As regards the modern botanical exploration of Africa we can only be thankful for the thorough way in which the flora is studied (Flore du Congo belge, Flora of West Africa, co-operative work of A.E.T.F.A.T.) and in future it will be possible to refer to very elaborate standard herbaria at Brussels, Kew, Paris, and in African centres such as Dakar. But what is the benefit to agriculture if the material important to the selection of economic crops only exists in the form of dry relics between the sheets of a herbarium ?

Admittedly there exists in Africa another valuable possibility of plant life conservation in the national parks and wild life reservations established in widely different regions all over the continent. But most of these either provide for game protection, or being completely abandoned to the forces of nature they do not fulfil the requirement of preserving the greatest store of plant material which is desirable for any future agricultural purpose.

Examples of favourable exceptions are the collection of forage plants at Kitale, Kenya, and small local collections under the care of the I.N.E.A.C. stations in the Belgian Congo and elsewhere ; nothing of this kind is found in French West Africa. Incidentally, CRA was in possession of a collection of autochthonous and imported leguminous plants at Bingerville (Ivory Coast), and Idert (Orstom) at Adiopodoumé (Ivory Coast) also keeps a number of leguminous plants used for green manuring, cover crops and shade plants (most of these are imported).

But collections of this type suffer far too often from the lack of continuous activity, a common phenomenon in the tropics ! These kind of collections are adequately maintained for a number of years, the next "generation" more or less keeps them going and eventually a part of the material which is unable to maintain itself vanishes through lack of sufficient upkeep. A single "tough weed" occasionally even escapes and becomes, like other imported plants, a steadily advancing plague hindering the actual vegetation which in the end it often even outgrows.

Eventually it will be possible to maintain collections of tropical annuals on a small scale in temperate regions by means of hothouses, a procedure which is nearly always impossible in the case of perennials on account of their size. But even with annuals it remains to be seen whether such cultures, grown from seeds propagated under temperate conditions, will not ultimately lose a considerable part of the original variability owing to extreme climatological conditions; greenhouse culture, for example, is an abnormal milieu as regards length and intensity of daylight, even with additional artificial illumination. This may give rise to the possibility of directed selection and, eventually, of mutations. When seeds of such plant material are returned to tropical regions it is always possible that the progeny may possess characteristics entirely different from those of the original stock.

In our view, the only way to create a sufficient "gene reservoir" of tropical crops which allows for future selection demands is to establish collections under supra-national management. Such gardens should be situated in different climatic zones and their task should be to assemble and maintain fairly complete collections of economic plants and their relatives from the region in which they are situated. Under strict quarantine conditions it should be possible for the various collections both to exchange natural and provide institutes and experiment stations with material for selection purposes. It should, however, only be possible to supply plant material to growers through the intermediary of the experiment stations. Such quarantine measures are especially necessary because unlike crops already under cultivation the kind of diseases and plagues to which these wild types are liable in their countries of origin are often still unknown.

Thus all over the world, and particularly in Africa where changes in vegetation proceed at a constantly increasing rate and where the forest area especially is steadily shrinking, it is necessary to consider in good time what steps can be taken to preserve valuable material for future selection work.