

RECENT PROGRESS IN FRUIT-GROWING IN INDIA AND ABROAD*

The importance of fruit-growing.—Fruit-growing is an important source of wealth in several countries in the world. It is regarded as a money crop irrespective of whether the fruit is sold fresh or is converted into other valuable products. It provides both work and cash even under adverse economic circumstances and thus enables the farmer to meet liabilities which would otherwise weigh heavily on his holding. It is not surprising, therefore, that a tendency to encourage fruit cultivation has been apparent in all countries during the past decade. The mention of the monopolies in the fruit trade will give some idea of the importance and magnitude of fruit-growing in other countries. Italy, for example, specialises in the cultivation of citrus fruits and wine grapes and the world trade in Italian lemons is her monopoly. Her annual export of citrus fruits comes to about 301,000 tons. The French growers enjoy the privilege of specialising in the cultivation of certain wine grapes, and French viticulture is a great asset to the nation, and undoubtedly reflects credit on the ability of the growers who have held their position for ages. The total annual wine production of France amounts to 1,232 to 1,254 million Imperial gallons, out of which 15 million gallons are exported annually. Algeria is an important source of the French supply of wines. The Turkish fruit-growers helped by their own natural resources and foreign exploitation, more than by scientific organisation, have a strong hold on the world market for their dried figs and sultanas, the export of which amounts to more than 75,000 tons annually. Though their fruit industry is of comparatively recent growth, the United States of America with their scientific ability, perseverance and organisation play a leading rôle in this field. Their annual exports amount to 238 million pounds of canned products, 13 million boxes of fresh fruit, and 365 million pounds of dried fruit. Spanish fruit-growers also occupy a prominent place in the fruit trade, as Spain exports oranges and grapes annually to the extent of 931,000 tons. The annual export of Spanish oranges to the United Kingdom alone is 300,000 tons.

In many British possessions and Dominions such as West Indies, Palestine, South Africa, New Zealand, Canada and Australia, fruit-growing is being developed on scientific lines. Fair quantities of bananas, oranges and apples are shipped to the United Kingdom from British territories. The annual import of fruit into United Kingdom, however, amounts to £48,000,000 worth, inclusive of foreign imports, which come to 70 per cent. Countries like Iraq, Afghanistan, Persia, part of Russia and Japan also claim fruit-growing as a principal source of income to the agriculturist and are endeavouring to develop their fruit export.

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In India the development of the fruit industry forms but a minor part of our agricultural activities, for, despite a vast range of soil and climatic conditions, fruit cultivation is not commercialised. Although India has some five million acres under fruit, she imported in 1933-34 fifteen lakhs worth of fresh fruit, 19 lakhs worth of almonds, currants and raisins, 36 lakhs worth of dates and 10 lakhs worth of canned and bottled fruit. Also other dried fruits and vegetables, for which classified details are not published, valued at 14 lakhs. Exports of fresh fruit only amounted to 4 lakhs worth. Exports of dried fruit and vegetables totalled 69½ lakhs, but fruit forms only a part of the total. The natural facilities and forces of India, suitable for this development are not properly harnessed, although there is a growing demand for fresh fruit and vegetables among her people, which can be noted by the steady increase in the imports of fruit. The total area of about five million acres under fruit and similar crops in India has remained practically steady for several years past and the expansion in acreage has not kept pace with the increased demand, which is now supplied by imports from abroad to an appreciable extent.

Research in fruit-growing.—A study of the development of fruit industry in various countries brings out the fact that research relating to fruit-growing deals with the following aspects of this industry:—

1. The breeding of suitable varieties to meet the commercial needs of the world.
2. The selection of proper rootstocks, and the adoption of convenient methods of propagation to facilitate their distribution on a large scale.
3. Nutrition of fruit trees, pruning and cultural operations to get higher yield per unit area.
4. The improvement of transport and storage to reduce damage during movement and the sale period of fruit.
5. Methods of preservation by which surplus produce can be economically converted into more valuable products.
6. Pests and diseases which attack fruit trees and reduce their yield and economic value.

Where fruit-growing is an organised industry, every aspect of fruit cultivation is studied scientifically.

Fruit trade control.—In addition to the investigation of the above aspects of fruit-growing, trade control and legislation have played a prominent part in recent advances in fruit-growing. The benefits of the application of the results of researches are properly safeguarded by appropriate legislative and administrative measures, with a view to protecting the industry against factors unfavourable to its growth. Such control tends :—

1. to safeguard the industrial and economic interest of the people from foreign competition,
2. to check the introduction of harmful pests and diseases along with new varieties of fruit or in other ways, and
3. to maintain economic balance between the grower's expenses and risks and his profits,

Legal restrictions are now a regular feature of the trade control of fruit-growing in most countries. Legislation has indeed transformed fruit-growing conditions in some countries. The cultivation is neat. The handling of fruit is sanitary and the marketing properly organised.

Agricultural co-operation and fruit-growing.—Besides trade control, agricultural co-operation is acting as a powerful instrument in promoting the growth of the fruit industry in many parts of the world. Co-operative fruit-farming, co-operative manufacture of wines and preserves and the preparation of fruit for marketing through co-operation are the growing tendencies of the modern age. Agricultural co-operative facilities facilitate credit, secure specialised staff and obtain favourable terms for the disposal of the produce. The success of Jewish fruit colonies in Palestine, and the fruit-growers' societies and exchanges in the United States of America and Italy are instances where agricultural co-operation has shown profitable results.

The relation of co-operation to the well-being of the fruit industry is not fully realised in India. Recently, however, a few co-operative fruit sale societies have been registered, but they are not yet functioning properly.

THE TREND OF RECENT INVESTIGATIONS IN FOREIGN COUNTRIES AND INDIA

Every fruit-growing country has contributed substantially towards the science of fruit-growing. The trend of investigations in France shows that the French workers have struggled to develop those types of grapes which would yield decidedly superior wines and help them to hold their monopoly. Aenological researches, coupled with the evolution of new types of grapes, root studies, fight against pathogens, soil fertilization and finding suitable methods of propagation, are the chief lines of experiment in France. All have a common object, viz., to reduce the cost of cultivation and increase the yield in order to bring in more money to the growers. The French workers are also busy on the standardisation of packs suited to various types of fruit. Such improvements are controlled by national committees and the French system of disposal of fresh fruit is skilfully organised.

The Italian Government is also busy improving the quality of fruit with the hope of establishing a wider trade in fruit products. Prompt attention is being given at present to diseases like the 'Mal del Secco' (caused by the organism *Deuterophoma tracheifila* Petri.) disease of citrus plantations, and relief is being given to needy growers by reducing their land tax and other liabilities. Rules and regulations are also being framed to control the import and export of fruit, with the hope of protecting their present industry. Foreign fruits cannot land so easily in Italy. Research on pomaceous fruits, genetics and the standardisation of lemon products form an important part of the Italian fruit work. Stress is being laid on the cultivation of nuts. At several places, the Italian growers have organised themselves in order to fight against pests of fruit trees,

Germany, though an industrial country, has contributed greatly towards the science of fruit-growing. Researches on plant growth and plant propagation, root studies, pollination, proprietary fertilizers and their effects on the quality of fruit-breeding and testing of new grape varieties and other such problems have attracted the attention of the German workers. The German observations on the technique of cold storage are very valuable.

The United Kingdom, being a great fruit-consuming country, is striving to develop fruit-growing in her territories with a view to reducing fruit import from foreign countries. Efforts to develop fruit-growing in British territories have been very successful. Researches on rootstocks, soil deficiencies, gas storage and cold storage, and such other problems have helped the growth of fruit trade. The development of a canning industry has stimulated the extension of fruit cultivation in the British Isles. The findings of the Imperial Economic Committee (1926) emphasised the importance to fruit-growing in the Empire. The promulgation of pure food laws and the national marks scheme have enhanced the market value of British produce, whilst the activities of the Empire Marketing Board have developed the Empire fruit trade considerably. Empire fruits, by virtue of the various Ottawa agreements are admitted into the United Kingdom free of duty, whilst foreign fruits pay duty under the Import Duties Act, 1932.

The discussions at the Imperial Horticultural Conference, the establishment of the Imperial Bureau of Horticulture and of self-contained fruit experiment stations in the United Kingdom, as well as in other parts of the Empire, are some of the other important items which have led to the rapid progress of the fruit industry in the various parts of the British Empire. The recent list of scientific workers in the Empire shows that almost every conceivable line of research is being pursued by one worker or another, in at least one part of the Empire. The extension of fruit cultivation in various parts of the Empire is encouraging. The movement of fruit from one part of the Empire to the other is also brisk, and the development of the canning industry, specially in the United Kingdom, is phenomenal. All this success has been achieved within a decade. Plant-breeders all over the British Empire are keen on evolving suitable varieties of commercial fruits which will be useful for preserving and which can compete favourably with non-Empire products. The economic value of fruit research and organisation in the British Empire can be well judged from the volume of the trade from the West Indies to the United Kingdom and the rapid and successful establishment of the Jewish fruit-growing colonies in Palestine. Nor should one omit to mention the important researches on the 'Panama' disease of bananas in West Indies, and varietal trials, crop investigations in relation to soil and climate, cultural methods, plant diseases in South Africa, New Zealand and Australia.

In the United States of America the introduction and breeding of productive types of fruits are being actively pursued. Irrigation and pruning practices and use of fertilizers have undergone a great change. Their investigations relating to the improvement of transport, pre-cooling and storage of fresh fruit as well as canning are conducted on the more

approved technical lines. Investigations on frozen pack, preservation of juices by freezing and colouring and softening of fruits by ethylene are considered valuable by the trade. The improvement of fruit crops by bud selection has been accomplished in recent years. Efforts are being made to find better stocks. The principles of evolving fruitful types by cross-pollination are well understood and practised. The State rules and regulations to control both the import and export and the internal movement of fruit and its products play as important a part as research does in the improvement of the American fruit industry. The development of mechanisation in agriculture has diminished the cost of production and has added materially to the profits of the commercial fruit farmer. The Fruit Bureau Section of the U.S.A. Department of Agriculture and the marketing and intelligence organisation add daily to the economic well-being of fruit-growers. The Government of the United States of America recently introduced a Bill to grant patents to holders of new varieties of fruit plants in order to give a stimulus to growers as well as plant-breeders to breed new types. The same policy is followed in her possessions in the Philippines and other islands.

Greece is also an important country from the point of view of fruit-growing as it specialises in currant grapes. The growing, manuring and drying of fruit have attracted the special attention of the Grecian growers. Greece exports 85,500 tons of currants and raisins annually.

It appears from recent reports and events that Japanese workers are closely following in the footsteps of investigators in other fruit-growing countries in the world. It is surprising to see that during the last three years the import of Japanese apple into the Indian Market has increased from Rs. 704 in 1930-31 to Rs. 108,475 in 1932-33. Japanese researches on citrus crops are leading in many ways.

In India the fruit industry is still in its infancy. There is not much at present in this country which can be claimed as a valuable contribution towards the development of the fruit industry, either in the matter of research or of administrative measures. The importance and necessity of developing this industry have lately been attracting the attention of the agricultural mind. Both the Imperial and Provincial Governments are taking a lead in the matter and are financing fruit research schemes and establishing experimental stations. In Sind this activity is perhaps stimulated by the large irrigation projects in which huge sums have been invested and the move to develop wide tracts of the countryside where ordinary agricultural crops are not financially successful. Up to the present the work on the fruit crops done in India has chiefly consisted in introducing new varieties and giving them a trial under different soil and climatic conditions. Organised fruit research in India dates back to the last quarter of the nineteenth century, but the progress made so far is not encouraging. A survey of the work done shows that the earlier efforts were spasmodic and lacked that continuity which is so essential. It may be true that these attempts have but poorly subscribed to the economic development of the country, but the importance of the work should not be undervalued, as a beginning had to be made. The paucity of results is largely to be

attributed to the fact that only now have self-contained experimental stations been established. Much effort is still needed in the way of developing productive varieties of fruits, improvements in propagation and cultural practices and researches relating to the utilisation of crops.

Progress of research and its application to industry requires both patience and finance. The success of the other countries mentioned above is the result of a long scientific struggle entailing large expenditure. In India fruit research has heretofore been of secondary importance in our agricultural development. It is a welcome sign, however, that in recent years some effort is being made to encourage the fruit industry in this country. Fruit has not yet played any part in the export of agricultural commodities on which, it is believed, India's economic prosperity depends so largely.

Looking to the history of the past decade one can safely say that the development of the Indian fruit industry shows a material advance. The first nucleus of this development is seen in the appointment of the Mango Marketing Committee in Bombay in 1925. This was followed by other important steps, which various Provincial Governments and the Imperial Government took to stimulate the growth of this industry. The Punjab Government organised their Fruit Section in 1926. The Government of Bombay showed their practical interest in the matter by permitting the writer to study the lemon industry in Italy and fig industry in Aisa Minor in 1925. They also took the lead in exporting the Indian mango to England in 1932-33, with the financial help of the Imperial Council of Agricultural Research, working out thereby the possibilities of this trade. They further convened two fruit trade and export conferences in 1933, soon after which the Bombay Fruit and Vegetable Marketing Committee was appointed to investigate the marketing of perishable products in this Province. In order to develop the Indian fruit trade, the Imperial Council of Agricultural Research in India further sanctioned a large amount of money for carrying out experiments to find out the "storage life" of different varieties of mangoes. The Council also finances fruit research schemes in Madras, United Provinces, Bengal, Bihar and Orissa, and in the Central Provinces; Punjab, Mysore and Hyderabad schemes have recently been approved. It remains to be seen what results emerge as a result of all these experiments and investigations, but it is hoped that the persistence of Indian investigators and their devotion to this cause will be rewarded by better yields and by the opening of better prospects for the development of the fruit industry.

It is satisfactory to note that material advances have been made recently in the organisation of fruit growers' associations in the Bombay Presidency, the Punjab and the United Provinces. The reduction of railway freight declared by the G.I.P. and B.B. and C.I. Railway Companies on perishable products is another helpful step. Such reductions are badly needed for the development of fruit industry as they give a great impetus to its growth by raising the growers' profits. A fillip has been given to

fruit-growing and big fruit orchards managed on modern lines are cropping up in different parts of India and fruit-growing methods are undergoing a change for the better. Our hunt for improved types is also meeting with success. Indian-made fruit products, notably lime juice and jams, are daily gaining ground in the market. Projected schemes relating to the establishment of a fruit bureau and canning laboratories will provide missing links in the chain of progress.

It is thus evident that the ground has been cleared for the development of the fruit industry in India, and it should not take long for Indian investigators to bring their work into line with the requirements of the industry. Their co-operation with each other as well as the co-ordination of inter-provincial activities will result in improving the resources of the fruit-growers throughout India. Given State protection to the industry, complete agricultural experiment stations, proper marketing organisations and transport facilities, fruit-growing in India is bound to be an important source of wealth to the Indian agriculturist as in other countries.