

health promoting foods, might now be revived with better hope of success. The great creditor nations would be the more willing to give their support, since they would see that their own economic interests would stand to gain by the operation of the proposed Bank.

Herein, in the view of Mr. McDougall, there may be found a solution of the hotly debated problem of agricultural protectionism. There can be no doubt that the solution of the questions discussed by the writer of this report might contribute in no small degree to a revival in world prosperity.

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## ABSTRACT

**Tobacco in South India.** By W. R. C. Paul, M.A., M.Sc., D.I.S., F.L.S. (*Trcp. Agri. LXXXVII p. 3*). This crop was first introduced by the Portuguese in the 16th century. Its cultivation was restricted to dark, and strong flavoured types and as such there was no or very little export in the early period. In order to meet the demand of the mild flavoured light tobacco in the United Kingdom, efforts were made in the direction of introduction of new types, methods of growing and curing. Madras Presidency occupies second largest position in India with an area of 292,000 acres and outturn of 286,000,000 lb. of cured leaf out of the total area of 1,350,000 acres and production of 1,000,000,000 lb. leaf respectively. The different kinds of tobacco grown may be grouped under (a) smoking (b) chewing (c) snuff. Dark tobaccos are strong flavoured and are used in the manufacture of cigars, cheroots, chewing and snuffing. Light tobaccos are generally associated with mild flavour and comprise cigarettes, pipe mixtures and beedies. The light tobacco industry has developed during recent years due largely to the efforts of the Indian Leaf Tobacco company, and Guntur District forms the chief centre of its cultivation with about 40,000 acres under the virginian variety Harrison's special. The flue cured Virginia is used for manufacturing standard brand cigarette while the sun-cured stuff and the finer country types are mostly used in blending the innumerable other cheaper brands and pipe tobaccos, and are exported to United Kingdom and Japan.

Cigar filler tobacco is mostly drawn from certain areas in Dindigul and Trichinopoly while cheroot tobacco is extensively cultivated in the Districts of Madura, Coimbatore, Trichy, Salem, Kistna, Godavari and Vizagapatam to the extent of 105,000 acres. Soil and weather conditions determine the quality of the tobacco. Light soils are suited for mild bright tobaccos, and heavy soils for coarse dark types. Application of cattle manure produces excess of chlorides in the leaf and the burning quality is poor. On the other hand application of organic manures leads to a high nicotine content. Irrigation is found better for chewing and cheroot types, and brackish water produces a greater potash content.

Tobacco curing may be either by flue, sun or air. Most of the light virginians are flue-cured and usually contain about 13% moisture at the time of export.

There are about 30,000 barns in the Guntur area.

R. B.

## Gleanings.

**Vitamins and Plants.** In general, vitamins are products of the vegetable kingdom. Their possible role in plants, however, has been almost totally unknown until quite recently.

Some years ago we followed the synthesis of carotene (the precursor of vitamin A) and vitamin C (ascorbic acid) in plants, and observed that the percentage content of these compounds in the plant is generally the higher the better

the plant grows. Their concentration thus reaches a maximum at an early stage of growth, either before or at the beginning of flowering. Similarly we found that an adequate fertilisation increases the percentage content of vitamin C and carotene. The view that artificial fertilisers would seriously affect the composition of plants is thus not tenable, at least where vitamins are concerned. This fact was clearly demonstrated by Scheunert's prolonged work on rats.

On the other hand, we found that all factors which have an unfavourable influence on the growth of plants, such as soil acidity, excessive concentrations of phosphate, potassium, sodium chloride, etc., lower the content of carotene and vitamin C in plants. In my opinion, these facts showed, although indirectly, that carotene and vitamin C are important growth factors of plants.

In the case of vitamin C, this assumption has now been conclusively proved by further work in this laboratory (S. V. Hausen.) Addition of crystalline vitamin C to the medium in sterile pea cultures led to an increase of 40–100 percent in the dry weight of the treated plants. (At the same time it was noted that the roots of the plant protect vitamin C very effectively against autoxidation). The effect of vitamin C on growth is a specific one, since, for example, glucose has no such effect. It was also shown that the peas actually took up with their roots vitamin C from the medium. Shortly after, L. Havas at Rothamsted made similar observations.

These results showed that an addition of vitamin C to the medium promotes markedly the growth of the plant, but they did not conclusively prove that vitamin C is essential for plants. Definite proof for the latter fact has, however, now been obtained through Miss V. Hausen's work on pea seedlings which were deprived of their cotyledons at a suitable stage, when they contained about ninety per cent of the total vitamin C present in the seedling. Such seedlings generally die or remain completely dwarfed, whereas they will develop distinctly better, and even produce normal blossoms, when small amounts of pure ascorbic acid are added to the medium. Even the treated plants naturally suffer from the removal of cotyledons, which evidently contain also other necessary compounds besides vitamin C. The accompanying table will illustrate the effect of ascorbic acid on the development of cotyledon-less seedlings.

*'Torstal' peas (cotyledons removed) in sterile Hiltner's solution with*  
( $\text{Ca}(\text{NO}_3)_2$ ; initial pH 5.5 Time of growth 29 days.

	Average length of two plants in cms.		Dry weight of two plants, in grams.		Vitamin C in two plants, total (ml. of ind. solution).	
	Treated.	Controls.	Treated.	Controls.	Treated.	Controls.
	83	35	0.431	0.070	22.8	2.7
	66	30	0.305	0.063	12.5	2.0
	75	30	0.461	0.075	22.5	2.8
	82	22	0.405	0.044	17.5	1.5
Normal plants						
(cotyledons not removed; ascorbic acid not added)	—	85	—	1.850	—	4.80
	—	92	—	1.706	—	44.0

It is therefore reasonable to regard vitamin C as a phytohormone, which is indispensable to plants. The formation of vitamin C during germination is necessary for the early development of the plant. During later stages of growth, large quantities of vitamin C are produced in connexion with photosynthesis,

So far, vitamin C is the only vitamin the indispensability of which to higher plants has been proved through *direct* experiments. Corresponding work on vitamin B<sub>2</sub> (lactoflavine) is at present in progress in this laboratory.

W. H. Schopfer has recently shown that vitamin B<sub>1</sub> promotes greatly the growth of lower fungi (Phycomyces, etc.). According to his results, the effect is very delicate and specific, so that it can be used for the quantitative determination of B<sub>1</sub>.

The fact that certain compounds, which act as vitamins in the animal organism, have important functions in plants, is additional evidence of the similarity of the metabolism of plant and animal cells.

—Artturi I. Virtanen.

## Review.

**Hoard's Dairyman.** This Journal contains a lot of useful information for persons connected with dairying and the care of animals. Some of the articles published by successful dairymen and business people are exceptionally good and are good examples to follow. Lists of important bulletins are also published. Pages are also allocated for articles on Poultry breeding and Veterinary matters which contain a lot of useful tips. Even the farmer's wife is not forgotten; recipes and notes on the home are also included. The cost of the Journal is small due to the large number of subscribers.

R. W. L.

## Agricultural Fottings.

**Campaign against Chillies Thrips.** Chillies occupy an area of about 43,000 acres in the sixth circle comprised of Madura, Ramnad and Tinnevely districts. Till very recently this crop gave satisfactory returns, yielding about 6 pothies of 250 lbs. each of dry chillies per acre. Of late the yield has been reduced considerably due to some cause or other. One of the causes, if not the chief cause, of this reduction in yield is the severe infestation of 'thrips'. Thrips are small straw coloured active insects which attack the plant in all stages of its growth. They suck up the 'sap' from the tender growing portions of the plant which make the leaves to shrivel up irregularly, causing leaf curl disease. The plants get stunted bear only a few flowers and of these only a small number grow up to the fruiting stage. In worst cases the plants dry up completely and do not flower at all and the farmer is forced either to give up the infested crop or to recultivate it, if the season is favourable, with fresh healthy seedlings.

It has been observed that during normal seasons the plant may be kept free from leaf curl disease by giving better preparatory cultivation, heavy manuring, frequent irrigation and above all by getting healthy and vigorous seedlings for planting. As the normal favourable season cannot be expected always, the cultivators are advised to take some precautionary measures to protect their crop by adopting suitable prophylactic measures against the attack of thrips. Remedies to mitigate the disease or to prevent it entirely are very simple and effective. Healthy seedlings may be obtained by treating the seedlings in the nursery with tobacco dust once a week or so from about 10 days after germination and rinsing them in tobacco decoction before planting.

During adverse season, in spite of the above precautions thrips get the upper hand even though healthy seedlings are planted. In such circumstances the