

RUIT SURVEY REPORT

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**A report on present condition and prospects
of fruit growing industry**

IN

H. E. H. the Nizam's Dominions.

BY

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AND

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FOREWORD.

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This survey was undertaken with funds provided by the Industrial Trust Fund. Most of the facts were collected by Mr. M. R. Siddaramaiya F. R. H. S., (London) who was employed for the purpose and his report will be found in part II. The services of Mr. H. P. Paranjpye, District Horticultural Officer, Bombay, were lent for a period of two months by his Government, to review the information collected by Mr. Siddaramaiya and to advise H. E. H. the Nizam's Government on the best methods of developing the fruit industry. His report will be found in Part I. Both officers have carried out their work creditably. The opinions expressed in their reports are their own and H. E. H. the Nizam's Government accept no responsibility for them. It will be seen from the reports that there is considerable scope for development of the fruit industry in Hyderabad, and it is hoped that this survey will be of assistance to the Agricultural Department in taking such steps as are possible for this purpose.

B. ABDY COLLINS,
*Director General and Secretary,
Commerce and Industry Department,*

7th. DECEMBER 1932.

PREFACE.

The Hyderabad State imports fruits to the value of about fifty six lakhs of rupees. This includes cocoanuts, dry fruits and fresh fruits. Fresh fruits alone are imported to the value of about twelve lakhs of rupees. Against this the exports from the State amount to about two lakhs of rupees only, which consist mainly of fresh fruits. The State inhabitants are, thus, sending out money out of their pockets upto ten lakhs of rupees every year to other countries for fresh fruits alone for their use. Why is this happening? Why are they unable to produce enough fresh fruit in their own country? Further more, why cannot and should not the Hyderabad State produce still more fruit and export it and bring in money thereby, as other countries are sending their produce to it and carrying away money therefrom? The Aurangabad district formerly occupied a high position in fruit growing. It fell from this later. Why should it not be lifted up? How can it be lifted? Several good kinds of fruit are still being grown in the State, though in small quantities and at scattered places. Why should not this be developed? How can it be developed? The climate, soil etc., are suitable for a still larger number of varieties of fruits. Why should they not all be produced locally? How can this be done? These and similar other questions naturally arise, when one considers the large amount of money which is going out of the State through imports of fruit and the enormous amount of money which other countries are earning by exporting their surplus produce. It was this important consideration which influenced the Trustees of the Hyderabad Government Industrial Fund to decide to institute an enquiry into the fruit growing industry of the State.

An experienced and practical Horticulturist, Mr. Siddaramaiya, F. R. H. S. (London) was engaged, who made a detailed study, by touring and otherwise, of the present condition of the fruit growing industry in the State. The report (Part II) submitted by him is a valuable record and contains much useful information. Mr. H. P. Paranjpye, B. A., formerly District Horticultural Officer of the Bombay Agricultural Department, who beside his technical capabilities, possesses experience of the systematic introduction of horticultural

improvements in the Bombay Presidency, was employed later on towards the completion of the survey. He studied the available information and visited the more important parts of the State from the point of view of fruit growing. The report (Part I) which he has given deals on broad lines with the present condition of the industry and its future prospects. Both of these officers have made valuable suggestions regarding the improvement and development of fruit production in the State. We have now before us definite lines on which systematic work can be done in future.

The Government Agricultural Department, realising the importance of the problem, started some systematic work four years ago. The old garden attached to the Government Farm at Sangareddi has been renovated. A portion of each of the Main Experimental Farms at Himayatsagar (Hyderabad) and Parbhani (Marahtwada Division) is set apart for horticultural work. Plants of a number of different good varieties of mangoes, sapodillas, oranges, grapes, dates, plantains, grape fruit, figs, papayas, guavas, pomegranates, pineapples etc., have been planted at these places and extension is still in progress. Similarly, it has been decided to start a horticultural section at the main farm of the Karnatik Division at Raichur, which is in course of construction; and also at the proposed main farm of the East Telingana Division at Warangal. The object of these small plantations is to study the behaviour of different varieties of the various fruit trees and to supply stock from the most successful ones of them to the public. Plants, cuttings, grafts and seeds from the varieties which have proved promising are still being supplied but in very limited numbers. Technical advice is also being given by the horticultural staff of the department to the public as far as possible. A Mali class has also been started at the Himayatsagar farm where practical training is given to gardener's and cultivators' sons. This is what the department is doing at present with its limited resources. But this is too little and on much too limited a scale, out of all proportion to what is really required to be done, considering the importance of the problem and the opportunities for fruit growing presented by Nizamsagar irrigation scheme. It is now proposed to start an independent horticultural section in the department, under an expert Horticulturist, who will work according to a well considered systematic programme for the whole Dominions. This scheme will

be given effect to as soon as necessary funds are available, the sooner the better.

The success of a scheme of this kind depends largely on the interest which the public takes in it. That the public has great interest in horticultural matters is beyond doubt. The horticultural shows which were held in Hyderabad in the past two years were clear manifestations of this interest. The first show, which it should be remembered was the first of its kind in Hyderabad, which was held in 1931, was a success beyond all expectations. The second show, which was held in 1932 was still greater success, the entries of exhibits were twice as numerous as in the first year and competition was keener. The most encouraging thing is the fact that the nobility and the gentry took part in competition along with others. It is this class of land-lords which we look to, to play an important part in the development of horticulture in the State.

Regular fruit gardens of large size are comparatively few in the State. Fruit trees of different kinds are grown scattered individually here and there. Collection of the information was, thus, a difficult task. It could not have been done so successfully had not all those official and non-official gentlemen who were approached helped us so readily as they did and to them we are very much indebted. We are also much obliged to Mr. T. F. Main, Director of Agriculture, Bombay Presidency, with whose help we were able to secure the services of Mr. H. P. Paranjpye, and whose horticultural section supplied all the information for which they were asked. Our thanks are also due to Mr. G. H. Krumbeigel, Director of Horticulture, Mysore State, who kindly went through the interim report of the Horticultural Survey Officer and offered valuable suggestions. The undersigned is also thankful to Mr. R.K. Bhide, Economic Botanist to H. E. H. the Nizam's Government, who was responsible for the general supervision of the work.

Nizamuddin Hyder,
Offg. Director of Agriculture,
H. E. H. THE NIZAM'S GOVERNMENT.

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FRUIT SURVEY REPORT

Report on the improvement of Fruit Industry in
H. E. H. the Nizam's Dominions.

PART I

BY

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Report on the Improvement of Fruit Industry in H. E. H. The Nizam's Dominions.

Importance of fruit:—Fruits may be said to be the most appetizing articles of food. It is impossible to think of a man who is not pleased at the sight of ripe and richly coloured fruit. It is customary to offer choice fruits to God or revered persons whom we honour and respect in order to invoke their blessings and favour. Old writers on Indian medicine always speak of the importance and health improving qualities of various kinds of fruits. "Eat more fruit" is the slogan of modern doctors, as fruits contain certain important vitamins. From all this it will be seen that fruit rightly occupies, or should occupy a high position in the human dietary. In the time of Babar and Akbar laudable efforts were made to introduce various kinds of grapes from Persia and to grow the "choicest fruit of India." In the Peshwa period also attempt was made to plant one crore of mango trees and as a result we still see beautiful groves of mango trees dotted over the greater part of the Bombay Deccan and elsewhere.

History of Fruit Survey:—Therefore with the object of stimulating the fruit industry which at one time occupied a high position in the Aurangabad District but which owing to certain unfavourable circumstances has lagged behind, a Survey of the Fruit Industry in H. E. H. The Nizam's Dominions was undertaken from September 1930 to the end of May 1932 A. D., with Mr. M. R. Siddaramaiya, F. R. H. S., as Horticultural Survey Officer. He collected detailed information through the Revenue Officers regarding the fruits grown, the area under each, their soil and other requirements etc., in the form of a questionnaire drawn out for the collection of the above information. As a result of this inquiry 106 replies were received. He also made extensive tours both to places in the Dominions noted for fruit culture and to other places outside the State. His report, which is printed as Part II, was of great assistance to me in preparing my own, which is, however, based on my personal enquiries, and visits to gardens during my somewhat brief stay in Hyderabad.

While I was working as the District Horticultural Officer in the Bombay Presidency, the Director General of Commerce, Industries and Agriculture to H. E. H. the Nizam's Government, requested the Bombay Government to lend my services for a period of two months and a half to draw up a note on the development and organization of fruit industry in H. E. H. the Nizam's Dominions. Accordingly I arrived here on the 2nd. of March 1932 and after settling some preliminary matters I made a tour in the greater part of the Mahratwada and some portion of the Telingana tract. I particularly studied fruit cultivation as it is practised in and round about Hyderabad and tried to verify the information collected by the Horticultural Survey officer.

As a result of the inquiry the following points emerged:—

1. People are ignorant as experienced men have died and families have split up and there is want of expert knowledge.

2. People are poor and there is no capital.

3. Owing to breakage of dams or silting up of old tanks and *nallas*, water supply in wells has gone down. Rainfall also has decreased.

4. Cost of cultivation has increased, prices of fruit realised are not adequate. Shares of commission agents are constant. There is some pressure for free supplies. Hence the profits of the grower are low.

5. There is difficulty in getting reliable varieties and stock nearby at reasonable prices.

6. Competition of money crops or quick yielding crops has checked fruit growing.

7. There has been deterioration of soil due to lack of manure.

8. There is lack of nearer markets or rapid transport facilities.

9. There is loss by birds, theft and pilfering by and gratification to station staff.

10. There is also high land assessment.

These points are no doubt depressing but on the other hand the following are worth considering.—

1. There is keen awakening in the people who would like to grow fruit crops if Government were to remove some of the draw backs mentioned above.

2. Expert advice is now available to help the fruit growers in technical matters of vital importance.

3. There are certain growers, whose gardens may be looked upon as models of certain fruit crops, such as grape garden at Limba Ganesh, citrus gardens at Vaijapur, Parsoda, Mudkhed etc., fig gardens at Maisaram, Red Banana garden at Gulberga, and a few Mango gardens in Bidar District.

4. Government also can help by giving Takavi loans to some of the deserving growers.

5. Reliable varieties of plants can be made available at reasonable prices through Government Agency.

6. Advantage can be taken by intending fruit growers of the newly opened canal in the Nizamabad District to establish fruit gardens so that there will be no risk of water scarcity, the only precaution that will be necessary being the choice of suitable sites in consultation with expert advice so that there will be no chance for the subsoil being adversely affected by the proximity of the canal and distributaries.

7. Since export of crude bones is now stopped by Government bone meal can be made available if bone crushing machinery can be installed wherever pumping engines are at work. This will enable the fruit growers to get bone meal locally and at cheap rate. To a small extent crude bones can be used in the pits while planting long lived fruit trees.

Owing to the depressing factors fruit cultivation in the Dominions is in a declining condition. The population of the State as recorded in the Census of 1931 A. D. is 1,44,37,541. The area under fruit crops is 3,530 acres only as per information obtained from Revenue Officers for the year 1339-1340 F. Thus it may be said that about 4099 people have to depend for their fruit supply upon one acre of land. Fruit supply is, therefore, inadequate and naturally fruit has to be imported into the State from outside to make up the deficiency. This will be seen from the figures of imports and exports of fruit for the five years

from 1335 to 1339 which show that while the average export of fruit is valued at Rs. 2,07,436., the average imports for the same period come to Rs. 55,42,843 *(as per appendices 2 and 3). Thus the ratio of import and export roughly comes to 27: 1. It is, therefore, imperative for the Department to try and improve the state of affairs and to raise more fruit in the Dominions so that people can get sufficient quota of fruit for their consumption and save at least a part of the money going out of the Dominions.

THE PRESENT CONDITION OF FRUIT GARDENS IN THE VARIOUS PARTS OF THE DOMINIONS.

(i). Telingana

Soils:— The soils in the Telingana tract are chiefly of the *chalka* type derived from granite of which the hills round about are formed. The hills are more or less barren of any vegetation and are, therefore, extremely heated in the day time, so that radiation from them makes the whole atmosphere oppressively hot in the summer. The soils are mostly poor in plant food and humus and owing to their porous nature have to be irrigated very often and particularly so in the hot weather. In certain places we find the presence of salts injurious to plant growth, and such soils which are generally sticky have to be carefully cultivated. In others the soils also become extremely hard on drying. The subsoil is often rocky which probably explains the premature dying up of mango and other trees.

Water.—The water from wells is generally sweet and is about 30 feet from the ground level. In certain cases it is brackish, though not always injurious to fruit crops. Occasionally the wells are influenced by the proximity of tanks.

Fruit crops.—In Hyderabad and its suburbs as well as in district towns are seen extensive private gardens maintained by well-to-do people. The crops in these are

* N. B. Since Mr. Paranjpe drafted his report detailed figures for 1340 Fasli have become available, and these show that out of Rs. 61,70,000 recorded for imports of "Fruit" 35 lakhs consisted of green and dry cocoanuts, 14.7 lakhs dry fruits and nuts and only 12 lakhs fresh fruit.

mostly grown for personal use and pleasure. The important fruit trees are mango and citrus. The most commercial types of the Bombay mango market viz. Alphonso and Pairi are practically absent. The varieties of mango at present grown in this tract are noted for their large size and brilliant colour.

Similarly many varieties of citrus are grown in gardens more or less for the size and variety of the fruit than for its quality.

Uncertain nature of the mango crop.—It appears that in the *chalka* soils mango trees have to be irrigated in all stages of their life. Money return from one acre of mango plantation is not always the same year after year owing to non-flowering of the trees in one year, and damage to flower and fruit by mildew, mango hoppers, untimely rain and storm in another. Taking into consideration the cost of cultivation and the money return, it appears that the fig crop is more paying and less expensive owing to its quick bearing than the mango crop.

The fig crop, therefore, is the only one that is grown on a strictly commercial basis. This is in the hands of the Arabs who grow it very carefully in the back yard of their houses. It has few diseases, at least people do not complain of any serious diseases and pests.

Citrus fruits.—A very large number of citrus varieties is grown in private gardens. Fruits of some of these varieties seem to be left on the trees unharvested probably for want of customers. Deshi Naringi is an inferior type of orange and is ubiquitous all over the tract as a subcrop in mango plantations.

Other crops.—The other kinds of fruit trees of this tract are grapes, bananas, guavas, pomegranates, pine-apples (to a limited extent). So far as the grape vine is concerned no one appears to have succeeded in growing grapes as a crop. The chief difficulty appears to be the choice of a suitable variety and want of knowledge in the matter of training and pruning of the vines and treatment of diseases at the right time. Otherwise the conditions of soil and climate seem to be suitable for the production of this fruit on an economic scale.

Bananas:—Are not grown to any appreciable extent in this tract. The same may be said of *chickoo* and *Papaya*. *Guava* and *Pomegranate* are hardy plants and can stand rough treatment as compared with other fruit trees. *Guava* is not susceptible to any serious pest like the *Pomegranate* which is badly damaged by the anar-caterpillar (*Viraichola*). This fruit is used by poor people more commonly than the *Pomegranate*.

Pine-apple:— There is very little cultivation of this fruit except perhaps in the gardens of a few well-to-do people.

Date Palm:— The Date (*Phoenix dactylifera*) grows with a certain amount of success in the vicinity of Hyderabad, but it is not grown on a commercial scale. The chief difficulty appears to be the absence of the right type of male trees owing to which the female flowers have to be pollinated with the pollen of inferior kinds like the *Shindi*.

Anonas:— Of these the Custard Apple grows everywhere in a semi-wild condition. The Bullock's Heart (*Anona reticulata*) is grown in almost every garden though never on a large scale.

Apples and Peaches:— These are grown to a limited extent in deep loamy *Chulka* soil and occasionally bear a small quantity of fruit.

Phalsa:— (*Grewia asiatica*) is a minor crop and grown to a small extent in Hyderabad. The demand for this is comparatively small.

(2) Mahratwada.

(A) LATERITE AREA OF BIDAR DISTRICT.

Soil:— The red soil of the Bidar District is derived from laterite. It is well drained and contains compounds of iron which are believed to be beneficial to mango growth. The soil is very similar to that of Belgaum in the Bombay Presidency. The climate of Bidar is cool and pleasant as its elevation is fairly high viz. about 2,000 feet above sea level.

Water.— The water in the wells is about 40 to 50 feet from the ground level. At Kohir and Vicarabad it is 60 feet or more. At Kohir the store of water also is not great at present, though formerly it is said to have been more being influenced by a tank situated at Badampet, the dam of which was broken some years ago and was never repaired. However in this tract there appears to be sufficient water for sugarcane cultivation which occupies considerable area.

Chief Fruit Crops.— Mango is the chief fruit crop in this area. The trees also grow quickly and do not require constant irrigation after they are once established.

Other Crops.— Guava, Citrus and Banana of the red kind are the other crops sometimes grown. Cashewnut was seen growing in a fairly good condition. The same may be said about the Jack fruit also.

At Vicarabad (2303 feet above sea level) Apples, Peaches and Cashewnut are grown to a small extent, and produce a small quantity of fruit, so also Jack fruit and Litchi were seen there in a fairly good bearing condition.

(B) UPLAND OR BALAGHAT PLATEAUX:—

This tract is situated about 2200–2400 feet above sea level. The soil is generally brown to black in colour and two to three feet deep overlying fine *murum* which ensures good drainage. The climate is cool and healthy with an assured rainfall of 25–30 inches.

Water.—There is sufficient water in this tract as can be seen from the existence of Sugarcane and Banana crops commonly grown there.

Chief Crops.—At Limba Ganesh on this plateau grape vines are successfully grown on a large scale occupying an area of $2\frac{1}{2}$ acres. Similarly bananas occupying 1 acre and papayas $\frac{1}{2}$ acre were also seen in good condition. Young Mosambi plants occupied 1 acre of land and were in good condition, though they had not reached the bearing stage.

The great draw-back of this tract is that there are no good roads and transport facilities and particularly so in the rainy season when even bullock carts cannot ply. From Limba Ganesh the nearest railway station in the British territory is not less than 40 miles, while in the Dominions the nearest railway station is as far as 60 miles. In spite of this fact there is a very successful grape garden at Limba Ganesh which shows the commercial possibilities of fruit growing in this tract.

Out of the 1,500 grape vines, 1,000 vines which were 8 years old had yielded 65 pallas of fruit in March 1931. (1 palla=240 lbs). But owing to unusual rains in October to December 1931 the crop was totally ruined by Downy Mildew which could not be controlled for want of copper sulphate. This stuff cannot be purchased owing to restrictions on its import which is a great handicap to grape growing, as per appendix 4. The result was that the grower suffered a loss of Rs. 2,000/- besides the usual expenditure of maintaining the garden.

(C) MAHRATHWADA PLAINS.

This tract is very vast and extends from Vaijapur in the northwest corner of the Aurangabad District to the eastern boundary of the Nanded District.

Soils.—The soils here are also derived from trap and are of various types from shallow to deep black. The latter are retentive of moisture, contain much organic matter and crack in the hot weather. In many cases they are overlying *shadu* or powdered lime on the one hand or *murum* on the other. Sometimes the subsoil may be of *chopan* nature, i. e. heavy shining black clay which does not drain easily but is richer in plant food than the *shadu* soils which are devoid of it. But these types can be used for growing fruit crops, but choice of the crop depends on the depth at which these layers occur. If the soil is shallow and has *shadu* as the subsoil within a foot or so, then hardy plants like Pomegranates, figs, *bore* (*Zizyphus jujuba*) are planted. If the soil is very deep with *shadu* or *chopan* layers below a depth of 3 or 4 feet then Citrus fruits and Grapes may be planted with liberal dose of farm yard manure as at Mudkhed. There is another type of soil called *Khalgat* which does not

drain easily and is unfit for any cultivation. In such soils fruit trees naturally do not grow well. Such a soil can be seen at Parsoda and other places in this tract. Soil with *murum* at a depth of 3 feet or so is very good for any type of fruit. Similarly alluvial soils which are usually found on the banks of streams and rivers and are formed of silt deposited by flood water are well-drained and quite suitable for any fruit crops particularly Citrus and Mango.

White soils are usually found on village sites and as the name suggests, are whitish grey in colour. They are very well drained and are well suited for Grapes, Figs, Pomegranates, Guavas, Bananas and Sour Limes (Kagdi Limbu). These have to be irrigated twice a week in summer.

Water:— There is fairly good supply of water in this tract. It is sweet and its level in the wells is about 30—35 feet below ground. Generally the wells used for orchards do not fail. In certain cases slightly brackish water is found as at Jalna, where it is used for orange trees of which the growth is all right but the flavour of their fruit is affected. Similarly the *Basrai* variety of Banana does not grow satisfactorily with this water. At Doulatabad and at Vaijapur old tanks and dams on rivers are out of repair and hence the water in the wells concerned has gone down. As a result the fruit gardens have failed in such places. Similarly at Mominabad (Ambe-Jogai) the water supply is scanty and the fruit plantations of Guava, Pomegranate and Citrus seem to be adversely affected.

Fruit crops:—Citrus fruits, Guavas and Pomegranates are grown on a commercial basis, and as a rule are paying. Grapes and Figs at Doulatabad are more or less in declining condition on account of shortage of water. The varieties of Grapes grown there are mostly shy bearers and control measures against diseases are not known and practised. At Shingapur near Parbhani Grapes are grown by the four stake system which does not allow bullock power to be used in the gardens and hence it is costly. Red Banana is grown on a small scale at Aurangabad and the yield appears to be fairly satisfactory.

Other crops grown are Mangoes (largely) and Chickoo, Papaya, Basrai and Bodhi varieties of Banana. As regards mangoes many of the old grooves are in a neglected condition and show a bad attack of *Loranthus*, a semi-parasitic

RESULTS OF MECHANICAL ANALYSIS.

Particulars	Soil No. 17	Soil No. 18	Soil No. 19	Soil No. 20	Soil No. 21	Soil No. 22	Soil No. 23	Soil No. 24	Soil No. 25	Soil No. 26	Soil No. 27	Soil No. 28
	Per cent	Per cent	Per cent	Practically all stone very little soil	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Gravel & Fine Gravel	30	20	30		10	85	80	60	60	70	70	50
Loss on Ignition	7.69	9.14	8.73	6.9	4.75	1.18	6.16	6.64	6.16	5.61	5.23	6.59
P O	0.08	0.12	0.07	0.08	0.05	0.02	0.02	0.02	0.07	0.08	0.04	0.03
2.5 K O	0.47	0.38	0.44	0.58	0.34	0.28	0.65	0.73	0.64	0.42	0.39	0.43
2 Nitrogen	0.5	0.03	0.09	0.04	0.03	0.03	0.06	0.05	0.05	0.04	0.05	0.03

N. B. The Samples are mostly full of stone and grit.

NOTE:—Samples No. 1 to 16 are analysed in detail as given above. As to Nos. 17 to 28 beyond the limited details given the Industrial Laboratory could not work out a complete chemical analysis, more so, since samples of Soils were being sent to the Laboratory at intermediate periods and it is assumed that what could be furnished by them in time giving the important proportions of soil contents as Nitrogen etc., for inclusion in this report, would suffice.

WATER SUPPLY.

Sources.

1. Wells.
2. Tanks- Water taken by channels for irrigation.
3. Rivers.
4. Large reservoirs, built by damming rivers & taking water by *nalas*.

From No. 1 and 3, water is mostly lifted by *mhote* with bullock power, pumping of water is done to a small extent by using power from oil engines, steam engines and electricity.

Land lords are keen on installing oil-engines for pumping and other agricultural purposes.

The general decrease of late years in the average rainfall has affected water supply.

I note below water levels in wells at the time of my visit.

- | | |
|--|------------------------|
| 1. Aurangabad—20', 25', 30', 45' | January-February 1931. |
| 2. Parbhani—20', 25', 30' 35' 40' | do |
| 3. Nanded—35', 40', 50' | do |
| 4. Atraf-i-balda—(Vikarabad) 40', 45', 60' 70' | do |
| 5. Bidar (Koheer)—40' 45' 50' | do |
| 6', 8', 15', 20', 60.' | August, 1931. |
| 6. Bhir—15' | March 1932. |
| 7. Gulbarga—25', 30' | August 1932. |
| 8. Raichur—40', 50' | September 1932. |
| 9. Mahbubnagar—12', 25', 30', | January 1932. |
| 10. Medak—35', 40' | do |
| 11. Nizamabad—10', 12', 15', 20', 25', | do |
| 12. Nalgonda—26', 27. 30', 39', 42' | July 1931. |
| 13. Warangal—18', 19', 20', 25', 31' | August 1931. |

art of training the vines and pruning them at the right time as few people seem to know these operations correctly. Control measures against the diseases and pests of the crop should be made known to the public, and adopted at the right time. Delay of even a few days means partial or total loss of the crop.

It may be noted here that copper sulphate which is the chief ingredient of Bordeaux mixture used against *Anthracnose* and *Downy Mildew* cannot be purchased in sufficient quantities owing to restrictions against its import. But this must be made available to the growers who must have it in stock for use at a moment's notice. So also sulphur dust (200 mesh) should be used against powdery *Mildew*. Both of these are sure measures of a preventive nature, and too much stress cannot be laid upon their importance for the Grape crop.

Banana:—The Hyderabad market is at present almost absolutely dependent on the Madras Presidency for its supply of Bananas except the Red ones. It is desirable to extend the cultivation of this Red variety even in Telingana as can be seen from the fact that it is grown on a small scale round about Hyderabad. The only defect of this variety is that it is very tall and liable to break owing to strong winds. It rarely fetches less than Rs. 4/ per 100 fruits and hence it is worth growing. Basrai is a dwarf and very prolific variety, it occupies less space and therefore yields more. It is desirable to grow this where owing to prevailing strong winds the tall red variety may not succeed. Both these varieties are gross feeders.

Chickoo:—(*Achras Sapota*) This is found to grow very satisfactorily in certain gardens and should be grown on a larger scale than at present. If a demand can be created for this fruit, its cultivation is sure to prove a paying one. However care must be taken to get plants prepared by the *gooty* method to the exclusion of cheap grafts on Khirni stock (*Mimusops hexandra*) which rarely bear fruit. With careful cultivation, this is a very high yielding and prolific crop.

Papaya:—This is a crop which can be easily grown on a small capital. It appears, however, that there is a prejudice against this fruit which checks its demand in the Hyderabad market. But wherever there is demand for this fruit its cultivation should be adopted.

Guava.— Attempts should be made to grow seedless and Allahabad varieties of Guava which are superior to the local ones. The quality of the fruit, however, depends much on the soil and treatment given to the plant.

Pomegranate.—The crop is very susceptible to the *Anar Caterpillar*, which can only be controlled by bagging the fruit at a young stage, i. e. soon after pollination. Affected fruits should be destroyed as soon as noticed. This must be done by all growers in co-operation.

Pineapple.—This crop requires high type of cultivation such as deep trenching for growing plants, high manuring, constant watering, partial shade and loose well-drained soil. This crop has a better chance of success at Vikarabad and other places in the laterite area.

Date palm.—These grow well, but are at present pollinated with inferior males of Shendhi (*Phoenix sylvestric*) Some plants of good varieties have been obtained from Iraq and planted at the Government Farm at Himayatsagar. The Agricultural Department has an Assistant who was specially trained in Date cultivation in Iraq. He looks after the Date garden at the Farm and goes round to the date growers to advise and teach them the proper method of pollinating the female flowers with pollen of better kinds of males.

Anonas.—(*Anona cherimolia*)—deserves more attention than it receives at present as it grows in and requires the same conditions with regard to soil and water as the Bullock's Heart.

Apples and Peaches.— These may grow better in deep laterite soils in the Bidar district and at Vicarabad where elevation also is somewhat favourable for their growth and fruit production.

Green manuring.—In the matter of improvement of soils in general in this tract, it is advisable to grow *Sunn* or some other Leguminous crop in the rainy season and turn it into manure on the spot by burying it. This will improve the texture of the soil by increasing its moisture holding capacity.

Mahrathwada.

(a) Laterite area of Bidar.

The water facilities at Kohir are in need of improvement as was pointed out by the cultivators in the place who said that formerly even Grapes used to be grown there

but owing to breakage of the dam on the tank at Badampet, there is not enough water available at present in the wells influenced by the tank, and as a result the Grape and other crops cannot be grown to the same extent as before.

A Mango nursery should be established here to supply cheap and reliable grafts of select varieties, as mangoes grow very well in this kind of soil and do not require irrigation after the plants are once established.

In addition to Guavas, Citrus, Jack fruit, Cashew nut, Grapes, Pineapples etc, strawberries should also be tried as these grow well in well drained laterite soil at high elevation. When a new plantation is to be started, potatoes may be tried as an intercrop as they grow very well in laterite soils.

(b) UPLAND OR BALAGHAT TRACT.

This is perhaps the best tract for fruit cultivation in the whole of the Dominions and is capable of growing almost every kind of fruit crop commonly grown in the Deccan, such as Mango, Citrus, Grape, Banana, Fig, Guava, Pomegranate, Chickoo, Pine-apple, Grafted *Bor* (*Zizyphus jujuba*) and many other minor crops. Hence effort should be made to induce people to take up fruit cultivation on a commercial scale through a competent Horticultural Overseer appointed for this tract.

(c) MARATHWADA PLAINS.

Citrus.—This is a very paying and less risky crop in this tract, and the tract if developed is easily capable of meeting the requirements of the Hyderabad market as regards these fruits. People usually take the *Mriga-bahar* of Oranges as it is not affected by the *Ophideres* pest and because it is more convenient to take it. But *Ambe-bahar* is likely to fetch more as its fruit is ready in December when there is greater demand in the market. But it is liable to be affected by the above pest to guard against which it is necessary for the people to be well advised.

There is a seedless variety of Santra at Mudkhed in the Nanded District. It is worthwhile propagating and distributing this variety among the citrus growers. This is sure to command a high price.

Grapes.— There is a vast scope for Grape cultivation in this tract also provided steps can be taken to educate the people in training and pruning the Vines and in controlling

the diseases and pests. In fact this tract was noted for its Grapes at one time though latterly their cultivation has gone down owing to extraneous causes. This is a highly specialised crop and people should not be advised to take it up unless a very competent man is appointed to help the public with advice as to the proper management of the crop since any delay in doing the various operations at the right time would mean considerable loss to the grower. Prolific varieties should be grown to replace shy bearers. The four stake system of growing grapes adopted at Shinganapur should be replaced by single stake system as it enables the grower to use bullock power economically instead of costly human labour. The difficulty of getting copper sulphate has been mentioned elsewhere in this report and need not be repeated here again.

Mango.— Mango trees grow very well in alluvial soil. Similarly where there is three feet of black soil overlying *murum*, cultivation of mango trees succeeds well. Pairi and other prolific mango varieties should be grown. Wind belts of *nim* trees should be planted so that there will be less damage to the crop by hot dry winds. Wherever there is water facility cover crop like Banana should be grown so that the mango trees protected by them can grow quickly and without extra expense. Loranthuses and mango stem borers (*Batocera*) should be carefully removed and the land should be carefully cultivated. If possible some Leguminous crop should be taken in the inter spaces. An application of bone meal to the plants at the rate of about 15 lbs. per tree would be beneficial.

CONTROL OF DISEASES AND PESTS IN VARIOUS TRACTS.

All the fruit crops have their peculiar diseases and pests. The Horticultural Inspector must be in a position to adopt prevention measures in anticipation of the trouble, as for instance in the case of *Downy Mildew* and *Anthracnose* which attack Grape Vines or *Ophideres*, *Arbela* *Batocera*, *Scale insects* etc. which attack various kinds of fruit trees and for which curative measures have to be adopted.

RECOMMENDATIONS REGARDING GRADING, PACKING, DESPATCHING & MARKETING OF FRUIT.

Grading.—The packer at present only places inferior fruit at the bottom, better fruit in the middle and the best fruit on the top. Such a mixed packing is undesirable, and if fruit of uniform grade is packed, it is sure to fetch better price. This is the experience as regards Mangoes in Bombay.

Packing.—Mosambis are at present packed in gunny bags, baskets or deal wood cases. Supposing a given quantity of fruit of uniform quality packed in gunny bags fetches Rs. 1-8-0 it will fetch Rs. 1-12-0 if packed in baskets and Rs. 2 to Rs. 2-4-0 if packed in a box. The higher weight and the cost of the box as packing material is compensated not only by the higher price obtained but even by the repeated use of the box as is the experience in Bombay.

Despatch.—The chief needs of the grower are (1) well ventilated shelved waggons with wooden covers (2) quick despatch of fruit waggons by passenger train in the absence of goods train and (3) prevention of unreasonable gratification to station staff.

Marketing.—Establishment of a Central Fruit Market where fruit can be sold by open auction in place of private and insanitary godowns of the agents is desirable. It is also desirable that the grower gets correct information about the transactions as actually effected by making it necessary for the seller and the purchaser to sign the forms of transaction in triplicate and to send a copy to the grower.

(For detailed account on this subject, see Appendix No. 7.)

EDUCATION AND ORGANIZATION.

From the above account it will be seen that there is need for educating the public regarding the essentials of successful fruit growing. Thus what the grower must necessarily know over and above what he already knows in general is (1) the conditions which give rise to diseases and pests of plants, (2) how to avoid such conditions, (3) how and when to treat particular crops if they are attacked, (4) how to prepare the fungicides and insecticides required for

treatment, (5) the equipment necessary for treatment, (6) grading, (7) packing, and (8) marketing. Therefore adequate competent research and propaganda staff who can help the growers in these respects at any time is necessary. So also institutions where these things can be learnt such as model fruit farms, demonstration plots, nurseries and a Central Pomological Museum are necessary. In this connection, three Model Fruit Farms viz. one at Aurangabad, one at Hyderabad and one at Gulberga should be established with sub-stations at Bhir, Bider and Warangal. As regards the utilization of the present Local Fund gardens appendix No. 8 will show at a glance which gardens can be used for the purpose and why.

The model fruit farms should not only deal with the fruit crops suitable for the tract but also with vegetables, flowers and arboriculture. A Horticultural School with two years' course should be attached to one of the Model Fruit Farms.

The sub-stations or demonstration plots will look to the growing of nursery plants required for the tract and will grow the local fruit crops on a small scale.

The Propaganda staff.—Horticultural Inspectors will go round the districts and will carry the improvements home to the public particularly in the matter of introducing suitable desirable varieties, control measures against diseases and pests, holding short course classes and small local demonstrations and arranging for Takavi loans to deserving prospective growers. The propaganda staff should take advantage for holding short course classes for demonstration purposes, of the existing successful gardens such as at Limba Ganesh (grape), Vijapur, Parsoda, Mudkhed (Citrus), Maisaram (Fig), Bidar, Gulberga (Red Bananas).

With a view ultimately to sell fruit on cooperative basis the staff will first arrange to form a small association of fruit growers in the locality and engage a waggon in common for fruit transport, charges being divided proportionately among the growers. The fruit may be sold to the same or to different contractors. Grading of fruit should also be adopted along with this, each grade bearing a distinctive mark such as "choice", 1st. grade, 2nd. grade, etc.

CHIEF RECOMMENDATIONS.

1. The staff of the Horticultural section of the Agricultural Department should carefully examine the drainage condition of soil and other environmental factors, particularly in the canal zone, before recommending any site for fruit cultivation.

2. In the Marathawada tract particular attention should be given to the selection of sites, for wrong selection of land result in heavy loss to the fruit grower, and no amount of aftercare or treatment of the plants can correct the defects of unsuitable soil.

3. People should be advised to grow wind belts of hardy trees around mango and other gardens to protect them from hot dry winds.

4. For the improvement of soil intended for fruit trees, green manuring should be adopted and done more frequently than at present. This particularly applies to *chalka* soil.

5. Wherever old tanks are silted up people should be encouraged (if there is no objection on other grounds) to take away silt free of charge and use the same to improve their lands and for other purposes. This may help to increase the storage of water and indirectly to increase the water supply in wells under their influence.

6. The Horticultural section should supply on payment, if possible, even at concession rates, fruit plants to the public from reliable nurserymen whose nurseries should be examined by them from time to time to see that they keep sufficient stock of reliable plants. For concession rates some arrangements will have to be made with a few nurserymen. The public should be given the names and addresses of a few such reliable nurserymen in the different parts of the Dominions or in the surrounding parts of the British territory, so that the customer himself would make a choice from any of them by independent enquiry.

7. As far as possible hardy and prolific varieties of fruit should be grown.

8. A Mango nursery should be established at Bidar for propagation of reliable mango grafts and their distribution among the public. It is noticed that a high percentage of mango grafts imported from outside die, as many of them are not well suited to this tract.

9. People should be encouraged to grow mango trees particularly in the laterite tract where they thrive best without much irrigation. The laterite zone can supply more than 25 per cent of the Dominion's demand of mango fruit.

10. The Horticultural Section should bring to the notice of the mango growers the desirability of removing Loranthus and mango stem-borers- This will not only save their trees from destruction but will wipe away the source of infection to other trees.

11. Mango hoppers and mango mildew cause considerable damage to mango blossom, particularly when the weather is cloudy. The effective remedy against these is sulphur dusting (200 mesh) which may be tried in place concerned.

12. The well known *Alphonso* and *Pairi* varieties of mango are rarely seen in this State. It is not known whether they do not succeed here or people do not like them. Attempt should be made to grow these on a systematic scale and if found suitable their cultivation should be recommended to the public.

13. Vitamin contents of popular varieties of Hyderabad mangoes should be ascertained and those showing higher vitamin contents and other good qualities should be recommended to the public.

GRAPES.

14. There is a great scope for extension of grape cultivation in the Mahrathwada tract. People should be encouraged to grow grapes on improved method as followed at Limba Ganesh. The old method of growing grapes on four stakes should be discouraged as it is costly and involves more labour.

15. Control measures of grape diseases are practically unknown at Shinganapur and at Mitmitta near Aurangabad. These should be brought to the notice of the grape growers. Materials and appliances should be provided to them for the first two or three years by the Department.

16. Copper sulphate is the principal ingredient of Bordeaux mixture which is used against *Anthracoze* and *Downy Mildew* as a preventive measure. It cannot be imported into the State without special license and cannot be got in sufficient quantities at the right time. Some

steps should be taken to supply copper sulphate and also sulphur to grape growers in sufficient quantities. Permission also should be given to them to stock these stuffs for use whenever required.

17. It appears that many people plant very superior varieties of grape which are almost always shy bearers. People should be advised to grow prolific varieties, like Bhokri in the first instance and if they succeed in growing them then only they should grow superior varieties. In the majority of cases failure to grow grapes is mostly due to want of knowledge of pruning and control measures against diseases and pests.

FIG.

18. Fig should be grown as a commercial crop in *chalka* soil where water and manure are available. It particularly thrives best in the vicinity of hills as at Maisaram Nalgonda, Warangal, and Doulatabad. The Poona and Baghdad figs should also be tried.

19. Every attempt should be made to revive grape and fig cultivation in the Upland (Balaghat) and plain Mahrathwada tracts.

CITRUS.

20. Citrus cultivation particularly of Santra and Mosambi should be encouraged in Mahrathwada tract by providing funds on cooperative basis. This tract is capable of supplying all the demands of orange fruits in the Dominions.

21. A large nursery to supply reliable citrus plants should be established in Aurangabad District. If possible private enterprise should be encouraged.

22. A few seedless Santra plants were noticed at Mudkhed. These should be propagated carefully and distributed to the public.

23. People seem to be ignorant of control measures of *gummosis*, *Arbela* and of the 'fly' pest (*Ophideres*). A trained man should be deputed to demonstrate methods of control.

24. People usually do not take Ambebahar (January flowering) of orange trees on account of damage of fruit by the "fly" pest (*Ophideres*). When it is controlled, Ambebahar crop will perhaps be more paying than Mrigbahar (June flowering).

25. Time has come to bring to the notice of the public the Washington Navel orange and Grape fruit and to encourage their cultivation.

26. Cultivation of Sour lime (Kagadi limbu) is comparatively very small in the Dominions. This should be encouraged to meet the local demand. There are three or four types of this fruit and these should be tried in different parts of the Dominions.

27. In the Telingana tract people seem to prefer Deshi Narangi to Santra and Mosambi. Washington Navel orange, Grape fruit, Pomelo, Sour lime and Santra and Mosambi should be encouraged.

GUAVA.

28. Guava is one of the hardiest crops and stands considerably unfavourable conditions and has few enemies. Growers should be supplied with plants of seedless and Allahabad guava.

BANANAS.

29. In villages the Bodhi or Mhaskel variety of banana is grown and is used by poor people. Superior varieties such as Basrai, Red, Sonkel should be encouraged particularly in the canal zone.

CHICKOO (SAPOTA).

30. This is a highly paying crop near Bombay. In suitable soil conditions, plants prepared by *gootie* method should be used.

DATES.

31. Some plants of good varieties of Date-palm have been imported and planted at the Himayatsagar farm, and the assistant in charge has started demonstrating the proper method of fertilising the females with pollen of better kinds of males. This should be continued and extended.

32. Pine-apples, strawberries and potatoes should be grown as sub-crops in the laterite soil at Bidar and Vicarabad.

33. The Horticultural Section should help the fruit growers in combating diseases and pests, by taking preventive measures and teach them the preparation of fungicides and insecticides. At the same time spraying and dusting appliances should be purchased on a cooperative basis and used by all.

34. Arrangements should be made so that the fruit growers can get at short notice sufficient quantities of the chemicals that are used in preparing the insecticides and fungicides.

35. The Horticultural Section should try to educate people in grading fruit in the orchard itself before it is packed. Similarly, each fruit parcel should contain fruit of one grade only marked as such on the outside.

36. The Government should move the Railway authorities to provide well-ventilated and shelved waggons with wooden covers, and to arrange quick despatch of fruit waggons by passenger train when a goods train is cancelled for want of traffic.

37. Allegations that extra gratification has to be given to the Railway station staff for fruit parcels are common. These demand inquiry.

38. The Horticultural Section should encourage fruit growers in a village to form a small local association and they should engage a waggon in common for fruit transport, the charges being paid proportionately. The fruit may be sent to the same contractor or to different ones. (This is the first step towards cooperative sale of fruits).

39. After getting thorough experience in grading, packing, and transporting for some, say five years continuously the fruit growers may be induced to open a small shop in Hyderabad market, where the association could sell a small quantity of fruit through their own servants and also through hawkers. The hawker is an important agency to dispose of fruit right at the customer's table. The association should also supply parcels of fruit of any required grade to customers to suit their pockets.

40. Advantage should be taken of horticultural shows for ascertaining the places where particular fruit and vegetables grow well, and also to find out the factors which make it possible for such crops to be grown there successfully, apart from the personal care.

41. A central Pomological Museum should be started where names of mango fruits and other kinds should be standardised.

42. Short course classes should be held at the central horticultural station, and ten to twelve days classes in different parts of fruit growing centres. Here intending fruit growers and cultivators should be called and practical

lessons in fruit growing should be given, including the methods of resting, pruning, forcing etc. Practical demonstrations should be given of what are desirable and what are undesirable grafts. Special emphasis should be laid on showing them how to avoid conditions which encourage diseases and pests, and teaching them the method of treating the various diseases and pests if they appear. They should be shown the method of preparing and applying the various insecticides and fungicides.

43 The prospective fruit grower should be shown successful fruit gardens, where the chief difficulties in growing the crop particularly diseases and pests should be discussed with the owner of the garden.

H. P. Paranjpe,
Horticultural Adviser.

APPENDIX No. I.

Please see page 251

APPENDIX 3.

COMMERCIAL ASPECT OF FRUIT CULTIVATION IN THE STATE.

The subjoined Statement of imports and exports of fruits from the Customs Department for a period of 5 years 1335 F. to 1339 F. (1925-30) shows the Commercial Aspect of Fruit Cultivation in the State:—
 The Imports average Rs. 55,42,483 } in the ratio of 27:1 roughly, in other words the State is depending upon other parts of India
 and Exports average Rs. 2,07,476 } and foreign countries for her fruit supply.

I M P O R T S.

Serial No.	Customs office.	1335 F.	1336 F.	1337 F.	1338 F.	1339 F.	Average for 5 years.	District
1	Hyderabad	424,180	718,800	615,060	702,920	826,140		Atrafbalda, Telingana
2	Secunderabad	786,180	830,660	756,880	984,600	951,800		Atrafbalda, Telingana
3	Osmanabad	1,187,940	823,060	988,900	930,260	607,980		Osmanabad, Mahratwada.
4	Anrangabad	281,200	222,420	300,500	183,900	294,060		Anrangabad, Mahratwada.
5	Lingsugur	207,480	234,300	268,040	227,120	281,720		Raichur, Mahratwada.
6	Madhira	4,340	1,780	1,480	5,056	1,620		Warangal, Telingana.
7	Warangal	332,800	318,540	312,880	447,120	477,120		Warangal, Telingana.
8	Rajura	36,400	68,200	58,600	57,480	53,380		Adilabad, Telingana.
9	Gulbarga	777,700	999,120	957,840	905,600	967,020		Gulbarga, Mahratwada.
10	Godavari	585,860	1,163,160	1,279,560	1,319,080	1,337,900		Nanded, Mahratwada.
11	Gadag line	99,590	47,760	80,080	...	...		Raichur, Mahratwada.
12	Bhir	...	...	...	152,440	199,780		Bhir, Mahratwada.
	Total Customs free	4,693,580 4,571	5,425,400 200	5,649,880 7,900	5,814,900 27,300	6,048,320 39,964		
	Grand total	4,698,151	5,425,600	5,657,780	5,842,200	6,088,484	5,542,813	

NOTE.—The following figures show the value of imports during the year 1340, of dried and fresh fruits separately, as per Customs Department report for that year. The detailed classification as shown for 1340 was not maintained during the year 1339 F.

1. Green Cocoanuts	Rs. 1340 F	Rs. 1339 F
	19,53,000	19,70,000
2. Dry Cocoanuts & Copra	15,60,000	19,90,000
		3 Dry fruits & nuts
		14,70,000
		12,07,000
		21,28,484
		Total Rs. 61,70,000
		60,88,484

Appendix 3.
EXPORTS.

S. No.	Customs office.	1885 F.	1886 F.	1887 F.	1888 F.	1889 F.	Average for 5 years.	District.
1	Hyderabad	...	...	40	280	240		Atrafbalda Telingana.
2	Secunderabad	...	...	...	680	60		Do.
3	Osmanabad	21,120	48,280	49,740	60	81,560		Osmanabad Mahratwada.
4	Aurangabad	73,720	59,640	93,200	32,160	93,200		Do.
5	Lingsugur	3,620	3,140	1,700	42,540	740		Do.
6	Madhira	...	1,720	220	8,260	13,460		Warangal Telingana.
7	Warangal	1,040	11,660	1,900	10,360	300		Do.
8	Rajura	...	...	...	11,660	660		Do.
9	Gulbarga	54,700	22,560	92,940	4,560	51,300		Adilabad Mahratwada
10	Godavari	19,940	29,900	2,220	43,440	3,100		Do.
11	Gadag line	...	...	9,660	8,220	...		Do.
12	Bhir	...	...	...	18,060	36,240		Do.
Total		1,74,140	1,76,000	2,51,720	1,80,280	2,35,860		
Customs free		...	...	8,600	6,800	3,080		

APPENDIX 4.

Copy of letter No. 101 dated 1st. Khurdad 1341 F.
from H. P. Paranjpe Esq., to the Economic Botanist.

SUBJECT:— SUPPLY OF COPPER SULPHATE TO GRAPE GROWERS.

During my recent visit to several places in the Mahratwada tract, I came across a successful grape plantation at Limba Ganesh in Bhir District with over 2,000 vines of which 1,000 yielded 16,000 lbs. of marketable fruit in March 1931. The remaining vines are still young. The garden is situated on a high plateau of the Balaghat hills. In normal years the place is dry during October and November and there is no damage done to the young crop in these two months. But in the months of October and November 1931 unusual and heavy rains occurred which lasted for several days continuously and the whole crop was totally destroyed by Downy Mildew which is favoured by the presence of rain and certain temperature prevailing at that time.

The grape growers are advised to spray the grape vines with Bordeaux mixture once in May before the rainy season and again in October soon after October pruning as a measure of insurance against Downy Mildew which may appear in the presence of unexpected and unusual rains in the months of October and November. The number of Bordeaux mixture sprayings to be given in October and November will depend upon the weather conditions prevailing in these two months.

One of the principal ingredients of Bordeaux mixture is copper sulphate which cannot be imported into the State without special license or permit from Government. In local shops, not more than a few tolas of copper sulphate can be sold at a time, and thus the cost would be something like Rs. 5/-per lb., whereas the same stuff is sold at-/-4/-per lb. in Poona. Now supposing that one cwt. of copper sulphate is required for one acre of vines the cost of copper sulphate in the Hyderabad State would be Rs. 560 whereas in Poona it is only Rs. 28/-

The grape grower at Limba Ganesh could not get copper sulphate in time from any source owing to restrictions on its import and he sustained a loss of more than Rs 2,000 (which was the price he actually realised in March 1931) in addition to the usual expenses of maintaining the garden.

It is therefore highly desirable that the territorial Deputy Directors of Agriculture should keep a stock of copper sulphate in adequate quantities for supplying to the grape growers, or the grape growers may be permitted officially to import copper sulphate for their requirements. The Departments of Customs, Excise, Revenue and Police should, if necessary be informed of the names of such grape growers who have always to keep the stuff in stock for use at a moment's notice. It is recommended that each grape grower may be permitted to stock copper sulphate at the rate of one cwt. for each acre of vines—the stock may be replenished as the old stuff is used up by indenting upon the Deputy Director of Agriculture. It is also equally desirable that the stuff should be supplied to the vineyardists at a cost not higher than the one prevailing in Poona or Nasik.

This is a very urgent matter which requires early attention of Government lest an established and paying vinery of eight years' standing may be permanently ruined. It is needless to say that the success of this garden means revival of the old industry of viticulture in this State. Many fruit growers asked my advice on grape growing, but I had to ask them to wait till the question of timely supply of copper sulphate to grape growers was satisfactorily solved. I may please be allowed to mention that in the Bombay Presidency every grape grower is permitted to purchase and stock as much copper sulphate as he required without any reference to Excise Department.

The first spraying of Bordeaux mixture is to be given before the end of May, hence favour of early orders of Government should kindly be solicited.

I have, etc.

H. P. Paranjpe.,
Horticultural Advisor.

APPENDIX 5.

SELLING, PACKING, GRADING AND DESPATCH OF FRUITS.

After cultivation of fruit crops, marketing of fruits is the most important item. In fact it is here that the fruit grower is greatly handicapped by factors which are almost beyond his control. The standing crop is sold to a contractor or *bagwan* who pays a lump-sum to the grower and takes all the risks of further transaction and disposal of fruit. If this is not done the grower himself picks, grades, packs and sends the fruit to a commission agent either in Hyderabad or in Bombay. The ordinary grower who is always a needy man sells the fruit by contract to raise money. He realises about 30 to 40 % of the price he would have actually got, had he done the whole business himself. In very many cases the contractor who stipulates to pay a certain amount, finds the market very low or just high enough to pay all his expenses and therefore never pays in full. This particularly happens in the case of mango crop which is a very uncertain one and liable to be damaged in a short time by untimely rain or hail or storm.

Standardisation of fruit and fruit parcels is a very desirable step. Graded fruit always commands a high price as also standard fruit parcels. To bring all this into practice requires considerable propaganda by the officers of the Agricultural Department who can command respect and confidence of the fruit growers. This is a subject which should be taken up by the Horticultural Section as the area under fruit crops increases.

Santras and *Mosambi* fruits are packed in bamboo baskets called *paties* which have a narrow bottom and wide mouth. These hold about 72 fruits. Ordinary cylindrical baskets called *karandies* contain 48 *Mosambi* fruits or 60 *Santras*. Usually without grading the fruit into different classes the packer places inferior fruit at the bottom, better fruit in the middle and best fruit at the top. In certain cases ordinary *Mosambi* fruits are packed in gunny bags to the extent of 200 to 225 fruits. Sometimes choice fruit is packed in deal wood cases, paper and straw is used freely in packing fruit in baskets and wooden cases. The

Hyderabad merchant has no suggestions to offer by way of improvement in packing and he says that good fruit travels equally well whether packed in boxes or in baskets. But packing method—box, basket or gunny bag—does necessarily influence the selling price of the fruit. Thus, if a given quantity of fruit of uniform quality when packed in gunny bag fetches Rs. 1-8-0, it will fetch Rs. 1-12-0 when packed in bamboo basket and Rs. 2-0-0 or Rs. 2-4-0 when packed in a box. The higher weight and cost of the box as packing material will be compensated not only by the higher price obtained and safe travel without pilfering but even by the repeated use of the box as is the experience in Ratnagiri in the Bombay Presidency as regards mango packing.

The packer also has his own difficulties and limitations. In certain places sufficient number of bamboo baskets are not available, there being no bamboo grooves in the vicinity. They have to be brought from outside or old mango baskets imported from the Madras Presidency in the previous season have to be used. Again the empties are not returned in time (within one week) by the fruit merchant. Therefore heavy charges have to be paid for the baskets. Empties are classed as first or lowest class and are charged at 38 pies per maund per mile or at half parcel rate at owner's risk.

Besides the cost of simple production the fruit grower has to incur manifold items of expenditure, until the fruit is sold in the wholesale market. These items are charges on (1) picking, (2) packing (basket, or box, twine, paper) (3) haulage from orchard to station, (4) gratification to the station staff and *hamals*, (5) railway freight, and (6) expenses at the market (in Bombay market (a) cartage or *hamali*, (b) weightment charges, (c) ground rent, (d) charity, (e) Commission and (f) postage. In Hyderabad market (a) carting charges (b) postage, (c) commission and (d) charity. When the fruit is to be sent outside the Hyderabad State it has to pay Customs duty at the rate of -/4/- a maund. This is particularly the case with the growers of Aurangabad district, who find it more convenient to send the fruit to Bombay owing to better railway facilities than to Hyderabad market.

APPENDIX 6.

TRANSPORT OF FRUIT BY RAILWAYS.

The Citrus growers all along the metre gauge line from Rotagaon to Mudkhed complained to me that they have to pay a higher railway freight than the Nagpur merchant although he has to send his fruit over a larger distance. This is not borne out by actual facts. The distance between Nagpur and Hyderabad B. G. is 365 miles (132 miles over G. I. P. + 233 over N. S. line). The charge per waggon load of 300 maunds of loose fruit is Re. 0-12-7 (Re. 0-4-6 over G. I. P. Section + Re. 0-8-1 over N. S. section) per maund. Now the distance between Rotagaon and Hyderabad M. G. is 358 miles and the charge per waggon load of 160 maunds of loose fruit is Re. 0-12-8 per maund. If the weight is less than 300 maunds the rate over the G. I. P. Section is Re. 0-4-10 and in that case the total rate for Nagpur.—Hyderabad would be Re. 0-12-11 by goods train. The rates of Re. 0-8-1 and 0-12-8 are the maximum class rates. When the full weight of loose fruit is loaded, there is the difference of 0-0-1 in favour of the Nagpur merchant. But Citrus fruit is rarely loaded loose like water melons. We may therefore leave this out of consideration.

When the fruit is packed in baskets etc., the charge is the same as above but the minimum weight by goods train is charged at 120 maunds per waggon over the broad gauge and 81 maunds over the metre gauge line.

The parcel rate over the Nagpur—Hyderabad line and the Rotagaon—Hyderabad line is the same, that is, Rs. 1-14-0 per maund, the distance being 365 and 358 miles respectively.

The rate of Re. 1 per waggon per mile is charged for booking from Rukmapur and Dharur to Bombay during the season.

On Lasur—Bezwada Section a special rate of Re. 1/-per maund is allowed for traffic to Madras for a waggon of 120 maunds. The usual rate for first or lowest class is Re. 1-2-3. The special rate is in force for at least over a year.

If about 100 waggons in a year from any station to Hyderabad are guaranteed, the N. S. Railway authorities may be prepared to quote a special rate, as they have given for Lasur-Bezwada Section. It will not be altogether impossible to secure co-operation between fruit growers to so arrange their consignments that a daily waggon can be engaged from one station to Hyderabad M. G. Such an arrangement at present exists at Mudkhed where three fruit growers jointly book a waggon daily and their business lasts for about two months. If other fruit growers of Mudkhed would join these three men the business would last for three months. It sometimes happened that the goods train did not run regularly as expected between Mudkhed and Hyderabad and the fruit was spoiled involving heavy loss to the growers.

It is the earnest request of the fruit growers on metre gauge line that when a goods train is not likely to run in the usual time the fruit waggon should be attached to the passenger train. The fruit growers on the N. S. Railway should not be penalised for shortage of traffic in other directions.

Now with regard to transport of fruit by special fruit waggons as they exist on the G. I. P. line, the N. S. Railway authorities want facts and figures to establish the fact that such waggons will pay the capital outlay and interest thereon incurred in constructing such waggons. From the number of Citrus gardens in the Mahrattwada tract it appears that the cultivation of oranges is sufficiently extensive to warrant construction of such special waggons.

To run a special fruit parcel train between Rotagaon and Hyderabad cannot be justified as the present volume of goods traffic is not sufficient to run regular goods trains owing to trade depression. The traffic between Bombay-Peshawar or Bombay-Hyderabad or even Nagpur-Hyderabad is far heavier than the N. S. metre gauge traffic. Therefore the consignor on the metre gauge must send his fruit by parcel instead of by goods train to ensure arrival of fruit in Hyderabad in good condition otherwise he must be prepared to take the risk of a slow goods train. It is for this reason that the fruit grower expects some help from the N. S. Railway by attaching fruit waggon to passenger train.

The fruit waggons are not well-ventilated and are iron covered. The fruit, therefore, gets easily spoiled in transit when the train is unduly slow. Here also the N. S. Railway are reasonably expected to provide suitable waggons for transfer on the metre gauge line.

Waggons with refrigerators are in use on the G. I. P. and other lines for fruit from Peshawar to Bombay, to Madras or to Calcutta. There being insufficient traffic on the N. S. Railway, this arrangement will not pay.

APPENDIX 7.

MARKETING.

When a waggon arrives at the station, the wholesale Commission Agent to whom it is consigned, takes delivery of the waggon and carts the fruit to his godown. The usual charge per cart is annas 14 which is charged to the fruit grower. The agent then sells out the fruit for retail buyers. He fixes the rate and sends the fruit to the city through the hawkers or sells it to retail merchants on credit. The price realised is usually collected in the evening from the hawkers. The Agent charges one anna per rupee as his commission on the total or gross realisation and all the charges of clearing, carting, Customs duty (if paid), postage and charity are debited against the grower or *bagwan*. The net amount recovered is sent to the owner at once or at any other time according to his instructions.

Miscellaneous expenses incurred by the commission agent are 6 to 7 annas for the Bombay Market and these amount to 4 to 5 annas in Hyderabad market per parcel whether of box, bag or basket. In Bombay these expenses are for Agent's Commission, Cooli hire or cart hire, weightment charges, ground rent, charity and sometimes postage. While in Hyderabad the miscellaneous expenses consist of station charges and commission. The station expenses include cartage, postage and charity (and also Customs duty if paid). In Hyderabad no special ground rent is charged for as the ground belongs to the commission agent; similarly no weightment charges are to be paid. In Bombay the commission charged is 4 annas per parcel, box or basket, irrespective of the price realised while in Hyderabad it is 6½% on gross price realised. From this it will be seen that the big leakage in the grower's money in Bombay market is in the shape of the Agent's commission and in Hyderabad it is in the shape of carting or station expenses.

In Bombay the amount collected for charity by the Agent is usually spent in building Dharamsalas or feeding the pilgrims at *Jatras*, while in Hyderabad it is spent in feeding the poor in Mohurram and other festivals. Of course these charity funds are not open to the public.

The sale of fruits is effected under cover in Bombay by the agent and buyers. In Hyderabad it is sometimes by open auction when the fruit is much in demand or the price is fixed by the agent himself when there is a glut. It is interesting to note that two agents in Bombay pay the same consignor different rates for the same quality and number of fruit on the same day. The rate varies inversely as the number of consignments sent. It is also high for better type of packing as per tables given on page 36.

Agent.	Date.	Consignment.	Rate. Rs.	Gross price realised.	Remarks by Agent.	Conclusion.
A	7-3-32.	3 Boxes mosam- bi.	Rs. A. 7-8	Rs. A. 22-8	Send more fruit.	Note the difference in rate for the same quality of fruit.
	7-3-32.	4 Boxes santras, 6 Boxes mosam- bi. 5 Boxes large fruit 1 Box fruit medium.	4-4	17-0		
A	13-3-32.	6 Boxes mosam- bi.	4-0	20-0	Large fruit has better rate.	In one week the Mosambi rate goes down from Rs. 7/8/- to 4/8/- & Santra rate from Rs. 4/4/- to 3/8/-
		8 Boxes santra	3-0	3-0		
B	13-3-32.	2 Boxes mosam- bi.	4-8	27-0	Sale very carefully done.	Note increase in rate from Rs. 4/- to 6/8- in one week. Note also increase of rate for better packing as seen from the next table.
		8 Baskets san- tra.	3-8	28-0		
B	13-3-32.	2 Boxes mosam- bi. 8 Baskets san- tra.	6-8	13-0		
			2-0	16-0		

Now compare the rates in Hyderabad market with rates in Bombay market given to the same grower.

Agent.	Market	Date.	Consignments	Rate	Gross price	Deduct expenses.	Net amount	Remarks.
				Rs.	Rs	Rs. A. F.	Rs. As. Ps.	
C	Hyderabad	13-3-32	2 baskets each of 4 doz. choice mosambi.	4-0-0	8-0-0	0- 3-3 cartage 0- 1-0 postage 0- 1-0 charity 0- 8-0 commissioner <hr/> 0-13-3	7-2-9	Transaction in H. S.
D	Bombay	13-3-32	6 baskets each of 4 doz. choice mosambi	2-8-0	15-0-0	1-10-0	13-6-0	Transaction in B. G.

Note decrease of rate for basket packing as compared with that of boxed packing.

On the whole the growers in the Mahratwada tract do not complain against the fruit merchants in Hyderabad. They usually give better rates than the Bombay merchants. The growers believe that a central market place where fruit is sold by open auction would considerably improve trade in fruit. At present the fruit is dumped in private godowns of the agents where sanitary conditions are not satisfactory. If such a market is opened one of the conditions of business by brokers should be open auction and it should be easy for any man to see how transaction is done.

The total amount realised by sale of fruits as shown by the agent must be taken with caution. It is generally believed that the figure is almost always much lower than the actual figure. A grower in Bombay has suggested that the fruit should be sold by open auction and the auction should be completed on a triplicate form one form to be given to the purchaser, one to the owner and one to be retained by the agent. Each form should have signatures of both the seller and the purchaser. If a Central market is opened in Hyderabad, this system is worth trying for a few years in the first instance.

APPENDIX 8.

HORTICULTURAL GARDENS.

With a view to establish Model Fruit Farms in the Dominions, six or seven gardens in charge of the Local Fund were visited in different parts of the Hyderabad State. Out of these the largest is the one at Gulberga with a walled-in area of 72 acres. This garden is situated close to the Gulberga town and is within easy reach of the Railway Station. It is under the direct influence of a large tank called Usmansagar, and is approached by four main gates. The garden contains one public Clubhouse, Local Fund Engineer's Office, Store rooms, Mali's quarters, Cattle shed, hand stand and Tennis Courts.

From the general lay-out of the whole situation it appears that the garden is situated on a more or less low lying area. The Usmansagar receives flood water from round-about Gulberga and the garden itself is situated lower down this tank. As a matter of fact it is the chief source of water supply of the garden. Naturally therefore the garden area being in close proximity of the tank is receiving seepage water and is therefore ill drained. At least a considerable part on the Northern side and adjacent to the Dam of the tank is almost marshy, particularly in the rainy season. The plots No. 9, 10 and 11 which are very close to the tank are receiving seepage water. The plot No. 9 (2.53 acres) is partly occupied by 80 guava trees which are in fairly good condition. The remaining trees died in the famine period prior to 1921. The present group of guava trees were saved by irrigating with water from a well close to the dam. This well is however dependent upon the tank for its source of water.

The plot No. 10 (area 1.70 acres) is used for Kharif crops only. It is said that the soil of this plot is saline, therefore fruit trees do not grow satisfactorily. Though no salt incrustations were noticed on the surface the soil was wet almost close to the surface. It is very remarkable to find wet soil even though it had not received any water since October 1931 to April 1932. The South-west corner of this plot is highly water-logged in the rainy season. There is a luxuriant growth of cyperus weeds.

The plot No. 11 contains some buildings used for Store house, Mali's quarters, bullock shed. The unoccupied area is about .75 acres a part of which is exceedingly marshy. It is said that some years ago it was used for boating purpose.

The plot No. 12 showed signs of moist soil near the surface but this may not be due to seepage but to irrigation which is given to the many trees planted in this plot. The soil of this plot as well as that of the plot No. 13 is over lying *Shadu* or powdered lime but mixed with small stones or, sand. At any rate these two plots with a total area of 3.10 acres are suitable for fruit crops.

The plot No. 14 with an area of 2.60 acres has a tennis court in use and another under construction. This is an excellent plot with medium black loamy soil the subsoil was dry although a small water channel passes on a higher level near by. This is higher than the plots No. 12 and 13.

Plot No. 15 has an area of 1.90 acres. There is a well with brackish water which is 15 feet from the ground level. The water which is 16 feet deep was used for sugarcane last year. Surface soil is about 18 inches overlying *chopan* soil which is sticky shining black clay.

The plot No. 16 covering 2.70 acres has a trace of *Shadu* at a depth of 9", then *chopan* character is noticed. In another part of this plot, the *shadu* showed a mixture of coarse sand. This plot was planted with figs some of which are still surviving. The plot No. 17 measuring 2.50 acres has very little *shadu* lime in one part and a trace of *chopan* in another part. This plot was formerly used for Citrus crop. The plot No. 18 (1.96 acres) and plot No. 19 (1.70 acres) have a slight *chopan* sticky soil at a depth of 18" from the surface. The plots No. 17 and 18 can be irrigated from a well which has a sure supply of water even in famine years.

Plot No. 1 covering 1.80 acres has a step well out of repairs on one side. Water fails in famine year. Flood water used to be taken out of the garden by the side of this plot, but a neighbour built just outside the garden a house and compound wall and thus blocked the passage of water which therefore accumulates in one corner of this plot. As a result of impounding of flood water in the corner rank growth of *Astracantha*, *Typha cyperus* etc, which are characteristic of stagnant water has taken place. The

flood water is now let out by means of a trench inside and along the compound wall. The neighbour has not only blocked the original passage of water but has opened his household drains into the trench. The trench requires repairs particularly at the small opening near the sentry gate. Plot No. 2 is marked with lines for ornamental gardening. Plots Nos. 3, 4, 5, 7 and 8 are small ones and are planted with pomegranate, guava, mango, bananas etc, which are more or less in neglected condition owing to shortage of funds.

The plot No. 6 situated in front of the main gate (Darwaje-Kalan) and is ornamental and may be reserved as such.

All the above described plots are situated along the compound wall of the garden. They enclose a centre block consisting plots 20, 21, 22 and 23 including the band stand. All these four plots were originally designed with carpet beddings in the old Moghul style. All the beddings have now practically disappeared. They cover an area of nearly 12 acres including buildings.

From the examination of the above plots it appears that the subsoil is, in many cases, *chopan* that is black sticky clay and does not properly drain, but the top soil is almost in all cases, good loam. The *chopan* soil will not affect any crop adversely as the climate of Gulberga is very dry. Very good orange trees and grape vines which are most sensitive to defective drainage are grown in the neighbouring Barsi and Madha Talukas of the Sholapur District, where also the subsoil is *chopan*. In the greater part of the Mahratwada tract (Jalna, Parbhani Mudkhed of the Nanded District) oranges are being successfully grown in such *chopan* soil.

On an average the plots are of the size of almost two acres and are well suited for any sort of experiment. Santra, Mosambi, Sour lime, Navel Orange, grape fruit pomelo, different varieties of mango and of banana, chickoo, guava, grape vines, papayas and many other minor crops can be grown in these gardens. In short the greater part of the Gulberga garden is thoroughly representative of the Gulberga District.

Water.— The principal source of water supply to the garden will of course be the tank from which water can be taken to any plot by flow. Besides this there are six wells

of which five fail in famine years but one is known to have a sure supply of water even in famine years. Now supposing that the usual quota of rain fails to occur for two years, the fruit trees can be saved by judicious management of the garden. The standing crops of fruits will of course be ruined. Similarly flower beds and other ornamental plants of minor importance may be dispensed with for the time being.

If it is possible the silt from the tank may be removed so as to hold more water in the tank.

Accommodation for the staff:— At present there are three or four buildings within the garden compound, a club house, Local Fund Engineer's office, Mali's quarters, bullock shed and certain other minor structures. All of these can be used by the staff after making suitable changes. A few more buildings will have to be constructed.

There are four principal gates of the garden and a few sentry rooms on certain corners which are now out of repairs. On the east and south side of the garden there are compound walls in stone, the latter is partly out of repair. The compound walls will not prevent thieves and pilferers from coming in. A broad road suitable for riding extends all round the garden inside the wall. There are sufficient number of roads in fairly good condition all over the garden. In short if a horticultural garden is established at Gulberga it will be very necessary to protect it from unwelcome intruders.

General Remarks:— The Local Fund garden of Gulberga was originally very nicely laid out with artistic designs in old Moghul style. Almost all of these have now disappeared. The central block with plot No. 6 should be retained for ornamental gardening. The flower beds should be relaid with simple designs and will then be easy and less costly to maintain.

At present the garden is in a deplorable condition. Wherever there is a vacant space available some kind of trees are being planted without due consideration as to the suitability of the soil or proximity of large shady trees. This sort of promiscuous planting must be stopped and in many cases young trees recently planted will have to be removed to make room for a uniform growth of trees.

From the budget figures of the last five years it appears that the income of the garden is decreasing by about Rs 200- a year. The average income per year comes to Rs. 750- while the expenditure comes to a little over Rs. 5000.

THE LOCAL FUND GARDEN AT BHIR.

The garden next in importance and in size is the one at Bhir with an estimated area of 33 acres. It contains all sorts of trees and the principal ones are mango and guava which are at present the most paying crops. The soil is deep and very well drained. There is a perennial supply of water from the *Khajana* well. As a result of these favourable factors mango and guava trees have grown very well and are the principal paying crops.

Bhir is a District town and is about 67 miles from the nearest railway station of Jalna. This garden will be useful for the interior tract and particularly for the Balaghat plateau where there is excellent scope for extension of fruit crops as the soil there is with *murum* as subsoil.

The following crops may be tried:—

Mango grafted varieties, grapes, citrus, chickoo, banana, pomegranate.

The whole garden is surrounded by thick bamboo clumps, all these will have to be removed as their roots will not allow any thing else to grow satisfactorily within their influence. Mango trees also will have to be removed to a certain extent to make sufficient room for the new plantations.

The only buildings in the garden compound are a club house and a shrine. There is no accommodation for the staff which will have to be provided in the garden itself.

THE LOCAL FUND GARDEN AT BIDAR.

This garden consists of 19 acres. There is only one big well with water at about 50 feet from the ground level, and there is only 8 feet of water in the well. The soil is of laterite type. The depth of water is almost prohibitive to make the garden a paying one. It can only be used as a substation for growing mango grafts for distribution to the public. From this point of view the garden will serve a good purpose.

Bidar is a central place in the laterite zone of the Dominions and this is most suitable for the cultivation of mango and for other kinds of trees which thrive best on the sea coast, such as cashew nut, marking nut, *Eugenia Jambos*, *Eugenia malaccensis* and *Buchanania latifolia* and the apple. All these seem to grow well at Vicarabad and Koheer. There should be a central place where young plants of these could be had at a cheap rate and specimen plantations could be seen. Some of these plants are such as can grow almost in wild condition in laterite soil.

Although the water level in the Bidar Local Fund garden is low, it is not so in all the wells of Bidar and therefore sugarcane is grown on a large scale. Advantage of this can be taken in establishing new gardens.

THE LOCAL FUND GARDEN AT NALGONDA.

The Local Fund Garden at Nalgonda is situated in the central place in the town of Nalgonda close to many Government offices. The garden is greatly influenced by two high hills on the western side, which are absolutely barren of any vegetation. The rocks are considerably heated in the day time and the whole atmosphere becomes oppressively hot in summer. From the narrow valley between the two hills flows flood water into the Local Fund Garden and it has breached the dam put up in the garden inside the compound wall. This was probably meant for impounding water to use it for rice crops.

In the Telingana tract the soils are mostly of *chalka* type and for garden purposes, they have to be irrigated twice a week at least in the hot season. The subsoil in the Nalgonda garden varies from hard *Betti murum* to powdered *murum*. It appears that Deshi Narangi and certain other citrus fruit thrive well in this soil, particularly the first which is an inferior type of orange. But still better is the fig crop. Fig plants seem to make an incredible growth of five feet or so in about six months and come to bearing within one year and this is particularly so in the vicinity of hills.

In the front portion of the Nalgonda garden, Deshi Narangi, Santra, Mosambi, Pumelo and Guava trees are grown and some of them are over thirty years old and seem to have

thrived well. But Santra and Mosambi trees seem to be particularly affected by stem borers (Arbela) in this as well as in other private gardens. People do not seem to know the remedy to control this pest.

In another plot near the Travellers' Bungalow where ten years old guava plants are growing, the subsoil shows clear signs of salty nature (*Shadu*). The salt makes the soil very stiff and hard and it is used for putting on the terraces of houses. Water does not percolate through this quickly. The only remedy to prevent salt from coming upto the surface is to cultivate it frequently, to add to it liberal manure and fresh soil from outside. If this is not done regularly for three or four years, white salt will come up making the soil unfit for cultivation. There are about 2 acres of such salt land in the Nalgonda garden.

There is an extensive *chalka* land on the north side of the Travellers' Bungalow and it is useful for any fruit crop. It is on a high level and the present wells will not command this area unless special arrangement is made to take water to this plot. An attempt was made to dig a well in this plot but the well either failed to give water or was left unfinished.

On the west side of the bungalow there is a good plot with *chalka* soil. There is also a good well with six feet of water which is 25 feet from the ground level. The well is not tested for famine conditions. Besides this there are two wells in the garden of which one has six feet of water which can be taken out in two hours by two *mohots*. The water is recouped the next day. In famine years there is only one hour's supply of water. The second well has an assured supply of water and in large quantities, but it is brackish. It is however used for irrigation purpose in the garden.

It will be seen from the above remarks that the Local Fund Garden at Nalgonda has an area of 22 acres of which about 12-15 acres would be useful for experimental purpose. The remaining land is partly occupied by the Bungalow, roads and partly is useless for experimental purpose as it is saline. The useful land is suitably divided into plots of about half an acre which can be used for experimental purpose.

THE LOCAL FUND GARDEN AT WARANGAL.

This garden is situated at Hanamkonda which is 3 miles from Warangal or Kazipet station. It is situated close to principal Government Offices. The garden covers an area of 12 acres and 6 guntas. There is a big building of Town-hall and a room for the Daroga and a shed for bullocks. There are two wells one of which has 13 feet of water at a depth of 35 feet from the ground level.

The supply is assured even in famine years. The other well has good water but being on a lower level does not command the whole garden. Very probably these two wells are influenced by a tank close to the garden. Being on a lower level than the garden the tank does not adversely affect soil or sub-soil of the garden. The garden is enclosed within a 3 feet stone wall which is in good repair. A broad motorable road runs around the garden inside the wall.

The soil of some of the plots is loamy and of some *chalka*. In fact the soil of plots 1, 2, 3, 4, 6 and 7 is good for any fruit crops. The subsoil of plot Nos. 5, 9 and 10 is clayey. Plot Nos. 8, 11 and 12 are more or less liable to be water logged, but can be improved by making suitable drains.

The Warangal garden is on the whole suitable for a horticultural garden. The important defect of this garden is that it is too small in area. After deducting the area under buildings, roads, ornamental flower beds, the actual area suitable for fruit crops come to about 8 acres. The garden therefore can serve as a substation where figs, mangoes, citrus, pomegranates etc. can be grown. The Talukdar of this place, whom I saw, said that if more land was needed for experimental purposes it could be had. The two pieces will of course be separate from one another. There is no accommodation for the higher staff who will have to stay outside the garden.

The principal features of the five Local Fund Gardens are shown in the subjoined tabular statement.

From the above account of the Local Fund gardens it appears that the sites of these gardens were chosen on account of their proximity to principal Government offices and not from their suitability for fruit trees in every respect. However these can be used as Demonstration Fruit gardens. The Gulberga Garden is the largest but its water supply

in famine years is precarious. The Bhir garden has a very large number of old trees and bamboo which will have to be cut down before any of the plots can be used for new fruit trees. Besides the garden is far into the interior. The garden at Bidar will serve as a centre of mango nursery for the laterite tract where mangoes thrive best. The Nalgonda and Warangal gardens are useful for the Teliugana tract. These two gardens will be very useful for fig trees.

If Government are pleased to take over these gardens for demonstration purpose it will be very necessary to appoint very competent staff to conduct experiments in garden. Particularly the Curator of the Gulberga garden must know the management of the Deccan trapsoil and proper cultivation of almost all the important fruit crops. Injudicious watering and defective cultivation in the *Shadu* and *Chopan* soil will quickly spoil the plantations.

STATEMENT SHOWING CONDITIONS OF THE LOCAL FUND GARDENS IN THE HYDERABAD STATE.

Name of the garden	Temperature	Area in Acres	Soil		WATER		Existing Chief Crops	Condition of the Crops	Possible crops	Situation	Protection	Accommodation for staff
			Topsoil	Subsoil	By flow from tank	by lift from wells						
1. Gulbarga		7½	Loamy some parts affected* seepage.	Shadu powdered lime) or chopan i. e. Black sticky clay	Flow, but doubtful in famine* years*	Six wells in all of which only one sure	Guava, mango & shade trees	Fair	Mangoes, Citrus, family grapes, chickoo, Banana, Pomegranate Papaya Flowers & Vegetables & certain other minor crops	Central Place Dist. town very close to Railway,	low wall improvement required	Available to a certain extent
2. Bhir		33	Deep loamy	Well drained	Flow assured from Khajana well	One well not in use	Old mango & guava trees surrounded by bamboo clumps	Both good	Practically all the above of many of the existing mango & other trees & bamboo	Dist. town in the interior 87 miles from Jalna* the nearest Railway station	Fencing required	Nil

STATEMENT SHOWING ACREAGE UNDER FRUIT CROPS IN DIFFERENT DISTRICTS.

MAHARATHAWDA.

Serial No.	Name of the District.	Mango acres.	Citrus acres.	Guava acres.	Banana acres.	Other fruits acres.	Average.	Remarks.
1	Aurangabad	180	192	124	111	97	704	
2	Farbhani	365	78	132	160	57	792	
3	Gulberga (K)	58	2	2	10	115	187	
4	Bhir	134	59	110	18	27	348	
5	Nanded	6	2	124	3	7	142	
6	Raichur (K)	310	4	27	2	5	348	
7	Bidar (K)	87	7	39	0.8	8	142	
8	Osmanabad (K)	107	9	27	11	29	183	
	Total	1,247	353	585	315.8	345	2,246	

STATEMENT SHOWING ACREAGE UNDER FRUIT CROPS IN DIFFERENT DISTRICTS.

TELANGANA.

Serial No.	Name of the District.	Mango acres.	Citrus acres.	Guava acres.	Banana acres.	Other fruits acres.	Average.	Remarks.
1	Adilabad	14	2	6	1	2	25	
2	Mahbubnagar	48	...	...	...	10	58	
3	Karimnagar	263	3	11	1	192	470	
4	Nalgonda	22	0.1	0.4	0.4	72	95	
5	Nizamabad	2	0.6	0.5	0.4	...	3.5	
6	Medak	8	0.3	0.4	...	...	3.7	
7	Warangal	23	...	...	...	...	28	
	Total	380	6	18.3	2.8	276	683	
	Grand total for Mahratwada and Telingana	1,627	359	603.3	318.6	621	3,529	

FRUIT SURVEY REPORT

**A survey of the present condition of fruit cultivation in
H. E. H. the Nizam's Dominions**

PART II

BY

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A SURVEY OF THE PRESENT CONDITION OF FRUIT CULTIVATION IN THE HYDERABAD STATE.

I. INTRODUCTION.

Modern scientific research has established beyond doubt that a daily bill of fare in which fruits and vegetables enter largely is essential to perfect health. Such a diet helps largely in maintaining in us that degree of mental equipoise and stability which are necessary for sustained effort, whether mental or physical, or both. Moreover, in a tropical climate like ours, fruits and vegetables are one of the most natural and perfect forms of food which are available to us. This is no exaggeration for, one has but to consider the case of a debilitated invalid to whom no other food, but fruits or fruit juice is acceptable or digestible. These while being delicate and light are yet refreshing and health giving. The question which naturally arises here, is, why is it that while wholesome fruits and vegetables which possess such inestimable merits are not more universally used by the rich and poor alike than they seem to be at present. The answer is simple. There are not enough fruits and vegetables produced to meet all demands, and, what is more important the prices of such of them as are available, are prohibitive and entirely beyond the reach of the poor and even the middle class people. Good fruits and vegetables are considered a luxury, and, not as they ought to be, as necessary articles of diet.

2. The plantain is undoubtedly the poor man's fruit, It has, when well grown, a splendid flavour and is very nutritious. It is available in limited quantities only in local markets and what is found is generally imported from outside the State. It is not unusual to find at Afzalganj Market in Hyderabad, imported Apples from Australia, Grapes from Malta and Pomegranates from Muskat, more so is the case in the Bombay market, where Oranges, Apples, Grapes etc., imported from California, Spain, Italy, Syria etc., successfully compete with similar fruit grown in India.

India as a whole is lagging behind in Fruit Industry, though sporadic attempts are being made in different provinces to develop it.

Hyderabad in spite of her central position, fairly good climate, and soil, with her rivers and irrigation projects is not taking full advantage of the facilities existing to grow her own fruit, so much so, that she is dependent upon other parts of India and foreign countries for her fruit supply.

To remedy this draw-back a Fruit Survey has been instituted.

The following short description of the State will perhaps be helpful:—

PHYSICAL FEATURES OF THE COUNTRY, AREA, ETC.

(Extracts from Mr. Wakefield's Revenue Administration Report, 1324 F. and Mr. B. Abdy Collins's Article in the Hyderabad Farmer Vol I. Part. I)

Area.—The Dominions of H. E. H. the Nizam cover an area of 82,698 sq. miles. The State lies between $15^{\circ}10'$ and $20^{\circ}40'$ N. Latitude, and $74^{\circ}40'$ and $81^{\circ}35'$ E Longitude.

Population.—1,44,37,541 (1931).

Boundaries.—It is touched on the North by Khandesh (a district of the Bombay Presidency) the Berars and the Central Provinces, on the East the Wardha and the Godaveri rivers separate it from the Chanda District of the Central Provinces and the Godavery District of the Madras Presidency, on the South the Krishna and the Tungabhadra rivers divide it from the Kistna, Guntur, Kurnool and Bellary Districts of the Madras Presidency and the Districts of Dharwar, Bijapur, Sholapur. Ahmednagar and Nasik of the Bombay Presidency form the Western Boundary.

Physical Aspects.—Traversed by low ranges of hills and cut up by valleys of several rivers and streams, the country is an extensive Plateau sloping gently from North-West to South-East. In the extreme North-West corner near Aurangabad the general elevation is about 2,000 feet above sea level, falling quite imperceptibly to about 900 feet in the vicinity of Kurnool. The average elevation of the Plateau is about 1,250 feet above the level of the sea, but there are summits here and there reaching an altitude of 2,500 or even 3,000 feet.

The main drainage of the country follows the general slope of the Plateau, and the two principal rivers of the State, *viz.* the Godaveri and the Krishna take a North-west to South-west direction and discharge their waters into the Bay of Bengal.

General Appearance—From the Boundary North of Aurangabad southwards to the Tungabhadra, the country is bold and undulating, the hills are principally basaltic trap, the broad valley of the Godavari is deep in alluvial soil and the land is productive of dry crops. On the whole the country presents a variety of surface and feature, in some parts it is mountainous, wooded and picturesque, in others flat or undulating.

Natural Divisions—Although the general conditions prevailing in the Deccan Plateau are sufficiently uniform to constitute it a single Natural Division of the wide continent of India, a line drawn on the map due north and south through the city of Hyderabad would pretty well divide the country into two large and nearly equal divisions known as Telingana and Mahrattwada.

The State falls into four main Divisions. Telingana is peopled by the Telugu speaking races. Mahrattwada is the home of the Mahrattas. The Karnatak in the South west is inhabited by the Kanarese. The fourth of the laterite area is the meeting point of these three races and people speaking all three languages. It is a curious coincidence that the first three tracts differ also geologically and offer different problems to the farmer.

Soils Telingana.—The area which forms the south-eastern half of the State includes the districts of Mahbubnagar, Medak, Nizamabad, Nalgonda, Warangal, Karimnagar, and the Eastern half of Adilabad, and is roughly 40,000, square miles in extent, that is about half the whole of Hyderabad. Although the rainfall varies considerably from the north-east, to the south-east, the soil conditions throughout are approximately the same. Along the valleys of the Godavari and its tributaries and the Krishna which form the chief boundaries of this tract, black cotton soil will be found imposed on a small area, but the soils generally found are derived from the crystalline rocks and are, therefore, usually sandy and gravelly and incapable of retaining moisture. The Red and Sandy soils are usually called *chalka* and the darker ones are known as *Regur*, which is the same name given to the true black cotton soils of Mahrattwada. The *chalka* soils, which are much the most common, are porous, shallow and lacking in fertility.

The soil formed by the decomposition of the granitic and calcareous rocks of the Telingana tract is generally sandy and sterile, and owing to its pervious nature and rocky substratum and the sloping nature of the country, the rainfall drains off much too rapidly. Hence the imperative need of artificial storage of water in this tract, which accounts for the large number of tanks scattered over the whole area. It is on account of these numerous storage works that the Telingana is principally a land of rice cultivation.

Soil, Mahratwada.—This portion of the State includes all but one of the main cotton growing Districts viz. Aurangabad, Parbhani, Nanded, Bhir, Osmanabad, the West of Adilabad and the North of Bidar. Its area is approximately 25,000 sq miles. The geological formation is totally different from that of Telingana and similar to that of the Bombay Deccan. The soils, which are chiefly formed by the disintegration of basaltic trap, are generally soft and dark coloured. The most important is the black cotton soil, popularly known as *Regur*, though there is a certain amount of red gravelly soil and a mixture of the two is not uncommon. The black cotton soil is very fertile and extremely retentive of moisture, so much so that where the soil is deep, it often cannot be worked at all in the rainy seasons and is used for a Rabi crop only, which it is able to produce in abundance with little or no winter rain. The black cotton soil being eminently suited to the cultivation of Jowar, cotton and wheat, these form the principal crops of the tract, and as the soil retains sufficient moisture in all ordinary years to bring the crops to maturity without the aid of artificial irrigation, irrigation works, unlike Telingana, are very scarce in this region, and wet cultivation is limited to garden crops raised under wells.

Karnatak.—This tract which includes the Districts of Raichur, Gulberga and part of the south of Osmanabad is about 13,000 sq. miles in extent. In many respects it bears a general resemblance to Mahratwada, and is usually classed as part of it, but its low and badly distributed rainfall and the difference in its soil gives it a character of its own. Most of the land is what is known as "Doab", i. e. is bounded on two sides by rivers which eventually join each other. The whole of the Raichur District is the *Doab* of the Krishna

and the Tungabhadra rivers, while a large part of Gulberga form the *Doab* of Bhima and the Krishna. Although most of the soil is black cotton soil, instead of being derived from the local rocks, it seems to have been brought down by the action of the rivers in past ages. It is fine in texture and very liable to erosion. This is assisted by the nature of the rainfall, which, though very low in itself and usually not exceeding 22 inches in the year is often precipitated in heavy falls which rapidly flow away and take much of the soil with them. In a way the tract suffers from both heavy rain and lack of rain and the farmer hardly hopes to get even a fair crop more than once in three or four years.

Of the Mahratwada tract, the portion in the south-east corner, consisting of the Districts of Raichur and Gulberga, partakes in some portions, of the characteristics of the Telingana territory. The soil here being suited to wet cultivation, artificial storage of water is resorted to, and the people understand and practice irrigation. The inhabitants are mostly Kanarese, hence the tract is sometimes separately styled the Karnatic.

The laterite Area.—This is a small portion of the Dominions comprising most of the south of the Bidar District and a small portion of Gulberga, which is about 2 to 3 thousand square miles in extent and mostly consists of Paigah and Jagir Estates. It is thus outside the charge of the Revenue and most other Government Departments. Its geological formation and soil are entirely different from the rest of the State, since there is a true laterite formation which appears to be super-imposed on the rocks of the surrounding areas. The soil, especially in the valleys is rich, deep red, and is extremely fertile when irrigated. The sub-soil water in the valleys seems to be plentiful and very near the surface, while wells can easily be constructed with laterite blocks.

Hill Ranges.—As already described, the country is traversed by low ranges of hills. These may be more suitably described as a series of flat topped plateaus appertaining to that great table land of Peninsular India which has been gradually worn away by sub-aerial denudation, and the present hill ranges are merely the dividing lines left undenuded and now forming watersheds between the different drainage

areas. There is one main water shed traversing the State from north-west to south-east at a general altitude of nearly 2,000 feet and dividing it into two nearly equal basins, which are drained off by the two great river systems of the State viz, that of the Godavari in the north and of the Krishna in the south.

Climate.—(a). Although not altogether salubrious, the climate of the Dominions is pleasant and agreeable, during the greater part of the year. The maximum temperature of the State is 109° the minimum 52° giving a mean of about 81°. Extremes of heat and cold are altogether unknown. Hilly surroundings and freedom from arid deserts make the country practically immune from those scorching blasts that blow over the sandy wilds of Rajputana and certain other parts of India.

Seasons.—(b). The year may be divided into three distinct seasons. The rainy season, beginning from early June, lasts to the end of September, and is immediately followed by the cold season extending to the end of February, the hot season running from March to the end of May. An occasional thunder storm is a special feature of this month, as we progress towards the close of it, the heat shows signs of diminishing and with the commencement of rain in the first week of June there is a sudden change in the climate. This is a peculiar character of the Deccan climate.

Rainfall.—(c). The average rainfall for the last 10 years is computed to be 26·54 inches. But the distribution is capricious. Some of the Telingana tracts in the north-east corner receive from 40 to 50 inches of rain, while the Karnatak districts in the south west corner with an average not exceeding 25 inches suffer from frequent visitations of drought and severe distress once in every 12 years. The country in general or any district in particular, does not, as a rule suffer damage from excess of rain but heavy downpours do sometimes occur and cause serious injury to the crops but the evil is quite local and there is a considerable strip of territory lying within the zone of scanty or precarious rainfall.

The south-west monsoon commencing in June brings in the largest amount of rainfall and north-east monsoon from October to December gets only 4 to 7 inches.

The summits of the Western Ghats are, however, a great impediment to the free distribution of clouds over the Dominions and this is a source of grave uncertainty.

2. SANCTION AND SCOPE OF SURVEY.

With a view to encourage fruit culture and help people with sound advice about the cultivation and marketing of fruit, the Industrial Fund Trustees sanctioned a scheme for conducting a Survey of the existing conditions of fruit culture in the Hyderabad State and to get into touch with people interested in the industry. I was appointed Horticultural Survey officer with an establishment of a Clerk and a Peon, under the general supervision of Mr. R. K. Bhide, Economic Botanist to His Exalted Highness the Nizam's Government, Hyderabad, Deccan and joined on 18th Aban 1339 Fasli (24th September 1930).

A Press communique and questionnaire were simultaneously issued by the Director of Agriculture and all persons interested in fruit industry were invited to send their names and addresses to Mr. Bhide and to give him any information and assistance in their power (vide Appendices Nos. 1 and 2.)

COMMERCIAL ASPECT OF FRUIT CULTIVATION IN THE STATE.

The subjoined Statement of imports and exports of fruits from the Customs Department for a period of 5 years 1835 F. to 1839 F. (1925-30) shows the Commercial Aspect of Fruit Cultivation in the State:—
 The Imports average Rs. 55,42,483 } The proportion of Fruit Imports to Exports is in the ratio of 27:1 roughly, in other words the
 and Exports average Rs. 2,07,976 } State is dependent upon other parts of India and foreign countries for her fruit supply.

I M P O R T S.

Serial No.	Customs office.	1835 F.	1836 F.	1837 F.	1838 F.	1839 F.	Average for 5 years.	District
1	Hyderabad	424,180	718,800	615,060	702,920	826,140		Atrafbalda, Telingana
2	Secunderabad	...	830,160	756,580	984,600	931,800		Atrafbalda, Telingana
3	Osmanabad	11,87,940	825,060	988,900	930,260	607,930		Osmanabad, Mahratwada.
4	Aurangabad	281,200	223,420	800,500	183,200	294,060		Aurangabad, Mahratwada.
5	Lingsugur	207,480	234,900	268,040	227,120	291,720		Raichur, Mahratwada.
6	Madhira	4,340	1,780	1,480	5,030	1,620		Warangal, Telingana.
7	Warangal	332,800	318,540	312,880	447,120	477,120		Warangal, Telingana.
8	Rajura	36,400	65,200	58,680	57,480	53,380		Adilabad, Telingana.
9	Gulbarga	777,700	999,120	957,840	905,600	967,020		Gulbarga, Mahratwada
10	Godavari	535,860	11,63,860	12,79,560	13,19,080	13,47,900		Nanded, Mahratwada
11	Gadag line	99590	47,760	80,080	...	...		Raichur, Mahratwada
12	Bhir	...	...	...	152,440	193,780		Bhir, Mahratwada
Total Customs free		46,93,580 4,571	54,25,600 200	56,40,880 7,90	58,14,900 27,300	60,48,520 39,964		
Grand total		46,98,151	54,25,800	56,57,780	58,42,200	60,88,484	55,42,813	

Note:—The following figures obtained from H. E. H. the Nizam's Customs Department Report for 1840 F. show separately the value of dried as distinct from fresh fruits imported into the State during 1840 F.
 (The Customs Department have not maintained a similar Classification of imports prior to 1840 F. except for 1839 F. in regard to (1) Dry Fruits and nuts and (2) Fresh Fruits.)

EXPORTS

No.	Customs Office	1835 F.	1836 F.	1837 F.	1838 F.	1839 F.	Average for 5 years.	District
1	Hyderabad	...	...	140	280	240		Atrafbalda, Telingana.
2	Secunderabad	...	...	...	680	60		Atrafbalda, Telingana.
3	Osmanabad	21,120	48,280	49,740	60	31,560		Osmanabad, Mahratwada. K.
4	Anrangabad	73,720	59,640	93,200	32,160	93,200		Aurangabad, Mahratwada
5	Lingsugur	3,620	3,140	1,700	42,540	740		Raichur, Mahratwada. K.
6	Madhira	...	1,720	220	8,260	13,460		Warangal, Telingana.
7	Warangal	1,040	11,660	1,900	10,360	300		Warangal, Telingana.
8	Rajura	...	...	...	11,660	660		Adilabad, Telingana.
9	Gulberga	54,700	22,560	92,940	4,560	51,300		Gulberga, Mahratwada. K.
10	Godavari	19,940	29,900	2,220	43,440	8,100		Nanded, Mahratwada.
11	Gadag Line	...	...	9,660	8,220	...		Raichur, Mahratwada. K.
12	Bhir	...	...	...	18,060	36,240		Bhir, Mahratwada.
	Total	1,74,140	1,76,900	2,51,720	1,80,280	2,35,860		
	Customs free	...	...	8,600	6,800	3,080		
	Grand Total	1,74,140	1,76,900	2,60,320	1,87,080	2,38,940	2,07,476	

K. Stands for Karnatak.

NOTE:—Customs Report for 1840 F. gives the Exports of Fruits for 1840 F. as Rs. 2,33,000 against for 1839 F. Rs. 2,36,000. But no classification of Dry and Raw Fruits is made. Except dry Bheres that are sent out to Bombay in small quantities, it may be assumed that the fruits exported are all raw, as Santras, Guavas, Figs, Mangoes, Custard apples, etc.

EXPORTS OF FRUITS BY DISTRICTS.

The subjoined statement from the Customs Department gives the analysis of Fruit sent out by Districts. Maharashtra sends out more than Telingana. In the former Aurangabad stands first, Gulbarga second, in the latter Warangal first and Adilabad next.

Serial No.	District.	Customs Office.	1935 F.	1936 F.	1937 F.	1938 F.	1939 F.	Average for five years.	Name of fruit sent out.
<i>Maharashtra</i>									
1	Osmanabad (K)	Osmanabad ...	21,120	48,280	49,740	60	31,560	30,152	Mango, Guave, Pomegranate, Sour Lime
2	Aurangabad	Aurangabad ...	73,720	59,640	93,300	32,160	93,200	70,384	Orange, Santra, Musambi, Plantains, Grapes, Figs and Mango-Plantains.
3	Gulbarga (K)	Gulbarga ...	54,700	22,560	92,940	4,560	51,300	45,212	Mango and Plantains
4	Nanded	Godavari ...	19,940	29,900	2,220	43,440	8,100	20,720	
5	Rachur (K)	Lingsugur ...	3,620	3,140	1,700	42,540	740	13,924	
6	Do.	Gadag Line ...	...	...	9,660	8,220	...	...
6	Bhir	Bhir ...	...	...	...	18,060	36,240	10,860	Guave, Pomegranate and Grapes.
Total			1,73,100	1,63,520	2,49,460	1,49,040	2,21,140	1,91,952	
<i>Telingana.</i>									
7	Atrafhalda	Hyderabad ...	...	...	140	280	240	132	Mango, Orange Deshi
do	do	Secunderabad ...	...	...	...	680	60	148	
8	Warangal	Madhira ...	...	1,720	220	8,260	13,460	4,732	
do	do	Warangal ...	1,040	11,660	1,900	10,360	300	5,052	
9	Adilabad	Rajura ...	...	...	...	11,660	660	2,464	
Total			1,040	13,380	2,260	31,240	14,720	12,528	
Customs free			...	...	8,600	6,800	3,080	3,696	
Grand Total			1,040	13,380	10,860	38,040	17,800	16,224	
Grand Total			1,74,140	1,76,900	2,60,320	1,87,080	2,38,940	2,07,476	

K Stands for Karnataka.

4. (a) TOURS OUTSIDE HYDERABAD STATE.

Visit to Poona & Bombay. (3rd to 18th October 1930)

Study of Marketing Problems.

I left for Poona on 3rd. October 1930 by Passenger train at 4. 30 p. m. Arrived Poona 6. 30 a. m. on 4th October 1930. Having previously fixed up with Mr. Bhide, the Economic Botanist, I visited the Poona Agricultural College in the afternoon where I met Mr. H. P. Paranjpe and Dr. Cheema, went round Modi Bagh with Mr. Kulkarni, the Superintendent to form an idea of the work and the method pursued there in regard to fruit culture experiments studying at the same time reports of Horticultural work done under the Government Horticulturist. On 6th. October 1930, I visited the Reay Market in Poona City and went into the question of fruit marketing in company with Mr. Patwardhan, nurseryman, Kothrud and in the afternoon went across to the Agricultural College, saw Mr. Paranjpe and from thence to the Ganeshkhind Botanical gardens with Mr. Dani, Superintendent. I found the Pomological Museum most interesting. On 7th. October 1930, I again visited the Reay Market, collected information regarding wholesale fruit auctioneers, places to which fruit is exported and from which imported. After a visit to the office of the Director of Agriculture and the Empress Gardens, I left for Bombay by the night train. On Wednesday morning (8th. October 1930) I visited the Crawford Market and made the acquaintance of Captain Flanders, the Superintendent, from whom I obtained officially information regarding fruit imports into and exports from Bombay. On the 9th. October 1930, I again visited the Crawford Market for further investigation of fruit Marketing in which I was assisted by Mr. Mahomed Shaw, Chief Inspector of Markets. I was here given an opportunity of looking into the Cold Storage godown where fish, meat, fruit, vegetables, eggs, etc. are stored pending disposal. Eventually I visited the Market Superintendent's office and obtained official report of the daily market rates. Later on I left for Poona.

On the 10th. October, I met the Director General and the Director of Agriculture, H. E. H. the Nizam's Government at the Poona Railway station who had arrived by the Madras Express. I then visited the Hadapsar Sewage effluent farm along with the Director of Agriculture and on my return attended to some office work. Later on in the afternoon I called on the Director of Agriculture at his Hotel and received further instructions regarding Fruit Survey.

On the 11th, I met the Chief Officer of the City Municipality, Poona, with whom I had a discussion regarding fruit imports and exports and took down some notes from the Market Inspector whom I also met. Later in the day, I accompanied the Director of Agriculture, H. E. H. the Nizam's Dominions, and Mr. A. M. D' Cruz, Horticulturist, Bombay, to the gardens of Mr. Tulsidas Khatau Sir Kikabhaji Premchand, Raja Partapgirji Narsingirji Bahadur and Raja Dhanrajgirji Narsingirji Bahadur. On 12th. I accompanied the Director of Agriculture, Hyderabad State, to Sir D. J. Tata's garden, Gladhurst, Bund Gardens Road, Poona. In company with Director of Agriculture, met the Director General at Modi Bagh and Ganeshkhind Botanical gardens, seized the opportunity to familiarize myself with the method of fruit preserving, and then centred my attention on the Pomological Museum. On the 13th. October 1930, in company with the Director of Agriculture, I visited the Poona Agricultural College farm, the College Dairy and Poultry Farm. After the departure of the Director of Agriculture for Hyderabad by the 4-35 p. m. train, I visited the Empress Gardens. On my return from the Poona Railway station, I again visited on the 14th. and 15th. October 1930, the Agricultural College, and had the opportunities to discuss Horticultural Schemes with Dr. Cheema, from whom I obtained copies of the Bulletins on the Report of Mango Marketing Committee and the Fig Industry in Asia Minor, also Leaflet on Bamboo Baskets versus Wooden cases for packing mangoes". On the 16th. I took a trip into Bombay, met Captain Flanders, Superintendent of Markets at the Crawford market and further discussed fruit marketing problems. On my returning to Poona by the 4 p. m. train, on 17th. October 1930, I again visited the Agricultural College with a view to acquire further knowledge of the fruit marketing problems,

from Dr. Cheema and Mr. Paranjpe, whom I met here. Finally visited the Office of the Director of Agriculture, Bombay and obtained copies of pamphlets on Agricultural and Horticultural subjects in English, Mahratti and Kanarese.

I left Poona by Madras Express at 4-30. p. m. on the 17th. October and arrived at Hyderabad on the morning of the 18th. idem.

Attached are my detailed notes (Vide pages 66 to 68).

MODI, BAGH AGRICULTURAL COLLEGE, POONA.

5th to 72th October 1930.

On my visits to the Modi Bagh Agricultural College, Poona, I met Dr. Cheema, D. Sc., Horticulturist to the Government of Bombay, and Mr. Kulkarni M.Ag., Superintendent, from whom I obtained information as to the several kinds of fruits as grown in the Bombay Presidency. The following notes are based on what I was enabled to gather in the course of our discussions.

Pomegranate.—A number of varieties from Dholka (Ahmedabad District) (Soft seeded) and Alandi (Poona District) (Hard seeded) are grown. They vary in size, colour of juice, quality of fruit and habit of bearing. As in the Hyderabad State and elsewhere, considerable damage is done to fruits by the *anar-catrepillar* called *Sursa* in Mahrathi and scientifically named as 'Virachola isocrates'. Bagging the fruit with paper or cloth has been tried and found successful, more so with ordinary Kraft paper, superior quality, sun brand. It appears that at a cost of Rs. 10 a crop of 1985 fruits valued at Rs. 113-5-0 was saved.

2. *Fig*.—Notching is successful with the following results ;—

1. Stimulation of dormant buds.
2. Additional branches, hence increased yield.
3. Better distribution of secondary branches on the main frame work.
4. Less exposure of fruit to birds.
5. Increase of yield by 5 to 10%.

Local and imported varieties from Bagdad and South Mediterranean are grown. The latter grow well but the fruits do not mature.

3. *Papaya*.—Several varieties, including the "Washington" are being grown. The experiment now pursued is as to 'whether the headed plants give more yield than unheaded ones.' My attention was called to Bulletin No. 162 of 1930 of Bombay Agricultural Department on *Papaya*.

4. *Grape Vines*.—Seven varieties grown for testing yield. Pruning done in October and April. Mildew can be prevented by spraying thrice a year with Bordeaux Solution or dusting with Sulphur four times a year.

5. *Orange, Santra and Mosambi*.—Planted 18 feet to 20 feet apart yield per tree 400 to 1,000 fruits. Average income per tree, Rs. 6/-. 30 lbs. of Farm Yard Manure and 1½ lbs. of Ammonium sulphate are applied per tree.

Washington Naval.—successfully grown. Time for getting fruit is April. Treated for fruiting.

(1) *Ambe-bahar* in January to February.

(2) *Mrig-bahar* in June.

(3) *Hasta-bahar* in October.

6. *Pumelo*, planted 30 feet apart and bearing well.

7. *Sweet Lime* Fruits cracking.

8. *Plantain*, Breeding experiments are proceeding.

Rajpuri (fruit yellow, long with ridges) is a prolific bearer.

9. *Mango* Budding experiments partially successful, very interesting. Budding done about the middle of May has given out 50 per cent success.

10. *Grape Fruit*, Marsh's seedless, growing successfully at Mirpurkhas in Sindh.

11. *Tomato*. 'Bonny Best' acclimatised and selected, is recommended as the best yielder for market.

12. *Capsicum*, 'Hungarian Royal' (acclimatised and selected) variety is recommended as the best for marketing purposes.

13. *Cape Gooseberries*, very successfully grown and sold locally, can be preserved.

At Hadapsar Sewage Effluent Farm I got an insight into the experiments as to the quantity of water required for the cultivation of Agricultural crops as Sugar-cane, Lucerne, etc., and the proportionate use of sewage and river water.

It appears that experiments with pomegranates are not encouraging.

AGRICULTURAL COLLEGE DAIRY.

I availed myself of the opportunity to pay a visit to the Agricultural College Dairy and had a view of the pedigree cattle bred on the grounds. The Dairy is profitably run and I was able to form some idea of the method of working such a concern on economic lines.

A Poultry Farm has recently been established with a few good breeds as a start on up-to-date lines.

GANESHKIND BOTANICAL GARDENS, KIRKEE.

Mr. Dani, B. Sc., B. Ag. the Superintendent of the Ganeshkhind Botanical Garden at Kirkee took me round the Pomological Museum which is a most interesting adjunct to the Garden. Here can be seen various fruits grown in the Bombay Presidency preserved in jars, coloured models of the same, drawings in colours, photographs, charts showing acreage under each fruit and the places they are exported to, models of grafting methods for imparting instruction on "Propagation" to students, etc.

I was also shown selected varieties of guavas planted for comparative study, varieties of Papaya, improved and assorted plants of Jamoon for selection and Cherimoyer. The manurial experiments carried on for Oranges, Santras, etc., were explained to me. One here under castor cake and the other under fish gave the best results, whilst there are facilities for the study of the Die-back Disease of Citrus plants. Models could be seen of pots for Nursery work. Top working trials on mango plants are in evidence as well as trials on plants raised from seed of good varieties to see whether they come true to the parent.

In short it is clear that more attention is now being paid at the Ganesbkhind Gardens to improvement of fruits and vegetables and propagating the best for distribution to the public.

TOURS OUTSIDE HYDERABAD STATE.

(19th. November 1931 to 2nd December 1931.)

A second visit was paid to Poona with a view to see Mr. H. P. Paranjpe, District Horticultural Officer, Agricultural College, Poona and obtain advice on the Data collected on Hyderabad Fruit Survey in connection with his proposed visit to the Hyderabad State as Horticultural Adviser. (He eventually visited from 2nd, March 1932 to 16th May 1932). Opportunity was taken of the stay at Poona to visit among other gardens Modi Bagh and Ganeshkind Botanical Gardens, Kirkee. Attached are my notes.

MODI BAGH

(25th November, 1931.)

Mr. Kulkarni M. Ag., Superintendent, took me round and explained some of the experiments with fruit trees.

Plantain.—*Vala* variety—planted 8' × 8'—1½ year old. Soil medium black loam, *murum* 2 ft. down. Land ploughed and harrowed and pits made 2' × 2' × 2'—Farm Yard Manure 60lbs. given to each pit. Water from canal given once in every 10 days, in cold season and summer.

Trouble from black wild cats, which destroy fruits. 60-70 fruits on each bunch. Signs of maturity are noticeable when the colour of the fruit turns yellow and the end of the green fruit drops a second class variety.

Other varieties tried are Rajapuri and Gujerati. Gujerati keeps for 9 years without necessity of replanting suckers. Cultivation is carried on by Bed and Trench systems. In the former weeding is necessary and the latter not.

Logwood.—Slow grower but hardy. Grows 20ft. high in 9 years. Roots spread all round 20ft. Not advantageous to crops growing inside the area enclosed by this plant.

Windbelt.—Shevri, (*Sesbania grandiflora*). Grows 15' to 20' high in black soil in 18 months. Should be replanted every 3 years.

Mulberry.—(*Morus alba*). Grown as windbelt since 1923—grown 20 ft. high. Roots spread round about for 15 feet or more. More fibrous roots inter-twining with other crops. Not recommended as a Windbelt.

Orange, Santra.—Soil medium black 3 feet deep with *murum* subsoil—planted 15' × 15'. This has been found to be the best distance for such a soil. Water channel for irrigation should not be close to the trees, else percolation will not allow complete resting of trees. Finished *Ambebahar*. Ploughed and cross ploughed, Farm Yard Manure used in

the first week of January and 1st. watering was given on 15th January 1931.

Orange, Mosambi.—Soil, same as above, trees planted 16' x 16', ought to be really 18' x 18' not treated for any *Bahar*—manuring done once a year—6 baskets of Farm Yard manure given to each tree. Irrigated every 10 days, bearing well, pruned for dead branches.

Sour Lime.—10 years old. Budded on Jamboori stock—growth stunted—More growth of tap and fibrous roots brings on Die back early—irrigated in bed system, planted 30' x 30'—25' x 25' should be enough.

Grape Vines.—Trained on Pangara (*Erythrina indica*) in single stake system.

Varieties under trial are :—

(1) Bokhri (2) Phakri or Fakdi (3) Pandari Sahebi (4) Kali Sahebi (5) Neelum (6) Black Prince (7) Khandhari (8) Basrai (from Mesopotamia).

Pruned for 2 *Bahars* in a year :—

- (a) *Katta Bahar*—treated in the first week of April. Fruits ready in June, July and August.
- (b) *Mitta Bahar*—treated in October. Fruits ready in February and March.

Grape vine.—Pruning is done in the first week of October generally, but due consideration being given to climatic conditions. In 1931 on account of prolonged unusual rains the pruning was done on 25th October 1931 with no bad effect. No manure is given for October pruning—manuring is done only for April pruning. Generally sheep manure would be better.

Bordeaux solution is sprayed and sulphur dusted as a preventive against *Mildew* and *Anthraco*se.

Fig.—Alandi or Wadki, 10 years old 10 feet high planted 15' x 15' allowed to branch 3 feet above ground level affected by *Red Rust*.

- Tried (1) Spraying with sulphur dust.
 (2) different methods of watering by trench, ring, bed, basin, etc.
 (3) Manurial treatment, but no effect on Rust for borers, petrol or spirit is poured into the hole, when the insect comes out it is killed.

Pomegranate. 10 years old.

Varieties under trial are :—

- (1) Wadki, (2) Dholka, (3) Kabul, fruit in sparsely.
 (4) Muscat, not flowered for the last 10 years. If at all flowered the flowers dropped prematurely. Pruning at different seasons is being tried to make the trees flower and bear.

Papaya.—Transplanting seedlings every 20 days thrice will induce the plant to bear at a shorter height.

Mango.—Seedlings 8 years old bear well but they do not bear true to the parent and the quality of fruit is inferior—cracking on the stump above ground level facing west.

Sapodilla.—Chickoo - propagated from layers and gooties. Varieties round and oval. Fruiting twice a year.

(1) *Mrig Bahar.*

(2) *Ambe Bahar.*

not treated in 1931

Farm yard Manure is only given.

Mango.—Experiments on alternate bearing are proceeding—No definite results achieved yet.

Mango.—Propagation experiments in budding are continued. Hitherto middle of May gave the best results—It has been found subsequently that:—

August 2nd fortnight gave 40% success
 September 2nd. fortnight gave 50% to 60% success.

Guava.—Trellising Fruits bear on all the branches and better quality of fruit is produced.

Mosambi.—Budded on different stocks under trial.

Stocks used are,— (1) Australian sweet round Lemon.

(2) Kagzi or Sour Lime. (3) Ladu Orange
 (4) Khatta, (5) Sakkar Limbu, (5) Santra.
 (7) Mosambi, (8) Id Lemon, (9) Pumelo, (10)
 Gulgul. (11) Bitter Seville, (12) Citron.

GANESHKHIND BOTANICAL GARDENS, KIRKEE

Visited on 29th November 1931.

Mr. Dani, B. Sc., B. Ag., Superintendent, kindly took me round.—

Pomological Museum.—Models of fruits prepared at Chitrasala Press, Sadashivepet, Poona.

Guava.—Variety trials conducted. Planted 20' x 20'

- Varieties being (1) Dharwar, (2) Nasik,
(3) Lucknow No. 16.
(4) Lucknow No. 24.

similar to Allahabad Sufeida, less seeds round white, sweet.

- (5) Allahabad No. 9
(6) Seedless, graft, Shy bearer
(7) Kothrud.
(8) Sind Hyderabad, oval, very few seeds.
(9) Seedling Long Lucknow

It has been found so far that the following 3 varieties are the best.—

- (1) Nasik
(2) Lucknow No. 24
(3) Allahabad No. 9

Cheirimoyer.—Seedlings, 2 years old, grown 6 feet high, are doing well.

Papaya.—1½ acre planted in November 1930.

- Varieties are.—(1) Local Gujerat
(2) Washington.

Crop sold for Rs. 1005. for 1 year to a contractor in Bombay. Fruits harvested, half ripe, rolled in newspaper and packed in bamboo baskets—9 in a basket, sent by Railway parcel to Bombay—Freight 5 to 6 as. per basket—Each fruit is sold at 5 to 6 annas in Bombay.

Grape fruit.—Small round—20 years old—Gooty and grafting methods of propagation tried. Budding on Jamboori stock has been found to be most successful and best.

Plantains.—Basrai—Green Dwarf—5 feet high, wind resistant, bears heavy bunches—150-250 fruits per bunch, price fetched wholesale Re. 1-8-0 per bunch—Harvested once in 18 months and replanted fresh.

Plantains.—*Vala*, the local Dwarf hardy variety. Planted 10 feet apart allowed 3-4 years 2 to 3 suckers in each stool. 70-150 fruits in each bunch—Banked and irrigated in bed system. The plot planted 5 years ago is bearing well.

Lal Velchi Tall—10-12 feet high, requires wind belt—4-5 years thinning practised 150-330 fruits in each bunch average 200 fruits per bunch—sold 2 annas per dozen.

Figs.—Grecian, Italian, French, Spanish, and Mediterranean—under trial for the last 5 years—Fruits drop down immature. Do not require caprification.

Pomegranate.—3 years old—Varieties under trial.—(1) Seeded Local, (2) Dholka seedless (3) Ganeshkhind Botanical Gardens No. 1 seedless. Propagated from cuttings and seeds—No definite results yet.

Mango.—Manurial experiments with a programme for 20 years started—70 Pyrie grafts planted 30 ft. apart. Observed 1 Pyrie grafted tree 10

years old transplanted 20 days ago successfully doing well. Observed one budded mango 4 years old cracking with stump facing west as in Hyderabad.

Double grafting has been tried in the nursery to see whether inducing fruiting every year is possible.

Citrus.—*budding*. One man can bud 300-400 on *Jamboori* stock in a day.

Garuga Pinnata.—(Kakad,) fruits used for pickling.

Diospyros embryopteris—(Temburni,) Fruiting in May, resembling a Durian.

VEGETABLE BREEDING EXPERIMENTS.

being pursued by Mr. S. N. Patel, B. Ag.,

Brinjal.—50 varieties—types collected all over the whole of Bombay Presidency for the last one year—So far the following have proved to be the best.

- (1) The Krishna Valley—Green striped round similar to Giant of Benares.
- (2) Surat Round.
- (3) (American) Black Beauty.

Chili.—54 varieties—samples collected from all parts of Bombay Presidency, attacked by Virus disease. The only unaffected or less affected variety was the Poona Local.

VISIT TO UTRAN EAST KHANDESH.

(FOR STUDYING MANACKBACH ORCHARD OF
MR. MANACKCHAND KISONDAS.)

25th. to 27th. April 1931.

I left Hyderabad (M. G.) by 7-15 A. M. train on Friday the 24th April, 1931 and arrived at Pardhade Station (G. I. P.) 75 miles from Manmad, at 6-30 A. M. on the 25th. idem. There I was met by the messenger of Mr. Manackchand Kisondas and conducted to the Orchard $1\frac{1}{2}$ miles away near the village town of Utran, situated on the bank of the perennial river Girna, 300 feet wide, running from South-west to North-east rising in the Nasik District and joining the Tapti which falls into the Arabian Sea.

Utran is situated in East Khandesh about 450 feet above sea level, temperature 114° to 115° F. total rainfall, 30 inches. The highest level of the orchard close to the bank of the river varies between 32 to 36 feet from the rocky bed. The total area of land owned by Mr. Manackchand is 400 acres, 127 of which are more or less contiguous and near Utran, and are laid out into an Orchard and planted at different periods during the last fourteen years. Agriculture and fruit culture are followed as main occupations by the owner who is an astute business man and is working his land on business lines. His father was a land owner of the old type with banking business. Mr. Manackchand took to the same line with labour saving implements as Pumps, Engines, tractors etc. his sole object being to run a farm economically on up-to-date lines suited to Indian conditions. The Orchard has substantially built offices and stores with place allotted for a packing shed. It is well enclosed throughout by barbed wire fixed to angular iron poles to the extent of 20,000 feet (4 miles). There is a private Telephone Installation from his bungalow in Utran to 5 different points on the orchard. Mr. Manackchand lives a plain and simple life and enjoys good health. He is assisted by his son Mr. Bansilal trained in Horticulture under Dr. Cheema Government Horticulturist, Agricultural College, Poona. Mr. Manackchand personally works the orchard and directs all operations which is conducing so much to the successful working of the concern. No tall trees are grown for a wind-belt as it is feared, that they will harbour insects.

2. *Soil*.—Black and brown loam with limestone subsoil, 3 to 4 feet deep similar to Pandari soil of Aurangabad. Examining the bank of the river Girna, from where the orchard starts silt 6 to 8 feet deep is noticeable with a layer of sand, then silt and sand in layers reaching *murum* and rock bottom of the river, slope north.

3. *Water Supply*.—Water is obtained by pumping from the river.

There are,—

- (a) One 19 H. P. Crude oil Tangyne Engine, Pump 6 inches.
- (b) Two 5 H. P. Petter Oil Engines Pump 3 inches.
- (c) One large 75 H. P. Sisson Steam Engine, Pump 6 inches.

4. *Ploughing*.—Ploughing, harrowing and other operations are being done by 8 pairs of bullocks for the last two years. There are two tractors, one Cletrac 12-22 H. P. and one Fordson 10-18 H. P. with metal plough, Disc Harrow and Cultivator attachments. But these are not being used for orchard cultivation for the last 2 years, as it was found that in spite of careful handling ploughing by tractors was costly and not regular owing to stoppage of work due to repairs. Mr. Manackchand told me that it has been found from his experience that a tractor does not work regularly for 200 days out of 365 in a year. Taking cost of repairs including spare parts, lubricating oil, kerosine oil used as its fuel, the cost goes high causing inconvenience to cultivation work.

5 KINDS AND VARIETIES OF FRUIT GROWN.

- 1. (a) Orange, Santra, only one large fruited variety.
- (b) ORANGE, MOSAMBI.
 - (1) Kagdi, thin-skinned.
 - (2) Godadi, thick-skinned.

All budded on Jamboori Lemon stock. Budded plants obtained from Nagpur at Rs. 30.

- 2. Sour Lime.—All raised on the orchard from seeds of a small round variety proved to be the best.

6. *Manures*.—(a) Farm yard manure.
 (b) Castor cake.
 (c) Bone.
 (d) Superphosphate.

Arrangements are being made to attach a Bone Crusher to the Engines.

The following quantities per tree are given :—

- (a) Farm yard Manure, 40 lbs. twice a year in June and December.
 (b) Castor Cake, 4 to 5 lbs. once a year in addition to the above.
 (c) Bone. 1. Uncrushed, 20 lbs. buried 2 to 3 feet below roots before planting per tree.
 2. Crushed meal, once every year in June.

$\frac{1}{2}$ lb.	...	1st year after planting.
$\frac{3}{4}$ lb.	...	2nd year after planting.
1 lb.	...	3rd year after planting.
2 lbs.	...	4th year after planting.
3 lbs.	...	5th year after planting.
4 lbs.	...	6th year after planting.
		(d) Superphosphate at 2 lbs. once a year in June.

7. *Time of Planting*.—June to July, after one or two good showers of rain.

8. *Distance of Planting*:—

- (1) Orange, Santra 13' × 18'.
 (2) Orange, Mosambi, 18' × 18'.
 (3) Sour Lime, 20' × 20.'

9. *Irrigation*:—

Except in rains, Cold season once in 8 or 10 days.
 Hot season once in 8 days.

10. *Diseases and Enemies*

- 1 Sun scorch on fruits.
- 2 Mutchler (Ophideres).
- 3 Die back on branches and stump
- 4 Mova or tender insects cluster on tender shoots and suck juice from them.
- 5 White ants attack trunks and roots.
- 6 Leaves and fruits are attacked by black smut.
- 7 Gummosis attacks Mosambi and Santra Oranges and Sour Limes.

11. *Remedies for Diseases and Enemies enumerated above:—*

- 1 Nothing done, damage may be put at 5 per cent.
- 2 Hand-picking with a light in the night and killing them. Very troublesome, loss from damage may be put at 15-50 per cent.
- 3 No remedy discovered yet.
- 4 Phenyle is used for spraying them.
- 5 Castor Cake or Salt if administered as manure will not allow white ants to attack.
- 6 Nothing done. Very little damage.
- 7 Removing the gum and a little bark round the affected part and applying Carbolic acid diluted in water in equal proportions and sealing the wound with tar.

12. *Income.*—Orange, Santra average, Rs. 3
 per tree.
 „ Mosambi „ Rs. 5
 per tree.

Yield per good bearing Orange, Santra or Mosambi, 500—1000 fruits.

13. *Cost of cultivation.*—

ESTABLISHMENT:— 1. General section permanent,

1 Manager at Rs. 35 Rs. 35 per month.

1 Store keeper at Rs. 10 „ 10 „

— 45

10 Men at Rs. 12½ „ 125 „

15 Boys at Rs. 7 „ 105 „

— 230

2 Engineering Section :

1 Mechanic ... Rs. 65 per month

1 Driver ... „ 40 „

1 „ ... „ 30 „

1 „ ... „ 25 „

1 Fitter ... „ 15 „

— 175

450

Temporary Men average daily 15

Women „ 20 200

3 Contingencies as Kerosine oil,
grease, belting, repairs etc,
and straw for bullocks ... 750

Per month Rs. ... 1,400

Note:—Rate of labour in Rainy Season 5—6 annas per man.

Man—Cold season, 6 to 9 annas.

Hot season, 4 to 5 annas.

Woman—Rainy season 2 to 4 annas each.

Cold season, 4 to 6 „ „

Hot season 2 to 3 „ „

Work done by Establishment.—

1 man can harrow 3 to 4 acres per day.

1 man can plough with one pair of bullocks,
½ to ¾ acre per day.

3 men can do with 3 pairs of bullocks, one
acre in 3 days.

With Kirloskar plough Nos. 9 and 10, 10 inches deep.)

14. *Marketing.*—

Fruit is sent direct by the owner to the address of Commission agents in the markets of Bombay, Karachi, Baroda, Surat, Broach, Jamnagar, Bhavnagar, Rajkot, Viramgaum, Wadhvan Camp, Hyderabad (Sindh), Indore, Mhow C. I., Delhi, Calcutta, etc. Commission charged at Bombay varies between 4 to 8 as. per basket, besides, 2 to 3 annas extra per basket for clearing, carting, charity etc. In other places commission at anna one per rupee is charged on realisation, besides 2 to 3 annas extra per package for clearing and other charges.

15. *Transport.*—

Fruit is packed in baskets, gunny bags or deal-wood cases and sent up by bullock carts to Railway Station near and then booked to destination. River Girna will have to be crossed by a boat during rains. The charge is annas 8 per cart-load of 10 maunds.

Very little fruit is available in the rainy season. Fruit ripening is so arranged as to come off in the cold season.

16. *Packing.*—

Fruit is packed in Bamboo baskets and deal-wood cases and also in gunny bags.

Bamboo baskets.—1' × $\frac{3}{4}$ ' × $2\frac{1}{2}$ ' girth
to hold 3 dozens Mosambis. large
" 4 " " " medium.
" " upper 1' 5" × (1' 3") × (4')
lower 0' 8" × (2' 5")
to hold 5 dozen large.
6 " " medium.
" " 1' × (1' $4\frac{1}{2}$ ") × (4' 2")
(0' 10") × (3' 1")
to hold 5—6 dozens large
and medium.

Dealwood boxes with planks $\frac{1}{2}$ inch thick.

1. 10" × 1' $5\frac{1}{2}$ " × 10" to hold 6 dozens,
2. 1' 2" × 10" × 1' 9" to hold 8 dozen fruits.
3. 1' 2" × 8" × 1' 8" to hold 6 dozen fruits.

Fruits are put into dealwood cases and nailed to prevent breakage, the cases are tied round by coir rope. Empty boxes are only returned. No bamboo baskets returned. If at all damaged and a few.

Weight of Orange, Mosambi.

Large		Medium		Small	
19 tolas.		14 tolas.		8½ tolas.	
Length.	Girth.	Length.	Girth.	Length.	Girth.
5" × 10"		3¾" × 8½"		3½" × 8½"	

Gunny bags are used to pack Mosambis. 250 generally go into a bag. No sealing is done.

17. *Concession and Government Aid.*—

- (1) Government of Bombay on the recommendation of Government Horticulturist, have allowed free use of water from the river for a period of 25 years.
- (2) Free technical advice from the Government Horticulturist, Agricultural Department, Bombay.

18. *Miscellaneous.*—

- (1) The Orchard specialises in the cultivation on a large scale of Citrus trees; there are 10 Sapota trees, 10 years old bearing well, 40 large Mango trees (Seedlings) 40-50 years old 2 trees are only bearing. The rest are in shoots.
- (2) In one and the same line, some trees do not bear, some will bear though scantily. Others heavily and over-loaded, in spite of uniform treatment given to all the trees with little or no difference in soil. A few trees were noticed to die suddenly.
- (3) On the Orchard for the first 3 years interculture is done by sowing annual crops as groundnuts, coriander etc, thereafter the intervening spaces between rows of Citrus trees are ploughed and kept clean.

- (4) Treated for *Mrig Bahar* (June 1930) Santra Orange Crop was a failure. A few fruits were found to be very sweet, fruits from *Hatti Bahar* (October flowering) were as big as a marble.
- (5) Mosambi oranges treated for *Mrig Bahar* are bearing fairly well. A few *Hatti Bahar* (October flowering) fruits are of fair size.
- (6) In one of the plots, 1200 Mosambi orange trees 10 years old were attacked by Gummosis and to eradicate it Carbolic acid was indiscreetly tried out, resulting in the trees dying one by one and they are now being uprooted for planting newly. Proper practice in applying the remedy would have saved so much disappointment. Even a trial on a small scale would have averted such a huge loss.

i. e. an income of Rs. 3600—6000 per year.

- (7) The large number of Sour Limes are said to be grown for purposes of extracting pure lime juice and bottling for sale.
- (8) Sour Lime trees are being staked and pruned to give them shape and allowed to branch in umbrella form three feet above ground level. Cut wounds are carefully treated with tar. Similarly are all dead wood cut removed from Santra and Mosambi Orange trees. Attention is paid to each tree according to need, the whole orchard is kept clean. On certain Mosambi Orange stumps Jowari stalks are tied as a protection against severe sun during summer.

19. IMPORTANT FACTS AND FIGURES GIVEN BY MR. MANACKCHAND.

1. Initial cost of planting one *Santra* or *Mosambi* orange tree and taking care of it for 6 years, that is, till it is fit to bear fruits, including 6% interest on the outlay is Rs. 30/-.

2. Average income per santra orange tree is Rs. 3/- per year.
 Average income per Mosambi Orange tree is Rs. 5/- per year.
- 127 acres of the orchard with 6 per cent interest on the capital outlay (leaving the value of land) have cost Rs. 2½ lakhs.

(For the last 14 years 1916-1930)

1. Office and stores, Buildings. ...	10,000-0-0
2. Pumping Machines including sheds ...	50,000-0-0
3. Tractors (2) with accessories, spare parts etc. ...	15,000-0-0
4. Pipe, Earthen ware, Galvd, iron etc. ...	30,000-0-0
5. Barbedwire and angular iron fencing, 20,000 feet, ...	20,000-0-0
6. Miscellaneous, as labour, Bullocks, Carts etc. ...	1,25,000-0-0

The income derived so far from sale of orange crop 4,700 trees is said to have covered cost of cultivation, 3,000 Sour Lime trees 5 years old and 3,700 Sour Lime trees 3 years old now growing must give him profit hereafter.

Details of Orange trees on the Orchard, Age, income derived etc. are noted below :—

ORANGE, SANTRA)

14 years old, 1,500 } trees.

Income in ...	1923	11,000
	1924	3,500
	1925	1,100
	1926	.....
	1927	7,000
	1928	7,000
	1929	.....
	1930	6,000

8 years Rs. 35,600

Average Rs. 4,500 roughly.

ORANGE, MOSAMBI	}	Income	...	Rs.	4,000
1,300 trees 11 years old.			..	"	7,000
			..	"	11,000
			..	"	9,000
					<u>31,000</u>
		Average for 5 years (11-6)	..	"	<u>6,200</u>
400 trees	}	Income	...	Rs.	2,000
10 years old.			..	"	1,500
			..	"	2,500
			..	"	3,000
					<u>9,000</u>
		Average for 4 years (10-6)	..	"	<u>2,250</u>
2,300 trees	}	Income	...	Rs.	800
9 years old.			..	"	9,000
					<u>9,800</u>
		Average 9-6	..	"	<u>3,300</u>
Sour Limes, 5 years old			...	"	3,000
Do. 3 "			...	"	3,700
			...	Rs.	<u>6,700</u>

Conclusion.—One of the best Indian concerns, run on economical and up-to-date lines. Conditions similar to Mahratwada, facts and figures very useful for basing calculation upon, in the Mahratwada tracts of H. E. H. the Nizam's Dominions.

(3) VISIT TO BANGALORE*11th May to 22nd May 1931.*

I proceeded to Bangalore and obtained advice of Mr. G. H. Krumbiegel, Director of Horticulture in Mysore on the Data collected by me so far on various fruits grown in the Hyderabad State. He kindly perused the Interim Report on Fruit Survey I had drawn up and gave valuable suggestions for revision wherever necessary. As per his instruction special attention will be paid to Project areas, where possibilities exist for fruit culture and to describe varieties of mangoes which predominate in the State with a view to get an idea as to the best.

In connection with the proposed visit in July or August 1931 of Mr. Krumbiegel to Hyderabad as Horticultural Adviser, a programme of tour of important places and fruit gardens to be visited by him was drawn up and submitted for approval. But the proposal, however fell through.

Opportunity was taken of the stay at Bangalore to study:—

1. Latest improvements in the Government Botanical Gardens, Lalbagh Fruit Nursery.

2. Government Horticultural Farm. Varieties of plantains, Fodder Crops including 'Golden Beauty' Maize, and Vegetables.

3. Mr. Mc. Isaac's Gangenhalli Estate and Orchard (17th. May 1931) situated west on Bangalore Magadi Road, 15½ miles—area about 1600 acres, soil red with *murum* subsoil, owned and worked by the late Mr. Sabhpathaiya, Bar-at-Law of Hyderabad, Deccan. The Farm was a failure. Source of water is a tank built in a valley. Mr. Mc. Isaac is a Tea Planter from Assam, who, for reasons of health, settled down near Bangalore about 16 years ago, took up the neglected lands, has been working them profitably assisted by his son. This affords an example of European enterprise with a knowledge of Indian and local conditions succeeding. No prospective fruit grower should fail to visit the orchard and obtain lessons from Mr. Mc. Isaac, who being well up in his practical knowledge of fruit growing based on up-to-date scientific methods, willingly and kindly explains to the visitor every detail so vividly, thus renders a great service to the country.

The principal fruits grown are.—

- (1) Mango, graft varieties, Badami specially good.
- (2) Coconut. (3) Jack. (4) Apple.
- (5) Orange. (6) Grape Fruit. (7) Pine-apple. In all about 50 acres.

In laying out the fruit plots of Apple, Orange, Grape-Fruit and Pine-apple, special attention has been paid to (1) Grading of plots. (2) Drainage. (3) Conservation of rain water by catch-water drains (4) Diversion of water under ground. (5) Seepage water, subsoil drainage. Special valves made of cement for irrigation.

These prove that money wisely spent on initial cost is a better investment.

Individual care is given to each fruit tree and its requirements are attended to. Clean cultivation everywhere. Irrigation to growing plants by ring system with mulch of *Boga medalloa* is note-worthy. Selected varieties of good yielding Citrus trees are marked out and propagated for extending the plantations. Budding is not so successful as grafting. *Boga medalloa*, a leguminous plant, is used in the orchard with great advantage. Seeds can be had at 8 annas per pound.

Apple:— Varieties grown; Allington Pippin, Ribston Pippin, Peasgood Nonsuch, Cox's Orange Pippin, Devonshire Quarrenden, King David, Cleopatra Jonathan and Rome Beauty.

Rome Beauty, 8 years old, planted 15' by 15' is bearing well. So far it is the best commercial variety. Collar covers made of pot tiles are put round the stump, object being to prevent collar rot by sun stroke when the roots are attacked by white ants, soil is opened out and washed with Lime Sulphur and damaged parts cemented up. When Woolly Aphis attack, Spraying is done with Bordeaux Mixture and Fish oil Soap.

Peach:— Imported; Californian, not fruiting, being cut out.

Pine Apple:—The Queen. Suckers planted 3 feet apart, fruiting well in a year's time. Crowns planted take 3 years to fruit. 'The Queen' variety has a peculiarly good flavour and has been proved to be the best and is largely in demand, suckers available for sale at 2 annas each.

Orange:—Varieties grown are.—

(1) Washington Navel. (2) Mandarin. (3) Batavian (4) Valencia. (5) Navelencia. (6) Jaffa. (7) Joppa. (8) Nagpur, Santra. (9) Navel Orange from seed. (10) Sylhet (seedling). (11) Coorg (planted 8' apart growing close). (12) Cherapunji (plants doing well in nursery.)

Washington Navel:—Planted 20 feet apart. Grafts made on the orchard stock being rough lemon found wild in the Malnad of Mysore and in Assam. Disease resistant. Planted in round pits, 3 feet radius 3 feet deep, filled up with tank silt, Bone-meal and Karanj Cake. (*Pongamia glabra*)

Mandarin:—Planted 20 feet apart. Near rocks. Attacked by green bug. Sprayed with fish oil soap. Bearing well.

Grape Fruit:—Several varieties growing and doing well. Some types known as Pumelo in India and East, Shaddock in Australia named after Captain Shaddock who first took it to England. Grape fruit in America is so called because it bears in clusters as grapes. The new name was adopted by Fruit merchants of U. S. A. to attract demand for an uncommon fruit. Five years old trees planted 20 feet apart are bearing well and are already coming close.

Lemon:—Villa Franca 18 months from planting 9 months from budding. Bearing well. Flowers thinned out.

Plantain:—Koji, Dwarf Green. Grown well with the least trouble. Bearing a heavy bunch of fruits. Tastes very sweet.

Coffee:—Grown under ordinary conditions; treated with pot collars as in the case of Apples, are healthy.

Avocado Pear:—Near Tank bund, well drained. Planted 5 years ago, doing well.

Goma fish:—From Java is thriving in the pond under tank bund which collects all percolation. When well grown each fish is said to weigh 30 to 40 lbs.

VISIT TO PALACE ORCHARD ON THE

18th May 1931.

This was originally the site of the Mysore Fruit Syndicate organised by Mr. M. J. Paul, Fruit Expert from Australia; when it went into liquidation it was purchased by H. H. the Maharaja of Mysore and fruit culture is continued.

Soil.—Red-loam. Irrigated by water pumped from Sankey's Reservoir.

Kinds grown.—

1. Apple, Rome Beauty, proved to be the best.
2. Guava., Allahabad, Proved best, yielding well. Commercially paying. Trees 10 to 20 years old. Average income Re. 5/-per tree.
3. Mango. Upper Indian varieties, introduced 7 years ago, are fruiting successfully.
4. Sapota. Round and long varieties introduced from Calcutta 6 to 7 years ago bearing well
5. *Eugenia michellii*.
6. Kamrac.
7. Loquat, bearing well.
8. Litchi. Planted 15 years ago, not bearing well, more leaf growth.
9. Rose Apple.
10. Olive.
11. *Pouteria suavis*. A new fruit introduced from Urugnay. 15 years old. Growing well and fruiting, Borne once.
12. Cherimoyer. Not doing well.
13. Pomegranate.
14. Peach. 'Kashmere' variety. Raised from seeds of fruits originally got out from Kashmere Fruit-ing well. Colour, size and taste are good.
15. Grape vines, doing well. Varieties.—Muscat of Alexandria, Gros Colman, Gordo Blanco, Rose Muscat. Imported from Australia. Vines are

wintered and pruned in March and November. Stop water for 2 weeks. Expose roots. Sheep manure, Oil cake and Red soil used. Phosphatic and potash manures added will be advantageous.

16. Orange. Washington Navel. Imported from Australia, and planted, are doing well.
 17. Pine Apple. The Queen. Suckers got out from Mr. Mc. Isaac's Gangenhalli Estate on the Magadi Road and planted in rows 3 feet apart and manured with sheep dung are doing well. Some are bearing and throwing out side shoots.
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TOURS INSIDE THE STATE.

Procedure adopted for collecting data & tabulating it.

To begin with Revenue Statistics were gone through (referring to files in D. A's office) with a view to forming a basis for the Fruit Survey but the information was too meagre to be of any use and Preliminary Enquiry Sheet (Appendix No. 2 of Part II) was sent round to the Tahsildars through the Talukdars of the Districts on the information of which I could arrange my tour programme and check the individual gardens.

With the exception of the Mango, Orange (including other Citrus), Guava, Banana, and Papaya, there are practically no regular plantations of any particular fruit but the trees are planted in small plots in various parts of the garden and are inter planted with other fruit trees, vegetables, wheat, jowari and other agricultural crops.

To arrive at a fairly accurate idea of the actual extent of fruit cultivation it was evident that the area of the garden could not be accepted as the correct data as given by the Revenue officials. The trees therefore had actually to be counted and thus allowing a given number of trees to the acre the area actually under fruit was more correctly ascertained.

The following fruits were separately enumerated and considering the actual density of the gardens, the number per acre was fixed as shown against the name.

DISTANCES FOR CALCULATING ACREAGE.

Names of fruit.	Distance.	No. of trees per acre.
1. Mango (<i>Mangifera indica</i>)	25'	70
2. Orange (<i>Citrus Aurantium</i>)	15'	194
3. Lemon (<i>Citrus medica var</i>)	12'	303
4. Pumelo (<i>Citrus decumana</i>)	12'	303
5. Citron (<i>Citrus Medica Var</i>)	12'	303
6. Sweet Lime (<i>Citrus Medica Var</i>)	15'	194
7. Fig. (<i>Ficus carica</i>)	15'	194
8. Pomegranate (<i>Punica granatum</i>)	12'	303
9. Papaya (<i>Carica Papaya</i>)	6'	1210
10. Bhere (<i>Zizyphus jujuba</i>)	20'	109
11. Guava (<i>Paidium guava</i>)	15'	194
12. Sapota (<i>Achras sapota</i>)	15'	194
13. Phalsa (<i>Grewia asiatica</i>)	6'	1210
14. Kamrac (<i>Averrhoa carambola</i>)	8'	681
15. Bullock's Heart (<i>Anona Reticulata</i>)	30'	48
16. Date (<i>Phoenix dactylifera</i>)	15'	194
17. Litchi (<i>Nephelium Litchi</i>)	25'	70
18. Custard Apple (<i>Anona squamosa</i>)	5'	1742
19. Plantains (<i>Musa sp</i>)	6'	1210
20. Sour Lime (<i>Citrus Medica var</i>)	16'	170
21. Grape Vine (<i>Vitis vinifera</i>)	8'	681

22. *Miscellaneous.*

Apple, Bilimbi, Bael, Cashewnut, Cocoanut, Chironjee, Cherimoyer, Eugenia michelli, Guava, Chinese Jack, Jamoon, Jumrool, Kirni, Mulberry, Nectarine, Olive, Plum, Phalsa, Wild Peach, Pear, Pine Apple, Rose Apple, Sour Sop. Wood Apple, Walnut, Hill Goose- berry, Artocarpus Lakoocha, Grape Fruit, Star Gooseberry Loquat, etc,	12'	303
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The response to the preliminary enquiry was nil and I had to actually do the enumerating myself in the districts with the aid of the Revenue Officers wherever possible, and this was noted in Village Record Form (Appendix No. 4).

The final data and information collected by me in the districts surveyed are attached hereto.

1. District Record of fruit growing. pages 95 & 96.
(Gardens surveyed)
2. Notes on different fruits grown separately.
pages - .

Statement attached shows the area and number and kind of fruit trees in the Dominions as per information furnished by Revenue Officers with calculated acreage.

HYDERABAD FRUIT SURVEY.
(District Record of Fruit Growing, Gardens Surveyed.)
MAHARATWADA

S: No.	Name of District.	Mango.	Citrus.	Guava.	Banana.	Other Fruits.	Total.	Remarks.
1	Anrangabad (Calculated acreage) ...	1,508	47,230	5,525	6,765	19,404	80,427	
2	Parbhani (Calculated acreage) ...	21.5	193.6	28.5	3.1	36.5	283.2	
3	Gulbarga (K) (Calculated acreage) ...	130	605	788	1,012	1,925	4,410	
4	Bhir (Calculated acreage) ...	1.9	2.5	3.8	0.8	3.6	12.6	
5	Nanded (Calculated acreage) ...	105	12	62	173	3,575	3,927	
6	Raichur (K) (Calculated acreage) ...	1.5	...	0.3	0.1	6.7	8.6	
7	Bidar (K) (Calculated acreage) ...	5	144	...	1,200	1,200	2,549	
		...	0.6	...	1	2.2	3.8	
		381	917	600	...	19	1,867	
		4.7	3.8	3.1	...	...	11.6	
		540	493	165	250	663	2,111	
		7.7	2.0	0.9	0.2	1.2	12.0	
		2,704	481	4,884	4,904	1,455	14,428	
		38.6	2.0	25.2	4.0	2.7	72.5	
	Total number of trees ...	5,318	49,882	11,974	14,304	28,241	1,09,719	
	Total calculated acreage...	75.9	204.5	61.8	9.2	52.9	404.3	

K. means Karnatak.

NOTE :—*Citrus* :—Orange, Lemon, Pumelo, Citron, Sweet Lime and Sour Lime.

Other Fruits :—Fig, Pomegranate, Papaya, Bhery, Sapota, Phalsa, Kamrac, Bulbeck's Heart, Date, Litchi, Custard apple, Grape and Miscellaneous.

HYDERABAD FRUIT SURVEY.

(District Record of Fruit Growing, Gardens Surveyed)

TELINGANA

S. No.	Name of District	Mango	Citrus	Guava	Banana	Other Fruits	Total	Remarks
1	Mahbubnagar Calculated acreage	262 3.7	77 0.3	59 0.3	1,156 1	157 0.3	1,711 5.6	
2	Nalgonda Calculated acreage	1,861 26.6	627 2.6	700 3.6	638 0.5	1,010 1.9	4,836 35.2	
3	Nizamabad Calculated acreage	401 5.7	1,242 5.1	488 2.8	275 0.2	5,745 10.8	8,101 24.6	
4	Medak Calculated acreage	1,182 16.9	581 2.4	111 1.6	182 0.2	376 0.7	2,432 21.8	
5	Warangal Calculated acreage	574 8.3	878 3.6	443 2.3	161 0.1	651 1	2,707 15.3	
6	Atrafaldala Calculated acreage	7,705 110.0	4,482 18.8	1,498 7.6	1,865 1.5	10,255 19.2	25,805 157.1	
	Total number of trees ...	11,985	7,887	3,249	4,277	18,194	45,592	
	Total calculated acreage ...	171.2	32.3	18.2	5.5	33.9	259.6	

Grand total of calculated acreage for Maharatwada and Telingana 664.

NOTE.—

Citrus.— Orange, Lemon, Pumelo, Citron, Sweet Lime, Sour Lime.
Other fruits.— Fig, Pomegranate, Papaya, Bhere, Sapota, Phalsa, Kamrae, Bullock's Heart, Date, Litchi, Custard apple, Grape, Miscellaneous.

NOTE.— On pages 95 and 96 the total area of the gardens surveyed is given in the statement as 664 acres, whereas in the statements on pages 97 and 98 the total area of Fruit Gardens in the whole State is given by the Revenue officers as 8,530 acres.

At first sight there appears to be a vast difference between the two sets of figures.

The explanation of this disparity is that the figure 664 given by me represents the total area of the Fruit gardens actually surveyed by me, that is to say, only typical gardens in each district toured by me have been surveyed embracing the limited area of 664 acres as against the total acreage comprising all Fruit gardens in the State and amounting to 8,530 acres.

Due to the vast extent of the ground to be covered it was not possible to survey each and every garden, big and small, within the period allowed for completing the survey of existing conditions of the Fruit industry in the Hyderabad State.

DISTRICT RECORD OF FRUIT SURVEY.

Statement showing number of trees and acreage under fruit crops in different districts as per figures furnished by Revenue Officers.

MAHRATWADA

S. No.	Name of the District.	Mango.	Citrus.	Guava.	Banana.	Other fruits.	Total.	Remarks.
1.	Aurangabad. ...	12,575	46,999	24,132	1,33,804	52,031	2,60,541	
	Calculated acreage ...	180	192	124	111	97	704	
2.	Parbhani. ...	25,544	19,000	25,548	1,93,254	30,358	2,93,704	
	Calculated acreage ...	365	78	132	160	57	792	
3.	Gulbarga. (K). ...	4,068	526	296	11,635	61,524	78,049	
	Calculated acreage ...	58	2	2	10	115	187	
4.	Bhir. ...	9,368	14,369	21,132	21,132	14,459	80,714	
	Calculated acreage ...	134	59	110	18	27	348	
5.	Nanded. ...	429	480	24,143	3,954	3,773	32,779	
	Calculated acreage ...	6	2	124	3	7	142	
6.	Raichur (K) ...	21,723	914	5,167	1,990	2,837	32,631	
	Calculated acreage ...	310	4	27	2	5	348	
7.	Bidar ... (K) ...	6,058	1,690	7,505	996	4,287	20,336	
	Calculated acreage ...	87	7	39	0.8	8	142	
8.	Osmanabad. (K) ...	7,486	2,214	5,293	13,080	16,153	44,226	
	Calculated acreage ...	107	9	27	11	29	183	
	Total number of trees.	87,251	86,192	1,12,470	3,79,845	1,85,422	8,52,180	
	Total calculated acreage.	1,247	353	585	315.8	345	2,846	

K. means Karnataka.

Note:—Citrus:—Orange, Lemon, Pumelo, Citron, Sweet Lime, Sour Lime.

Other fruits:—Fig, Pomegranate, Papaya, Bhere, Sapota, Phalsa, Kamrac, Bullock's Heart, Date, Lichi, Custard apple, Grape, Miscellaneous.

DISTRICT RECORD OF FRUIT SURVEY.

Statement showing number of trees and calculated acreage under fruit crops in different Districts as per figures furnished by Revenue Officers

TELINGANA

S. No.	Name of the District	Mango	Citrus	Guava	Banana	Other Fruits	Total	Remarks
1	Adilabad	952	456	1,121	1,060	990	4,579	
	Calculated acreage	14	2	6	1	2	25	
2	Mahabubnagar	3,371	...	...	...	5,067	8,438	
	Calculated acreage	48	...	...	...	10	58	
3	Karimnagar	18,432	694	2,066	1,112	1,02,301	1,24,605	
	Calculated acreage	263	3	11	1	192	470	
4	Nalgonda	1,526	35	74	105	88,449	40,189	
	Calculated acreage	22	0.1	0.4	0.4	72	95	
5	Nizamabad	156	138	106	102	86	588	
	Calculated acreage	2	0.6	0.5	0.4	...	3.5	
6	Medak	222	87	75	4	122	510	
	Calculated acreage	3	0.3	0.4	...	...	3.7	
7	Warangal	2,011	...	...	...	...	2,011	
	Calculated acreage	28	...	...	...	...	28	
Total number of trees		26,670	1,410	3,442	2,363	1,47,015	1,80,920	
Total calculated acreage		380	6	18.3	2.8	276	683	

K. means Karnataka Grand total of calculated acreage for Maharatwada and Telingana 3,530 acres.
NOTE:—

Citrus:— Orange, Lemon, Pumelo, Citron, Sweet Lime, Sour Lime.

Other Fruits:— Fig, Pomegranate, Papaya, Bhere, Sapota, Phalsa, Kamrac, Bullock's Heart, Date, Litchi, Custard apple, Grape, Miscellaneous.

**LIST OF FRUITS CULTIVATED IN THE
HYDERABAD STATE.**

Serial No.	Name	Class	Nature	Page
A:—				
1	Apples, (<i>Pyrus Malus</i>) ...	Minor.	Delicate.	144
2	Almond, Country. (<i>Terminalia Catappa</i>) ...	do	Hardy.	145
B:—				
3	Badal. (<i>Artocarpus Lakoocha</i>) (<i>Monkey Jack</i>) ...	do	do	145
4	Baobab. (<i>Adansonia digitata</i>) (<i>Monkey Bread</i>) ...	do	do	153
5	Bhere. (<i>Zizyphus jujuba</i>) ...	do	do	134
6	Bread Fruit. (<i>Artocarpus incisa</i>)	do	Half Hardy	145
7	Bilimbi. (<i>Averrhoa Bilimbi</i>) ...	do	do	145
8	Bullock's Heart. (<i>Anona reti- culata</i>) Ramphal ...	do	Hardy.	145
9	Bael. (<i>Aegle Marmelos</i>) ...	do	do	145
10	Brazil Cherry. (<i>Eugenia Michel- lii</i>) (Same as No. 17) ...	do	do	146
C:—				
11	Cashewnut. (<i>Anacardium Occi- dentale</i>) ...	do	do	146
12	Cherimoyer. (<i>Anona Cherimolia</i>)	do	Delicate	146
13	Citron. (<i>Otrus medica</i> var. <i>Proper</i>) ...	Major	Hardy.	124
14	Chulta. (<i>Dillenia speciosa</i>) ...	Minor	do	146
15	Cocoanut. (<i>Cocos nucifera</i>) ...	do	Half Hardy	146
D:—				
16	Date. (<i>Phoenix dactylifera</i>) ...	do	Hardy.	139
E:—				
17	Eugenia Michelli. (<i>Brazil Cherry</i>) (Same as No. 9) ...	do	do	146
F:—				
18	Fig. (<i>Ficus Carica</i>) ...	Major	do	129

LIST OF FRUITS CULTIVATED IN THE
HYDERABAD STATE—*contd.*

Serial No.	Name	Class	Nature	Page
G:—				
19	Guava. (<i>Psidium Guava</i>) (Pumilinum) ...	Major	Hardy	124 & 147
20	Grapes. (<i>Vitis vinifera</i>) ...	do	Delicate		135
21	Grape Fruit. (<i>Citrus decumana</i> var.) ...	do	Hardy	123
22	Gooseberry. Cape (<i>Physalis peruviana</i>) ...	Minor	do	153
23	Do Hill (<i>Phyllanthus emblica</i>) ...	do	do	147
24	Do Star (<i>Phyllanthus disachus</i>) ...	do	do	147
J:—				
25	Jack. (<i>Artocarpus integrifolia</i>) ...	do	Half Hardy	148
26	Jamoon. (<i>Eugenia Jambolanum</i>)	do	Hardy	148
27	Jumrool. (<i>Eugenia alba</i> & <i>E. Acquea</i>) ...	do	Half Hardy	148
K:—				
28	Kamrac. (<i>Averrhoa carambola</i>)...	do	Delicate	148
29	Kirni. (<i>Mimusops hexandra</i>) ...	do	Hardy	148
L:—				
30	Lemon. (<i>Oitrus sp.</i>) ...	Major	Hardy	124
31	Litchi. (<i>Nephelium Litchi</i> and <i>N. Longanum</i>) ...	Minor	Half Hardy	149
32	Loquat. (<i>Eriobotrya Saponica</i>) ...	do	do	149
33	Lime, Sour. (<i>Oitrus medira</i> var. <i>acida</i>) ...	Major	Hardy	123
34	Lime, Sweet. (<i>Oitrus medica</i>) ...	do	do	122
M:—				
35	Mangosteen ? (<i>Garcinia sp.</i>) ...	Minor	do	154
36	Mango. (<i>Mangifera indica</i>) ...	do	do	102
37	Melon. (<i>Cucumis melo</i>) ...	do	do	141
38	Mulberry. (<i>Morus sp.</i>) ...	Minor	Half Hardy	149

LIST OF FRUITS CULTIVATED IN THE
HYDERABAD STATE—*concl'd.*

Serial No.	Name	Class	Nature	Page
N:— 39	Nectarine. (<i>Amygdalus persica-</i> <i>var. Laevis</i>) ...	Minor.	Delicate.	149
O:— 40	Olive. (<i>Olea Europaea</i>) ...	do	do	149
41	Orange. (<i>Citrus Aurantium</i>) ...	Major	Half Hardy	116
P:— 42	Papaya. (<i>Carica papaya</i>) ...	do	Hardy	132
43	Beach. (<i>Amygdalus persica</i>) ...	Minor	Delicate	150
44	Pear. (<i>Pyrus communis</i>) ...	do	do	150
45	Phalsa. (<i>Grewia Asiatica</i>) ...	do	Hardy	150
46	Phalsa, wild. (<i>Grewia sapida</i>) ...	do	do	150
47	Pine Apple. (<i>Ananasa sativa</i>) ...	do	Half Hardy	150
48	Plantain, Banana. (<i>Musa sapien-</i> <i>tum</i>) ...	Major	Hardy	127
49	Pumelo. (<i>Oitrus decumana</i>) ...	do	do	123
50	Pomegranate. (<i>Punica granatum</i>)	do	do	133
R:— 51	Raspberry (<i>Rubus Albescens</i>) ...	Minor	do	153
52	Rose Apple. (<i>Eugenia Jambos</i>)...	do	Half Hardy	152
S:— 53	Strawberry. (<i>Fragaria vesca</i>) ...	do	do	154
54	Soursop. (<i>Anona Muricata</i>) ...	do	do	152
55	Sapota. (<i>Achras sapota</i>). Chikoo.	do	Hardy	152
W:— 56	Wampee. (<i>Ampis</i>). (<i>Cookia punc-</i> <i>tata</i>) ...	do	Half Hardy	154
57	Wood Apple. (<i>Feronia elephan-</i> <i>tum</i>) ...	do	Hardy	153
58	Walnut. (<i>Aleurites moleccana</i>) ... <i>Desi Akrot</i> ...	do	do	153

MANGO.

*(Mangifera indica.)*1. *Where grown:—*

This is one of the extensively grown fruits in the Dominions, in a variety of soils and conditions, easy to grow, most neglected, yet the hardiest.

Mughal gardens in India are famous for selected varieties of mangoes and this country has very fine varieties.

2. *Soils:—*

*Maharatwada:—*all soils well drained

*Telingana:—*all soils, best results obtained in laterite soils.

3. *Total acreage:—7627 acres (Calculated)*4. *Varieties.—*

Varieties.

S. No.	NAME.	PLACE WHERE FOUND.
1	Abdul samar	Himayatsagar
2	Alfon, Alfonso, Apoos or Badami	Vikarabad
3	Amardana	Koheer
4	Ameer gola	Nalgonda
5	Ameer pasand	Nalgonda
6	Amin (Kadak)	Bidar
7	„ (Nawandagiri)	Bidar
8	Amini	Gulbarga
9	Amlet	Koheer
10	Anjeera	Koheer
11	Azeezusamar	Hyderabad
12	Badam	Koheer
13	Badami (Alfon), Alfonso, Apoos	Vikarabad see serial No. 2

Varieties (contd.)

S. No.	NAME	PLACE WHERE FOUND.
14	Balconda	Shamshabad
15	Banaganapalle	Suriyapet
16	Bangaloora	Hyderabad
17	Batasa	Koheer
18	Benishan	Hyderabad
19	„ (Banaganapalle)	Hyderabad
20	„ (Ranjole)	Bidar
21	Bombay, long.	Shamshabad
22	Borancha	Nalgonda
23	Chittur	Sailu
24	Chotagola	Bidar
25	Dilpasand	Koheer
26	Dilpasand (Ranjole)	Bidar
27	Doodia	Bidar
28	Elaichi	Koheer
29	Enayat pasand	Bidar
30	Fakrusamar	Himayatsagar, and Golconda.
31	Firdousi Berin	Bidar
32	Gaddemar	Hyderabad & Vikarabad.
33	„ (Nowbad)	Bidar
34	Gajur	Koheer
35	Goa pasand	Himayatsagar
36	Gola	Vikarabad
37	Gulelala	Koheer
38	Gurda	Koheer
39	Hafiz Pyrie	Jalna
40	Ikram pasand	Himayatsagar
41	Jam	Koheer
42	Kaju	Bidar
43	Kajur	Koheer
44	Kalapahad	Aurangabad, Bidar etc.
45	Kalipari	Bidar
46	Keshiri	Bidar
47	Kela	Koheer
48	Kevda	Koheer
49	Khadar pasand	Khammammet
50	Khurshid pasand	Himayatsagar
51	Khaja	Koheer
52	Khudadad	Vikarabad. (Eunnappalli)

Varieties (contd.)

S. No.	NAME.	PLACE WHERE FOUND.
53	Kishenbhog	Vikarabad
54	Kishmis	Koheer
55	Koweit	Koheer
56	Lalkadra	Vikarabad
57	Lalmunia	Moula Ali
58	Langra (Pasha pasand)	Hyderabad
59	Langda (Dharbhanga)	Bidar
60	Lohara	Himayatsagar
61	Loton (Sir Khurshedjah's Palace)	Hyderabad
62	Lukki (Ranjole)	Bidar
63	Mabmooda	Vikarabad (Ennapalli)
64	Maistry pasand	Shamshabad
65	Malai	Vikarabad
66	Matchi	Koheer
67	Mazgaon	Hyderabad
68	Mohanlal	Koheer
69	Mula	Koheer
70	Misri malai	Koheer
71	Mulgao, Kala	Dominions
72	„ sufeid	Hyderabad and Shamshabad.
73	Murshidabadi	Vikarabad
74	Nanakram	Koheer
75	Narangi (Ranjole)	Bidar
76	Narela	Koheer
77	Narial	Bidar
78	Naspati	Hyderabad
79	Navapasand	Koheer
80	Nazukbadan	Hyderabad
81	Nurjehan (Ranjole)	Bidar
82	Neelum	Vikarabad
83	„ Bombay	Vikarabad and Hyderabad.
84	„ Madras	Gulbarga
85	Papaya	Koheer
86	Pari (Ranjole)	Bidar
87	Peddarasam	Suriyapet
88	Phulgoa	Koheer
89	Pitur	Sailu
90	Puttu	Himayatsagar

Varieties (concl'd.)

S. No.	NAME	PLACE WHERE FOUND.
91	Rajpuri, Goa Bunder Pyrie.	Vikarabad
92	Raspuri Goa Bunder, Pyrie.	Vikarabad
93	Romani	Hyderabad
94	Sendhura (Ranjole)	Bidar
95	„ (Murshidabad)	Bidar
96	„ (Jammanpuri)	Bidar
97	Shahpasand.(Darbhanga)	Bidar
98	Shakkerghadi	Golconda
99	Shakker gola (Nuzvid.)	Nalgonda
100	Shakker para	Moula Ali
101	Shakkergulti	Vikarabad
102	Sheb (Ranjole)	Bidar
103	SindLuria	Vikarabad
104	Sultanusamar	Hyderabad
105	Sundershaw or Totapari	Vikarabad, See serial no. 108.
106	Sultania (Ranjole)	Bidar
107	Surkbada. (Banaganpalli)	Moula Ali
108	Totapari. (Sundershaw)	Raichur, Vikarabad. Hyderabad. See serial no. 105.
109	Tectur	Gulbarga
110	Turanj	Koheer
111	Umda	Koheer
112	Walajapasand	Koheer
113	Yacute Rahmani	Bidar
114	Yousuff Pasand	Moula Ali

MANGO VARIETIES.

Realising the universal importance and value of the Mango, rightly named the King of Fruits and considering the high esteem in which the Hyderabad Malgoa is held in all the varieties of this major fruit, every effort was made to catalogue as many varieties as possible. It will, however, be impossible to include every kind of mango claimed to be grown locally since it is common knowledge that one and the same variety is known by different names in different parts of the country according to the idiosyncrasies of the mango enthusiast.

Nevertheless by the very nature of its value a regular mango survey would, it is presumed, be justified to be pursued for a series of seasons, with photos, colour drawings, descriptions etc.

An attempt has been made in this direction with a limited number of 21 varieties, which are found in one of the popular and long established gardens at Vikarabad.

These 21 varieties have been carefully described and a rough sketch of each made.

(Fruits procured through the kindness of Raja Pratapgirji)

Serial No.	Name & place.	Size of fruit in inches			Weight in Tozas.	Flesh.	Taste.	Aroma.
		L.	B.	T.				
1	2	3			4	5	6	7
1	Goa Bunder (Raspuri or Pyrie)	3.9	2.9	2.6	21	Orange yellow	Delicious with sweet & acid taste	Good
2	Arzus Samar	5.9	4.5	3.9	80	Whitish yellow	Sour & Sweet	Fairly good
3	Nazuk Pasand	3.9	2.7	2.6	23	Deep yellow	Sweet & light	Good
4	Amini	5.8	3.4	2.9	43	Whitish yellow	Sour slightly Sweet	Fair
5	Nameless, resembling a small Pyrie in colour and shape	2.3	2.1	1.6	8 $\frac{1}{2}$	Yellowish white	Sweet & Sour	Fair
6	Hura Bura	2.5	2.4	2.2	13	Whitish yellow	Insidid	Very little
7	Neelum (Bombay)	2.2	1.6	1.6	8	Yellow	Very Sweet	Very good
8	Badami	4.2	2.9	2.2	26	Pale yellow	Sweet	Good
9	Kalaphad (Beaked & curved)	3.9	2.1	2.0	17	Orange Yellow turpentine smell	Slightly Sweet Carrot	Turpentine

of Varieties

Narasinghirji Bahadur from his Vikarabad Gardens).

Stone			Keeping quality	General purposes it is used	Early or Late	General appearance
L.	B.	T.				
8			9	10	11	12
2.7	1.9	.7	Fair	Table	Early 15th June	1. Shoulder rosy scarlet slightly fibrous on seed or stone. IInd class variety.
4.5	2.1	.9	Fair	Table	Early	2. Greenish yellow IInd Class variety.
3.2	1.6	.9	Fair		Early	3. Deep yellow & good smell.
4.3	1.2	.7	Fair	Table	Early	4. Long fruited slightly beaked yellow & green towards the beak.
2.1	1.2	.6	Fair	Sucking	Early	5. Borne in bunches yellow pinkish, resembling a small Pyrie in-shape an inferior variety, round fruited.
2.0	1.7	.7	Fairly good	Table	Early	6. A profusely bearing variety literally means full of green fruits- Yellow & Green, at stem. Round fruited. Purely yellow.
1.9	1.2	.5	Good	Table	Early	7. Bearing in clusters green and Yellow.
3.5	1.8	.6	Fair	Table	Early	8. Beaked, colour yellow, long, IInd class variety.
2.8	1.5	.7	Fair Keeps long	...	Early	9. Green and dark green. IInd Class variety. Round.

(Fruits procured through the kindness of Raja Pratapgirji)

Serial No.	Name & Place	Size of fruit in inches			Weight in Tolas	Flesh	Taste	Aroma
		L.	B.	T.				
1	2	3			4	5	6	7
10	Shakergutli	2.0	1.0	1.0	2	Yellow	Sweet	Turpentine
11	Sindhuria	5.0	3.5	3.0	35	Orange	Sweet	Carrot like
12	Bombay Alfon (Apoos)	4.5	2.9	3.0	27	Orange	Sweet & fragrant	Good & fragrant
13	Langda	3.1	2.9	2.7	16	Orange	Very Sweet	Good
14	Murshidabadi	4.9	3.2	2.9	27	Yellow	Sweet	Good
15	Lat. Kampo	6.0	4.5	3.0	62	Yellow		
16	Dilpasand	5.0	3.0	2.9	36	Yellow	Sweet	Skin Turpentine smell
17	Sultanus- samar	4.0	2.8	2.0	16	Orange	Very Sweet Carrot	Carrot like
18	Gola	2.9	2.8	2.5	14	Orange	Sweet slightly insipid	Carrot
19	Mahmooda	4.4	2.8	2.5	23	Whitish yellow	Very Sweet	Pineap- ple
20	Totapari	6.0	3.4	3.0	38	Whitish yellow Whitish	Slightly Sweet	Sour
21	Benishan	4.6	3.3	2.9	31	Orange towards seed.	Very Sweet	Slightly turpen- tine

of varieties

Narsingirji Bahadur from his Vikarabad Gardens)

Stone			Keeping quality	General purposes it is used	Early or Late	General appearance
L.	B.	T.				
8.			9.	10.	11.	12.
1.5	0.5	.5	Good	Sucking	Early	10. Bears in clusters IIIrd Class variety.
4.0	2.0	1.0	Fair	Table	do	11. Showy & coloured. IIInd class variety.
3.5	1.9	1.0	Excellent	do	do	12. Pinkish green turning yellow 1st class variety.
2.5	1.5	1.0	do	do	do	13. Pinkish yellow. Resembles Pyrie in taste 1st Class variety.
3.8	1.5	1.0	Good	do	do	14. Pinkish long and scarlet, showy beaked. Resembles Pyrie in taste. 2nd class variety.
4.8	2.8	1.0	Fair	Juicy, fit for Sherbet	do	15. Beaked green, slightly yellow IIInd Class variety.
4.5	2.0	1.0	Fair	Fit for Sherbet	do	16. Long orange yellow & green and Beaked.
3.5	2.0	1.0	Verygood	Table	do	17. Long, taste like Apoos, 1st Class variety
2.5	2.0	1.0	Verygood	Sucking	do	18. Pinkish yellow & green IIIrd Class variety.
3.5	1.5	1.0	Excellent	Table	do	19. Long Greenish yellow. Trees are stunted in growth peculiarly dwarf.
4.9	2.0	1.0	Fair	Table	Late	20. Beaked and curved pinkish yellow and green.
3.9	2.0	1.0	do	Table	Early	21. IIIrd Class variety.

5. *Propagation* :—

Plants are raised from seeds, one year old seedlings are transplanted, also grafts grown in pots. 2 to 3 years seedlings are used as stock.

6. *Distance of Planting* :—

Maharatwada,	16', 20', 21'.
Telingana,	13', 16', 20', 21', 25', 30', 35', and 50'.

In Maharatwada, loose soil, 1 to 3 feet cube pits are made and in Telingana 3 to 4 feet cube.

7. *Time for planting* :—

Planting is generally done in the monsoon, that is in June - July.

8. *Irrigation* :—

1 Twice a week in the early stages till the plants are well established for a year or more according to nature of soil.

2. In the vicinity of Nalgonda town it is understood that mangoes require irrigation in the cold and hot seasons. This might be due to the shallow soil with stony subsoil. But in most parts of the Telingana mangoes are watered only during summer after they are established for 2-3 years.

Irrigation is given in most gardens when the mango trees produce small fruits after flowering. In the Mahbubnagar district mangoes are irrigated for more than five years.

9. *Manures and Manuring* :—

Rotten cattle and sheep manure are used. Chuppalsend (*Opuntia* sp.) leaf mould wherever possible are obtained and buried in the bottom of the pit. At Mr. Ranchoddas's garden at Aurangabad $\frac{1}{4}$ seer fish manure is said to be given per tree.

10. *Income* :—

Re. 1 per tree, Rs. 70 per acre. Sometimes in the vicinity of large towns and cities large amounts as high as Rs. 25 per tree are obtained. While certain trees of historical importance near Bidar are said to fetch fabulous figures of Rs. 200 to 300 per tree.

11. *Cost of cultivation.* Figures not available.

12. *Diseases and Enemies* :—

1. Borers attack stem and branches.
2. White ants attack stem and roots.
3. Bark on stem facing south-west crack due to sun's action. South-Western wind being stronger tends trees to bend towards the east.
4. Various fungus diseases attack the skin and leaves.
5. Die-Back on small branches at the top and stumps.
6. Loranthus grown on branches (Karzdar).
7. Excess frost or dew scorches the flowers leading to failure of crop.
8. Cloudy weather at the time of flowering encourages flow of honey from flowers, resulting in failure of crop.
9. High winds and hail-stone attending thunder storms damage the crop.
10. Bats and birds damage fruit.

13. *Remedies* :—

1. Generally very little is being done to eradicate disease from the trees. In some places I have seen tarring the stumps one foot above ground is resorted to prevent white ants from damaging the wood.
2. When the borers are of large size tobacco and lime are boiled together in water and poured into the holes. When the borers are small or attacking at an earlier stage, a mixture of Asafoetida, curds and lime water is poured into the holes.
3. A paste is made of Bhilawan (*Semecarpus anacardium*) nut, Ticcamalli (*Gardenia Gummifera*), Butch, (Sweet flag) and Linseed oil and painted round the stump. If butch is applied to the roots of mango trees at one tola per tree white ants will not damage them.
4. Against damage by birds, flying foxes, etc. cover the fruits with small bamboo baskets. Against rats tie thorns round the stump. Against birds hoist a cloth flag to scare them.
5. Spraying with water or diluted phenyle will prevent or minimise damage to flowers from excessive dew and cloudy weather.

6. At the garden of Mr. Ahmed Ali, Retired Sheristadar, Shamshabad, for mangoes the following remedies have been successfully tried against white ants:—Put a ring of brass and zinc wire round the stump and paint with castor oil 3 inches above ground level and also use castor cake as manure, Damage from cloudy weather to flowers have been successfully prevented by spraying flowers with water at the time.

14. *Packing:—*

Fruit is mostly brought in country carts and sold in weekly bazars and cities nearby.

Packed in Bamboo and twig baskets bundled in green leaves with straw ropes, they are sent from Railway Stations leading to considerable damage by crushing. In Koheer large bamboo baskets are used to pack mangoes and guavas to be loaded on carts and sent to Hyderabad. In some places gunny bags are used to pack unripe and half ripe mangoes for transport.

15. *Transport:—*

By roads and Railway whenever possible.

16. *Miscellaneous:—*

1. Seedling varieties predominate in Mahrattwada and are planted at random in fields and gardens, some times very close.

2. At Lasur Aurangabad (District) it is understood that mangoes planted in deep black soil encouraged growth of dense foliage and did not fruit. Similar phenomena I noticed at Mr. Ali Hasan's gardens at Doulatabad.

3. Raja Pratappgirji Narsinghirji Bahadur's gardens at Vikarabad have choice varieties both for size, colour and flavour mostly imported from Upper India by the previous owner Nawab Imadul Mulk Bahadur, C. I. E., Here are some of the uncommon varieties as 'Dophali' and 'Barmasia.' Through the kindness of the Raja Saheb fruits of 21 varieties were obtained and described in May 1932 (vide statement attached under varieties.) 107, 107 a, b, c.

4. In Raja Chandrabhangirji's garden at Vikarabad, mangoes planted 16' apart some 12-15 years of age, are coming close together, but with proper tilth of soil and thinning of branches are said to be yielding well.

5. In many places in Telingana inter-spaces in mango plantations are used to grow dry crops particularly fodder.

6. Mangoes planted on hill slopes are doing well at Vikarabad in laterite soil.

7. In some gardens grass is allowed to grow in inter-spaces and no plough is passed for opening out the soil.

8. Koheer is celebrated for Mangoes. Mango trees there look healthier than in other places in Telingana and in spite of their age to be least liable to disease. Fruit from Koheer is still being sent by carts in preference to Railway, as pilfering *en-route* is feared, also delay in unloading at Hyderabad and then carting to the shops of fruit commission agents, consequently damage done to fruits, in handling. On the representation of the Director General of Industries and Commerce, H.E.H. the Nizam's Government, it is understood that the N. S. Railway authorised prompt booking and despatching and delivering fruits from Koheer to Hyderabad. Garden of Mr. Md. Bin Avad at Koheer has a type collection of all the best varieties of Koheer mangoes, he has a small nursery supplying mango seedlings of good varieties, as under :-

(1) One year old.	seedling	Rs. 10 per 100
(2) Two years old.	„	Rs. 15 per 100
(3) Three years old.	„	Rs. 25 per 100

9. A good collection of mango grafts planted at Mr. G. R. Nanel's garden (7 years old) at Parbhani and well cultivated are fruiting for the last 2 years. Varieties being Mulgoas, Pyrie, Apoos, Nazuk pasand, Totapari, Amin etc. most of these trees are from Salem and Chittur, 'Apoos' grafts obtained from Ratnagiri are not growing well. Some of these died.

10. Grafted mangoes from Bangalore planted at Parbhani 8 to 10 years ago are bearing well.

11. Mangoes round about Phulmari near Aurangabad and Harsul are fruiting well.

12. In Bidar District mangoes thrive best. They are here least susceptible to disease. They are said to fruit in 4 years from date of planting seed.

13. At Lingsugur Local Fund garden it is said that attempts made to grow mango trees failed in spite of suitable soil being available. This is a matter for investigation and experiment.

14. In some parts of Telingana mango trees grow well, then die suddenly in spite of a certain amount of care. In Nalgonda and Mahbubnagar, such casualties are very common on stony soils. At Shamshabad mangoes are irrigated from time flowers form into fruits as large as a marble.

15. At Moulali mango grafts planted in ground are watered for 3 years. Mangoes in flower and fruit if watered for 2 months would encourage development of fruit of better flavour.

SUPPLY OF MANGO GRAFTS.

I have seen that attempts are made in Hyderabad City to raise seedlings in the ground and transplanted into large pots, grafted and sold at Rs. 3 to 5 each. Grafts are imported at 12 annas to Re. 1 per plant from Bangalore, Salem, Chittur, Rajmundry, Banganapalli etc., and planted. These are said not to thrive so well as those grafts raised locally. This requires verification. It is not uncommon to see that large numbers of fruit trees are brought by dealers from Nuzvid, Bangalore and other places outside the Dominions from June - September and sold near Putli Bowli, Residency Bazars. Mango grafts are sold from Rs. 1-8-0 to Rs. 3 each. It has been ascertained that most of the supplies are not satisfactory and the graft thus supplied do not turn out to be true after much trouble taken in cultivating them for years.

While dealing with the description of the varieties of mango, it may not be out of place to refer to a new scientific discovery concerning the Indian mango as a result of its study at the Lister Institute for Preventive Medicine, London, by one of the leading vitamin authorities in Britain Dr. Solomon Zilva assisted by Miss Edith Perry.

A perusal of the report of the discovery which is a scientific proof of their exceptional richness in vitamins will bear out the undoubted importance hitherto attached to the mango.

TIMES OF INDIA

*Dated 9th March 1932.**Scientists Study the Indian Mango.**Richest known source of Antiscorvy Vitamin.**Discoveries in London season for the golden queen of fruit.*

A new scientific discovery concerning the Indian mango has just been announced. The fruit is one of the most potent, if not the most potent, known natural source of vitamin C. "The mango has been studied at the Lister Institute for Preventive Medicine, London, by one of the leading vitamin authorities in Britain, Dr. Solomon Zilva, and Miss Edith Perry.

In a report just published by the Empire Marketing Board, they state that the Indian mango, and particularly the variety called "Alphonso", is an extremely rich source of the vitamin which protects against scurvy, and is also rich in vitamin A, the anti-infective substance found in butter, milk, eggs, cod liver oil, etc.

"The 'Alphonso' variety contains about six times as much vitamin C as the most potent apple known, and about 30 to 40 times as much the Cox's Orange Pippin, which may be considered its prototype as regards palatibility among eating apples" the report states.

Mr. G. S. Cheema, D. Sc., Government Horticulturist in India, visited Britain last year under an Empire Marketing Board grant to study the marketing for Indian mangoes. Scientific proof of their exceptional richness in vitamins should be an important publicity point if it is found possible to establish an export trade to Britain.

Two other varieties, "Cawasji Patel" and "Shendrya," were examined. Both these varieties had a lower vitamin content than "Alphonso." Tests showed that the rind contained at least as much vitamin as the pulp.

"According to Sir George Watt," states the report, the fruit has long been considered a valuable medicine both by Hindu and Mahomedan physicians and has formed the subject of many articles in the *Materia Medica* of the East. Thus is the *Bhavaprakasa*, a confection made of the juice of the ripe fruit, sugar and aromatics, recommended as a

restorative tonic. The ripe fruit is also generally considered invigorating and fattening."

EFFECT OF CANNING.

"In view of the importance of the mango fruit," Dr. Zilva and Miss Perry conclude, "further experiments are called for, both for the purpose of consolidating the information obtained in this preliminary investigation and for further extension of our knowledge of the subject. It would be of direct practical significance to ascertain the change brought about in the vitamin content of the mango by the treatment it is submitted to in the preparation of the various articles of food, as practised in its native home, and also the effect on it of canning.

The presence of the antiscorbutic vitamin in the diet prevents the onset of scurvy, a dietetic deficiency disease to which man, the monkey and the guinea-pig are very susceptible. Their reaction to natural products or preparations from these sources containing vitamin C has been proved to be identical. The guinea-pig and occasionally the monkey are therefore utilised for the determination of this accessory food factor. In the investigation to be described young guinea-pigs were employed. When kept on diet free from vitamin C these animals grow for about three weeks, when their weights begin to fall rapidly and at the end of about four weeks death from scurvy supervenes; clinical symptoms of the disease are discernible after about 18 days.

If, on the other hand, a sufficient amount of the vitamin is offered to guinea-pigs on a vitamin C deficient diet they are protected from the disease and grow normally. Smaller quantities delay the onset of symptoms, loss of weight and death. In these tests graded doses of mango were administered daily and the degree of protection from scurvy was assessed by considering the cause of death, first appearance of scorbutic symptoms, degrees of scurvy at autopsy and amount of growth. Guinea-pigs which were fully or sufficiently protected by a given dose were maintained on the experimental diet for three months.

STORED FROZEN.

The mangoes on arrival in England were ripened in a warm, airy room if necessary, and when possible were used for testing purposes in an untreated condition. Owing to the long duration of the tests and to the perishable character of the experimental material, it had however, to be kept under conditions which would stabilise the vitamin. The fruit was therefore stored for the most part of the time in a frozen condition at -20 deg. C. It has been shown that apples lose very little if any of their vitamin C when kept in this condition. As the daily weighing out of small doses on a large scale would have been inaccurate and unnecessarily laborious, a week's supply was weighed out for each animal and one sixth of the weekly ration administered every day except Sunday. The weekly and daily doses were stored at -20 deg. C. and thawed immediately before being administered to the experimental animals.

The mangoes for experiments were kindly collected by Dr. G. S. Cheema D. Sc, I.A.S, Government Horticulturist, Poona and consisted only of one variety, "Alphonso," grown in the Thana District of the Bombay Presidency. The fruit was despatched by mail steamer and was kept during transit in the *pursere's* cool room, where the temperature varies from 40 deg. F to 50 deg F.

In view of the fact that the mango has an importance in the tropics similar to that of the apple in temperate countries, it is interesting to note that the "Alphonso" variety contains about six times as much vitamin C as the most potent apple known the Bramley's seedling, which is a cooking variety, and about 30—40 times as much as the Cox's Orange Pippin, which may be considered its prototype as regards palatability among the eating apples of this country. It also possesses about twice the antiscorvy value of most potent citrus fruits."

ORANGE

(*Citrus Aurantium*)

1. Where grown?—

Mahrattwada, extensively, Aurangabad, Mitmitta, Banjarwadi, Lasur, Parsoda, Vaijapur, Karanjgaon, Bhendwadi, Jalna etc.

Parbhani Town, Singanapur, Sailu, Nanded Town, Mudkhed.

Telingana. In limited numbers, Atrafibalda, (Vikarabad and Koheer). Hyderabad, Nirmal, Nizamabad etc.

2. Soils.—

Mahrattwada, in all types of black soils not heavy or deep, Pandari, brown calcareous, light black.

Telingana, Red soil or reddish loam, 3 feet deep with *murum* subsoil.

3. Varieties, 1. Loose-jacketted.

1. Santra in two or three types.

2. Kaula

3. Ladu

2. Tight-jacketted. 1 Narangi,
2 Mosambi. a. Kagdi b. Godadi

3. Washington Navel

4. Jamaica

5. Malta

Note—Tight-jacketted, (1) Narangi of Bigaradia (Sour orange) type, very hardy and largely grown throughout the Telingana in all types of soil sometimes as close as 6 feet. Lives even without irrigation during summer and with the rains flowers and fruits profusely less susceptible to the common diseases of the Citrus family, trees 30-40 years have been noticed to bear well at Arastubagh near Falaknuma, Hyderabad. Old stumps have been pruned down 1-1½ feet above ground. Mosambi and Washington Navel oranges have been used to bud on. Such budded plants are doing well, growing well and bearing well.

1. (*1*) *Santra*. Of oranges, *Santra* is the most popular and is recognised by loose skin and golden yellow colour. It is cultivated very largely in the *Mahrattwada* and in small numbers in some parts of *Telingana*. *Santra* fetches better price than any other variety of orange and is largely in demand. This may be said to be half hardy unlike the *Mosambi*, which on account of its tight-jacketted character travels better. *Santra* fetches annas 12 to Re. 1/- per dozen. *Jalna* is famous for *Santras*. In *Vaijapur* *Mosambis* are largely grown.

2. *Kaula*.—The skin is loose with irregular ridges and with a circular ring at the apex. The juice is scanty and the flavour bad.

3. *Ladu*. The shape is flattened from apex to base. The skin is loose and the fruit has a pupilla at the stalk, colour unattractive, juice is sweet and the fruit is almost seedless, called "Cawnpuri" at *Parbhani*. The *Kaula* and *Ladu* are not in demand and are not largely grown. They occur here and there in orange gardens by accident, *Santra* and *Mosambi* predominating in plantations.

2. (*1*) *Mosambi*.—Sometimes known as Sweet Lime. This is very largely grown for export. Hardier than *Santra*. The word *Mosambi* is said to be a corrupted form of *Mozambique*. Fetches generally 8 annas to Re. 1/- per dozen. Taste less piquant than that of *Santra*.

Varieties:—(a) *Kagdi*—thin skinned.

(b) *Godadi* thick skinned.

Mosambi is called *Batai* in *Telingana* probably a corruption of *Batavian* orange. At *Gulberga* the name *Batai* is well known. *Batai* is doing very well at *Warangal* and *Nalgonda* and bearing well quite as well as in *Mahrattwada*. Yield per tree of 10 years age at the garden of Mr. *Ramkishen*, Oil Mill Owner, *Warangal* was 400 fruits, which compares favourably with yields in *Mahrattwada*. Photographed in August 1931.

2. *Washington Navel*.—

This is of late introduction, acclimatised in *Bangalore*, *Poona* and other places in *India*. I have noticed the trees of this kind fruiting well in *Hyderabad City*, *Jagirdars' College*, *Begumpet*, *Secunderabad* (*Boosareddyguda*) and *Aurangabad*.

4. Propagation:—

Oranges are budded on to Jamboori stock (Lemon, local). There being no large nurseries, budded plants are imported from Nagpur, Poona and other places and planted. Budding not practised by malies at Vaijapur owing to superstition. Owners are also superstitious and do not allow any budding to be done in their gardens. Layers are taken from Batai and other citrus trees in Hyderabad and they yield in 3 years and are said to be better than budded plants.

At Nirmal, Adilabad District, Santras are budded on wood apple (Koweit) stock. At Bhir Local Fund garden Santras on this stock are thriving well. At Gulberga an old tree of 25-30 years is still doing well in spite of neglect. Santras budded on Wood Apple stock are said to be hardier and to bear sweeter fruits. At Desaipet, Nizamabad District, Mr. Lakshman Rao, Retired Police Inspector, has obtained similar stock from Nirmal and planted in his fruit garden under Nizamasagar lands commanded by *Nala* water from the Reservoir. These are doing well and have begun to fruit in 3 years after planting.

5. Manures used:—

Rotted village refuse, ash, cattle and sheep manure, and river silt, 4 basketsful for each tree. Night soil and cattle manure mixed and used. Dead dogs are buried near the trees. They are sometimes buried in manure pits, separately and the rotted stuff taken out and used.

6. Time for planting:—

July in the monsoon. But in Mahratwada planting in October to November, cold season, would be better (as informed by an experienced mali at Jalna).

- Irrigation. Trees flower (1) In January (*Amba Bahar*)
 (2) In June (*Mrig Bahar*)
 (3) In October (*Hatti Bahar*)

One of the first two flowering periods is usually taken since the trees require the cutting off of water and resting before each flowering. This is not so easy for the *Hatti Bahar* (the third period of flowering). Since it is impossible to rest the trees in the months of August and September as there is rain during these months. It would be difficult therefore to rest the trees properly for the *Hatti Bahar* and the whole process of careful resting is dependent upon the season at which it should be done.

For trees which have already commenced to bear fruit the usual water supply is gradually lessened when half the crop is gathered, so that by the time the last gathering of fruit is completed the surface soil is fairly dry. Two weeks after the last irrigation each tree is pruned of its dead and weakly branches. The whole plot is ploughed or hand dug and mixed manure of dung, ash, sheep mould, rotted village refuse, about 3 to 4 basketsful given to each tree. First irrigation is given 10 to 15 days after manuring. The roots near the stem are generally exposed and the trees show tendency to drop leaves. The first watering will be scanty, this stimulates flowering. The second irrigation is given 2 days after the first, and the third, four days after the second and then once a week.

The grower chooses the *Bahar* according to the market, but the fruits of *Amba Bahar* ripen in rainy season and those of *Mrig Bahar* in summer; the former will not taste so sweet as the latter.

At Parsoda I have seen oranges treated for *Amba Bahar* in January and the fruit comes ready for Bombay after Nagpur lot is over. At Vajapur pruning of orange trees is attended to, to a small extent before wintering for fruit.

In Telingana in *chalka* soil, oranges grow well and flower as in Mahratwada. But no treatment for *Bahar* is given, manuring is done to some extent but watering is done throughout the year.

7. *Distance of planting.*—

6', 8', 12', 13', 14', 15', 16', Pits 2 to 3 feet cube filled with soil and manure.

8. *Diseases & Enemies.*—

- (1) Borers attack trunks.
- (2) Leaves yellow, wholly or partially.
- (3) Sun scorch on fruits.
- (4) Mucher (Ophideres) (mosquito), a nocturnal insect attacks young fruits, punctures them and causes them drop.
- (5) Die-back on branches and stump.
- (6) Mova or tiny insects (Aphis) cluster on to tender shoots and suck juice from them.
- (7) White ants attack trunks.
- (8) Leaves and fruits are attacked by black rust.

9. *Remedies.*—

- (1) Borers are searched for and killed. A mixture of Garlic, Ginger, Ticcamalli (*Gardenia gummi-fera*), Asafetida (Hing), Chilli leaves, is boiled in water and poured into holes. Sometimes Neem oil and Butch (sweet flag) are ground and poured into the holes made by the borers.
- (2) Sand mounded round the foot of orange trees is said to prevent attack of white ants to the stump.
- (3) Citrus suffering from Chlorosis are improved by applying 1 to 2 oz. of Sulphate of Ammonia twice to each tree at intervals of a fortnight. Tried successfully at Sangareddy Government Agricultural Farm.

10. *Income.*—

Average Re. 1 to 5 per tree. A maximum of Rs. 40 per tree has been obtained at Bhendwadi, Vaijapur, at the gardens of Kishen Rao Patel.

Size of a 21 years old tree. Height, 15 feet.
 Girth 60 do
 Trunk 3 feet and 8 inches.
 Area about 4 acres.

Income	1st year,	Rs.	100
"	2nd "	"	2,200
"	3rd "	"	3,000
"	4th "	"	7,000
"	5th "	"	18,000
"	6th "	"	4,500
"	7th "	"	1,500
"	8th "	"	500
"	9th "	"	200

Fruit sold direct at Bombay, Surat, Ahmedabad
 and Hyderabad occasionally.

11. *Cost of Cultivation.*—Figures not available.

12. *Miscellaneous.*—

(1) At Jalna the space between orange trees is ploughed by bullock power and in other cases grass mostly *Hariahi* is allowed to grow. Vegetables are raised as catch crop, *viz.*, Onion, Carrot, Methi, Coriander etc., not only in the early stages but even when trees are bearing. I am told by a *Bagswan* at Jalna that such a cultivation is beneficial to orange trees in bearing.

(2) Mr. Hyder Husain, Hyder Manzil, Nanded, thinks that orange cultivation will pay even if fruits are sold at less than Re. 1/8 to 2 per 100.

(3) At Nanded it has been noticed that orange trees are more than 20 years old and going down in yield.

(4) In the same garden I noticed that roots of orange trees in fruit are exposed and fibrous roots were being cut and was told that better sized fruits are produced by such treatment.

(5) From Mr. Balwant Rao owner of large orange and guava gardens at Nanded informed that best yields are obtained from orange trees up to 16 years from planting.

(6) Yellowing of leaves on certain orange trees is said to be due to heavy yield, and sometimes stagnation of water around the roots.

(7) Owing to scarcity of water at Nanded, orange trees are treated only for *Mrig Bahar*.

(8) At Mr. Kalamnurikar's garden in Parbhani, experiments of chemical manures are being tried. Parry's Fruit mixture has been supplied through the Agricultural Department.

(9) Orange fruits are generally affected by sun scorch. I am told that soil aeration practised round the roots minimises such a disfigurement.

(10) In some cases though an orange looks to be green from outside, it is all ripe inside.

(11) At Mr. Gulebdass Byragis' garden, Parbhani it was found that Santra fruits facing the sun on the outer circle of trees are tighter skinned than those inside which are larger and more wrinkled.

(12) Santra and other oranges thrive in Telingana if water supply is good. They produce good coloured fruits as at Vikarabad but insufficiency of water supply is in the way.

(13) In Bhir District budded orange and Mosambi plants have been imported from Shikrapur near Poona.

(14) In the Nalgonda Local Fund Garden it is noticed that Santra orange trees 35-40 years old are still bearing withal that no special treatment is given to them.

(15) At Shamshabad Santra oranges from Jalna grown in red soil with *murum* subsoil bear well and give good coloured fruits. No treatment for *Bahar* is given. $\frac{1}{2}$ lb. of bonemeal given to each tree during rains is said to be beneficial.

Sweet Lime.—Next in importance to orange comes the Sweet Lime. Literally speaking there are not many trees grown in the gardens separately. They are found here and there in orange plantations.

Mosambi Oranges are classed under sweet limes. Village officers put all citrus trees under oranges. Plants budded on Jamboori stock are used. Fruits fetch 12 annas to Re. 1/- per dozen.

Sour Lime. (Citrus Medica var Acida). These are grown to a small extent in small plots, hardly there is a garden in which at least a single lime is not found. Juice used in flavouring Indian curries and preparing *Sherbeth*.

- Varieties:—1. Kagdi, round, small, thin skinned.
 2. Kagdi, round, large, thin skinned.
 3. Round large, thick rinded.
 4. Long and thick skinned.

Plants raised from seeds are largely used for planting. Fruits largely in demand, can be easily sold. Fruits sold at 6 annas to 12 annas per 100, in retail sold at Rs. 1-8-0 to 2-8-0 per 100.

Pumelo. (Citrus decumana.)

A few trees are noticed in gardens mixed with other trees.

Varieties:—(1) Round, white and red fleshed grown at Shamshabad and other places.

(2) Pear shaped (White fleshed and Pink fleshed Shaddock,) a small red type of Pumelo, imported from Australia is found in cultivation in Hyderabad City. Plants raised from seeds are used for planting. Budded plants and layers are also used.

Grape Fruit. (Citrus decumana type)

This is similar to the American Grape fruit, newly introduced into Raja Pratapgirji Narsingirji Bahadur's garden at Hyderabad. Bears in bunches like Grapes. Hence called grape fruit.

Lemon—(Citrus sp)

Varieties.—

- (1) Yellow, oval, from Poona.
- (2) Yellowish green, oval, from Hyderabad. Largely grown in Telingana.
- (3) Yellowish, flat bottomed.
- (4) Italian, long, noticed under cultivation in Mr. Rahimatulla's garden at Ameerpet, Hyderabad.
- (5) Pear-shaped, large. At Suriyapet, Nalgonda District in the A. B. Mission garden a very large Pear shaped type is noticed known as Dabba Nimma 12"×9" said to have been originally obtained from the Kristna District. The same type at Mr. Sarvottam Rao Viswamitri's garden at Lallaguda, soil black and red *murum*, skin of fruit thick and wrinkled pulp sour, juice used as substitute for tamarind.

There are several other types requiring identification. Stocks are raised from varieties Nos. 1 and 2 and Orange, Sweet Lime and Pumelo are budded on.

Citron.—(Citrus Medica.)

Two varieties are noticed, *viz.*, small long and large long. Plants raised from seeds and layers are used for planting.

Total calculated acreage under citrus ... 359 acres.

GUAVA

*(Psidium Guava)*1. *Where Grown ?*

1. *Mahrattwada*—Throughout in all gardens; good fruits can be had at Daulatabad, Jalna etc.

2. *Telingana*—Throughout in all gardens; fine fruits can be had at Koheer, Shamshabad etc.

2. *Soils :—*

1. *Mahrattwada*—in all sorts of soils.

2. *Telingana*—in all sorts of soils.

2 (a) Total calculated acreage:— 603 acres.

3. *Varieties.*

1. White-fleshed (a) round. (b) Allahabad large round. (c) Long, Bangalore grown at Raichur, Hyderabad etc.

2. Red-fleshed, round and long.

3. Long big, seedless growing at Marredpalli in the garden of Mr. Dorairangam Pillai, worth propagating. Under fish, cattle, sheep manure good results are produced. Grafts imported from Allahabad Government gardens have done excellently well at Shamshabad and are bearing large and sweet fruits some as heavy as one pound each.

4. Chittidar (from Allahabad Government Gardens) Himayatsagar.

5. Karela. (from Allahabad Government Gardens) Himayatsagar.

6. Habshi. (from Allahabad Government Gardens) Himayatsagar.

7. Seedless (from Allahabad Government Gardens) Himayatsagar.

4. *Propagation.*

By seeds sown in well prepared bed in ground and seedling transplanted into another bed 5 to 6 inches apart when 9 to 12 inches high before planting but in the monsoon. Layers are sometimes taken, also grafts prepared.

5. *Distance of planting.*

6', 12', 14', 15', 16½', 17', and 18,' in pits 2 to 3 feet cube according to nature of soil.

6. *Time for planting.*

June to July.

7. *Irrigation.*

Irrigation is commenced before the rains begin in June.

8. *Manuring and manures.*

Farm Yard Manure, stoppage of water after harvest in February till May, when a digging is given round the plants and a basketful of manure is provided.

9. *Income.*

Fruiting commences in the first year after transplanting or second year from sowing of seed. Annas 8 to Re. 1 per tree or Rs. 150 per acre.

10. *Cost of cultivation.* Information not available.

11. *Diseases and Enemies.*

1. Die-back on branches and stems.
2. Borers attack stems and branches.
3. Birds, Bats, Animals, monkeys etc., damage fruits.

12. *Remedies.* Nil.

13. *Miscellaneous.*

Allahabad, white round variety yields good sized fruits of fine aroma weighing 1 lb. sometimes. Guavas grown at Doulatabad and Koheer taste very sweet. Guavas are mostly consumed locally and sold in weekly markets and sometimes small quantities are sent down to Hyderabad. This is one of the hardy fruits grown largely giving an early return. No thinning of fruits is practised, easy to grow and withstands bad treatment and may be called the 'poor man's food.' Like plantain yields the second year. Interculture of vegetables, wheat etc., is practised during the first one or two years. Guava stumps shed bark annually. At Singanapur, Parbhani District guavas are being irrigated in bed system. At Ekkeli (Zahirabad) no interculture is practised.

At Koheer I noticed old guava trees are cut to a foot from ground-level and allowed to branch from the bottom, the original trees are said to be 60 to 100 years old. Very small pits 1' x 1' x 1' are made in irregular lines and guava seedlings planted. Soil similar to *Pandari* (*Brown calcareous*) with red soil added. No manure is used before planting or after when irrigated for bearing fruits.

Plants raised from seeds give fruit in 2 years whereas grafts in 1 year, the latter are said to be better than the former.

PLANTAIN-BANANA

(Musa Sapientum)

1. *Where grown?* *Mahrattwada*. Aurangabad, Bhir. Vaijapur and Parbhani,

Telingana. Koheer, Bhongir, Shamshabad. Hardly there is a garden wherein one or two trees are not found near wells.

2. *Soils*.

1. *Mahrattwada*. Black loam.

2. *Telingana*. Red loam, black loam, clayey with *murum* subsoil as at Mahbubnagar.

2. (a). Total calculated acreage 318 acres.

3. *Varieties*.

1. *Baseai*. Dwarf 5 to 6 feet high. Fruits green and very sweet. It is called Kozi in some places.

2. *Botha (Kattebale)*, angular fruited eaten by poor people in Mahrattwada, used for cooking purpose outside the state.

3. *Lal, Red (Red plantain)* largely grown near Gulbarga and sent to Hyderabad City, also at Koheer and Ekkeli (Zahirabad) Bidar District, and Aurangabad. Growing well at Hyderabad and Secunderabad.

4. *Kamalapuri*, similar to *Rajbale* of Mysore. Very sweet, outer skin green, flesh white.

5. *Sonkela*, small, yellow, thin-skinned and sweet similar to *Basabale* of Mysore.

6. *Martabani*, Dwarf small similar to *Sonkela* and also similar to Gujerati near Gulbarga.

7. *Karibale*, Green long.

8. *Elakki*, small fruited, thin skinned and sweet, grown at Raichur, also successfully at Mahbubnagar.

4. *Propagation*. By suckers.

5. *Distance of planting*. 4', 6', and 7' (6½' feet at Mahbubnagar.)

6. *Time for planting.* June to July.

7. *Manures and manuring.* Farm yard manure and in many parts of Mahrattwada, no manure is used. Fish manure is used at Mr. Ranchordas's garden at Aurangabad. Also sheep manure near Gulbarga.

8. *Irrigation.* Twice a week other than in rainy season.

9. *Income.* 8 annas to 12 annas per tree. *Rs. 500 per acre.* At Singanapur, plantains, Botha, planted 6 feet apart are sold, wholesale at Rs. 45 per 100-bunches, average 40 fruits per bunch.

10. *Cost of cultivation.* Figures not available.

11. *Diseases and Enemies.*

In Bidar District, monkeys of langur type, damage fruit crops except oranges.

12. *Remedies.*—NIL.

13. *Miscellaneous.*

1. Plantain is a gross feeder and delights in rich soil, heavy manuring and copious supply of water, can be grown under sewage.

2. Generally grown as an annual crop in many places in the Mahrattwada without any manure.

3. In Mahrattwada guavas and plantains are grown together and on yielding one crop the plantains are removed giving room to guavas to grow and fruit, a really economic method.

4. Very fine 'Red' variety of plantains are cultivated in Mr. R. Das's garden at Aurangabad and Mr. Bashiruddin's garden at Koheer. Thinning of suckers practised, cleanly cultivated and irrigated in bed system. Intercultured at times by onion as at Jalna, sold locally in weekly markets. Red plantain is sent out to Hyderabad as it fetches a better price there.

Dry leaves are twisted round the tree at Gulberga as at Bassein but removed clean at Aurangabad. It has been ascertained locally while studying Hyderabad Fruit Market that there is demand for Red plantains and they can fetch Rs. 4 to 6 per 100 wholesale and Rs. 100 worth of fruit can be sold in a day.

Plantains flower in one year and fruit will be ready in 4 to 5 months later. Bunches are removed as one or two fruits turn yellow, or soft. In the case of Lal, Red, softening of fruits is the only test. At Singnapur, Sailu and other places in Mahrattwada, it is believed that manuring affects flowering and bearing of plantain fruits and that white ants are attracted.

5 At Local Fund Garden, Lingsugur, I have seen plantains thriving well in black light and pale *murum* mixed soil.

6. At Mahbubnagar I noticed a very successful plantations of plantains owned by Mr. Seshagiri Rao, Contractor. With varieties of Botha, Dwarf, Sone or Elakki grown on paddy land with black loam and clayey subsoil, showing the possibility of growing this fruit in place of paddy and save water. There is good local market for plantains at Mahbubnagar.

7. At Sir Khurshid Jah's Palace, under high wall protection with a mixture of horse manure, ash and paddy husk, Nawab Wahidudin Khan Bahadur raised very fine Red plantains 8 inches long with a circumference of 8 inches.

8. The following varieties are under trial, in the Himayatsagar Farm.

1. Basrai (Poona), 2. Chittagong Koji, 3. Rangoon
4. Gulbarga, 5. Rajeli, 6. Lal (Red), 7. Karpursoni,
8. Sedam, 9. Kasadia (Cooking).

FIG. (*Ficus Carica*)

1. *Where grown?* Mahrattwada. Doulatabad, Maliwada, Vaijapur, Aurangabad and Jalna.

Telingana. Hyderabad, Vikarabad, Koheer and Warangal.

2. *Soil.* Mahrattwada, rich loamy soil with a mixture of lime as the Pandari soil, also black light loam.

2. (a) Total calculated acreage, 22 acres.

3. *Varieties.* 1. Maisaram, generally grown by Arabs in Hyderabad. There are about 10,000 trees at Maisaram and neighbourhood. Fruit pinkish at the mouth when ripe.

2. Poona, (a) purplish blue in colour when ripe, fruits well at Sangareddy Government Farm.

3 Doulatabad. Fruit develops a purple colour when fully ripe.

4. Black Ischia, (b) received at Doulatabad from Quetta. Fruits not maturing but dropping early but I heard only six fruits matured and tasted sweet. Same with plants imported into Hyderabad from Bangalore in 1922. Plants of this variety growing at Vikarabad and Koheer are faring similarly. Plants grown vigorously, budding experiments are being tried at Doulatabad making *Black Ischia* the stock.

Plants got out from Salem and planted in Local Fund garden at Raichur are not maturing fruit. Similarly is this variety faring at the Subedari garden at Warangal. This variety is used as stock to bud Maisaram variety on and is said to fruit well at Mr. A. B. Mehta's garden at Parsoda.

4. *Propagation.* By cuttings and layers. Layers are only used at Maisaram.

5. *Distance of planting.* 6' to 15'

6. *Time for planting.* June to July.

7. *Irrigation.* Six waterings in a month. At Doulatabad, water is withheld from March to May after harvesting fruits. No withholding of water is practised in the Telingana, 8 waterings in a month are practised.

8. *Manuring and manures used.* (1) Night soil.
 (2) Farm yard manure.
 (3) Sheep manure and blood (Jalna)
 (4) Fish manure and bonemeal are also applied at Shamshabad.

At Sangareddy Government Farm 2 basketsful of mixture made of Red soil, dried blood, bone meal 1 lb. per tree, castor cake 1 lb. per tree—3 years old tree is given.

9. *Income* Rs. 2 per tree (Doulatabad).
10. *Cost of Cultivation.* No figures available.
11. *Diseases and enemies.*
 1. Borers attack stem and branches.
 2. Brown spots on leaves.
 3. Bats, squirrels etc., and even bees and wasps damage fruits.

12. *Remedies.*

1. Very little or nothing done. Hand-picking of borer is done, though not persistently. At Shamshabad cats are reared to kill rats and squirrels.

At Shamshabad, mixture of Ticcamalli (*Gardenia Gummifera*) gum and gingelly oil is made and poured into the holes made by borers. They come out and are caught and killed.

13. *Miscellaneous.* No thinning of fruit is practised. The trees fruit after a year, real yield is taken into consideration from 2 years, vegetables as onions, brinjals, chillies etc., are grown in the interspaces.

Figs are not treated for any *Bahar* as *Katta* and *Mitta murum* soil of Telingana irrigation is continued throughout the year in summer profusely every other day.

Description of varieties :—

(a) Poona—Fruit, form of an inverted cone the lower half near the stalk has a greyish green colour with purplish streaks, and the broad end is grey purple with streaks of red and brown. A fully ripe fruit splits at the broad end shows the red colour of the inside pulp. The skin is very thin and when the fruit is ripe it comes off by the slightest touch,

(Agri-Horticultural Society of Western India, Bulletin No. 3 by P. S. Kanetkar, April 1905.)

Black Ischia.—Fruit medium, roundish obovate dark purple, almost black, flesh deep red, rich and luscious, a good bearer and comparatively hardy.

The Gardener's Assistant by W. M. Watson Vol. III)

PAPAYA

(*Carica Papaya*)

- 1 *Where grown?* *Mahrattwada*. Throughout.
Telingana. Throughout.
- 2 *Soils*. *Mahrattwada*. In well drained loamy soil.
Telingana. All sorts of soils, but well drained.
- 2 (a.) Total acreage calculated. 22 acres.
- 3 *Varieties* 1. Long 2. Round 3. Seedless.
4. Gujerat long fruiting well at Himayatsagar Central Farm and Sangareddy Agricultural Farm 5. Washington, Red Ribbed, sweet though small - grown on Himayatsagar Farm and Sangareddy Farm.
- 4 *Propagation*. By seed. Seedlings are raised in nursery beds and transplanted in plots prepared for vegetables as chillies etc. After the latter are harvested beds are made with two papaya trees in each.
- 5 *Distance of planting*. 4 to 6 feet apart.
- 6 *Time for planting*. October.
- 7 *Irrigation*. Once a week when there is no rain.
- 8 *Manuring and Manures*. Farm Yard Manure.
- 9 *Income*. 8 annas per tree. Rs. 500 to 600 per acre.
- 10 *Cost of Cultivation*. Figures not available.
- 11 *Diseases and Enemies*. At Doulatabad porcupines destroy the plants when put out in the early stages, they dig at the roots and eat them.

12 *Remedies.* NIL

13 *Miscellaneous.* Fruits consumed locally and sold in weekly bazars. Papaya does very well in *murum* soil and I have seen large fruits 10 to 12 lbs. in weight raised in Hyderabad City when planted in pits 10 feet apart, filled with a compost of sheep manure sand and red soil.

In Doulatabad Papaya seedlings are transplanted in plots growing onion and other vegetables.

POMEGRANATE.

(*Punica granatum*)

1 *Where grown?*

Mahrattwada. Vaijapur and Jalna.

Telingana. Vikarabad, Hyderabad and other places. Commonly grown in all gardens 1 or 2 plants can be found in them.

2 *Soils.*

Mahrattwada. Black light loam and Pandari.

Telingana. Red loam with *murum* sub-soil

2 (a) Total calculated acreage. 16 acres.

3 *Varieties.* 1 Kagzi, (1) Flowers red and scarlet.

(2) Flowers, white possibly called Kabul at Gulbarga and other places.

2 Habshi, Black.

There are several other varieties but the names are not known.

4 *Propagation.* (1) By seeds, (2) By cuttings, (3) By layers

5 *Distance of Planting.* 4', 6', 8'.

6 *Time for planting.* June to July.

7 *Irrigation.* Once a week.

8 *Manuring and Manures.* Farm yard manure in pits 2 to 3 ft. cube,

- 9 *Income.* Yield commences 4 years onwards. (Fruit ripens in cold season), Figures not available.
- 10 *Cost of Cultivation.* Figures not available.
- 11 *Diseases and Enemies.* An insect detected to be a certain hairy Caterpillar penetrates the hard rind when the fruit is a little more than quarter grown and by devouring a part of the interior causes the remainder to canker and rot.
- 12 *Remedies.* NIL.
- 13 *Miscellaneous.* (1) Pomegranate succeeds with a little care in all sorts of soils. Has a tendency to throw fresh shoots from the base.
2. Dead ends of pomegranate pruned and the trees treated with fish manure, excellent fruits have been produced at Shamshabad.
3. Mr. Mohiuddin Ahmed, Deputy Commissioner of Customs, Sultanpura, Hyderabad-Deccan tells me that he has heard that opening out soil round roots of Pomegranate and putting, filings of copper and brass, covering again, watering after manuring will prevent *Anar Caterpillar* trouble when the trees fruit.

BHERE.

(*Zizyphus Jujuba*).

1. *Where grown?* Wild throughout the Dominions. Also cultivated.
2. *Soils.* All sorts of soils.
2. (a) Total calculated acreage 87—acres.
3. *Varieties.* 1. Round. 2. Long, Nagpuri.
4. *Propagation.* 1. By seeds. 2. by budding.
5. *Distance of planting.* Irregular.
6. *Time for planting.*
7. *Irrigation.*
8. *Manuring and Manures.* } Particulars not available.
9. *Income.* Yield per tree, 12 maunds or 1,000 lbs roughly Rs. 4—20 per tree.

10. *Cost of cultivation.* Figures not available.
11. *Diseases and Enemies.* Maggots are noticed inside the fruit when ripe.
12. *Remedies.* Nil.
13. *Miscellaneous.* A thorny tree, flowers in rains, fruits mature in cold season, grows rapidly cut down to the ground after fruiting it will spring up again and fruits the next season. Long 'Nagpuri' variety is budded on to the wild 'Round.' Bhere fruits thus produced are luscious, peculiar sub-acid smell. I have had opportunities to taste good fruits at Jalna in January last. They resemble raw dates in taste, purchased at 36 lbs per rupee.

At Doulatabad I saw fruits of the Common 'Round' variety of Bhere purchased by *Bogwans* spread on the ground in front yards of house and sun-dried. The dry fruits are sent to Bombay, mill workers buy them for chewing to quench their thirst.

GRAPE VINE.

(*Vitis Vinifera*)

1. *Where grown?* *Mahrattwada.* Aurangabad, Mitmitta, Doulatabad Maliwada, Singanapur, and Jalna, Limba Ganesh Bhir District.

Telingana. Hyderabad and Koheer.

2. *Soils.* *Maharattwada.* Black loam and brown calcareous (Pandari.)

Telingana. Red soil with *murum* subsoil.

2 (a) Total calculated acreage—4 acres.

3. *Varieties.*

1. *Fakri.* Fruit small white round, fairbearer.

2. *Bokri* of Aurangabad, prolific bearer.

Bokri of Nasik, Largely grown at Limba Ganesh, Bhir District.

Famous
Doulatabad
varieties.

} 3. *Habshi*, yields black fruit of large size, sweet and of livery consistency with a musky flavour, fetching a high price, shy bearer.

Habshi seen bearing well at Sultanpura, Hyderabad.

4. **Sahebi.** Leaves broad rough and leathery fruit large, narrow at base, broad at top and white or amber coloured.
5. **Abi.** Colour of fruit, deep rose when ripe.
6. **Persian,** 2 varieties, one is small (whitish) fruit and the other round and whitish.
7. **Kabuli.** Grown at Shamshabad.
8. **Munacca.** Grown at Shamshabad.
9. **Malta, white.** Grown at Chanchalguda, Hyderabad.
10. **Kandahari.** (from Doulatabad and Poona) under trial at Himayatsagar Farm.
11. **Kali Sahebi** (from Poona) Under trial at Himayatsagar Farm.
12. **Bangalore, white.** Under trial at Himayatsagar Farm.
13. **Bangalore, Black.** Under trial at Himayatsagar Farm.

4. *Propagation.* By cuttings.

5. *Pruning.*—In Doulatabad and Aurangabad grapes are pruned once in the first week of April, when watering is continued. They are again pruned in the first week of October when the water is withheld for 3 weeks. Before ripening of fruit in February the water is withheld for 2 weeks. After pruning roots are exposed. At April pruning they are also manured with Farm Yard Manure at 2 baskets only per plant. Thinning of fruits is not practised.

In Hyderabad City and vicinity pruning is done one month later. Sheep mould and red soil are used after exposing and pruning the roots as well as branches.

In Hyderabad grapes are wintered again in *Hasta Karti* (October) soil opened out, small roots are cut, bark on stem removed.

6. *Manuring and Manures used.*

- (1) Cattle Dung.
- (2) Sheep manure and red soil.
- (3) Fish.

- (4) Fish soaked in toddy and rotted together for 10 days is poured on exposed roots. Cow dung and ant-hill soil are mixed and put on to the pit and irrigated every other day.

7. *Distance of Planting.*

(1) 8'-12' apart in Bush system.

(2) 25' apart in Pandal system.

Props used. (1) *Jatropha curcas*. (2) *Erythrina indica*.
(3) *Salix*. (4) *Agati grandiflora*.

8. *Irrigation.*

At Doulatabad except in the rainy season grapes are watered at intervals of 6 days if water is available even 7 waterings are given in a month excepting in pruning and resting season.

At Limba Ganesh, Bhir District, in Mr. Khadilkar's garden on the Balaghat plateau with medium black and white soil more or less Pandari irrigation is given once in every 8-10 days

9. *Income.*

Grapes begin to pay from the 5th. year. Rupee 1/- per tree. Rs. 500/- to 600/- per acre Rs. 2/- per tree or Rs. 1500.- to 1750. per acre at Limba Ganesh, Bhir District.

One Grape vine Sahebi trained on pandal 10 years old is said to have given 50 seers of fruit or Rs. 124 at Nawab Azeez Jung Bahadur' bungalow in Sultanpura, Hyderabad Deccan.

10. *Cost of cultivation.*—Figures not available.

11. *Diseases and Enemies.*

(1) Mildew attacks leaves, flowers and fruits.

(2) White ants attack stems.

(3) Anthracnose.

(4) Squirrels, bats and wasps eat fruit.

12. *Remedies.*—Sulphur dusting on tender leaves and spraying with Bordeaux mixture advocated by the Agricultural Department.

NOTE:—Here the ryot has been thoroughly helpless through ignorance and superstition.

13. *Miscellaneous*.—Doulatabad has been famous for grapes. Variety Bokri, 7 years old, yield 24 bunches 14 lbs. per tree. Bokri of Nasik grown at Limba Ganesh 7-8 years old has given an yield of 70 pallas of 240 lbs. each per acre or 21 lbs. per tree.

Fakri, 7 years old, yield 24 bunches 30 lbs. per tree.

At Maliwada village in Jamadar Ismail khan's garden grape vines are said to be immune to disease, the plants are 5 years old.

In Doulatabad grape cultivation had practically dwindled down when about 6 years ago, some efforts were made by the Agricultural and Cooperative Departments to revive it and most of the gardens growing grapes are of recent origin Pandari soil (Brown calcareous) in Doulatabad and in the vicinity of Aurangabad City were particularly suitable for grapes. I am told that grapes grown in the area of Doulatabad fort taste sweeter than those raised outside. In the gardens I visited at Mitmitta and Maliwada I have had no opportunity of tasting ripe grapes at the time but guavas from Doulatabad and Aurangabad City were tasted by me and the fruits from the former place were decidedly sweeter than the latter.

Generally grapes take 4 to 5 years to yield, and if not carefully tended they are prone to mildew and other diseases being delicate. Owing to ignorance of remedial measures and the uncertainty of a crop poor people cannot go in for grape growing. Even the few that have taken to it are involved in debts.

At Sirganapur and Sailu 1 noticed grape vine grown by Bush system are allowed to branch out from the bottom of the stem somewhat like fingers.

Grapes do well at Bidar, altitude 2209 ft. Rainfall 32 inches. Soil Red, Laterite-bearing in the District Jail also at Mr. Yadav Rao's garden-fast growth. Also at Ekkeli (Zahirabad) District Bidar, manured with rotten cow dung.

D A T E

(Phoenix dactylifera)

1. *Where grown?* *Mahratwada.* A few trees in gardens of Aurangabad, Singanapur (District Parbhani.)

Telingana. Grown mostly in Hyderabad City by Arabs. A few trees are found at Vikarabad, Koheer and Suriyapet, Nalgonda District.

2. *Soils.* All sorts of soil except clayey.

3. *Varieties.* Yellow and scarlet. There are many other varieties, but the names are not known.

Number of trees about 1,000.

4. *Propagation.*

1. By seed., Trees raised in this way take 10-12 years to yield.

2. By side shoots. Trees planted in this way take 4-5 years to yield.

5. *Distance of planting.* 15 feet.

6. *Time for planting.* March to May.

7. *Irrigation.* Once a week for 2 years till the trees are well established.

8. *Income.* Yield Per tree 150 to 200 lbs. of fruits. Per tree Rs. 20 to 30.

Yield per date tree at A. B. Mission, Suriyapet 40-60 lbs. Tree not specially treated.

9. *Cost of cultivation.* Figures not available.

10. *Diseases & Enemies.*

(1) Immature fruits drop on the ground.

(2) Flowers drop completely.

(3) Rhinoceros beetles cut down tender shoots.

11. *Remedies.*

(1) To prevent No. 1 sheep manure and green pomegranate leaves and pigeon dung are used in manuring at the end of rainy season

(2) To prevent No. 2 soil round the roots opened out and straw is carefully burnt without injuring roots.

(3) Salt and curds tied in cloth and hung on tender shoots.

12. *Miscellaneous*. 1. Date is an important fruit said to have been introduced from Arabia and cultivated to a small extent in the City of Hyderabad. Dates have great possibilities in Hyderabad. Having trained a specialist in the line, the Agricultural Department has started varietal trials. Advice is being given free in local gardens and pollenising has been successfully done. There are male and female trees ; for every 90 female trees there must be 10 male trees.

Dates flower in December and fruits will be ready in June—July.

2. Date trees are noticed throughout the Dominions, say Suriyapet, Nalgonda District, Gulberga etc, but the method of Pollenising is not known. In most cases the trees do not form fruits. At times poor specimens are formed by self pollenising or pollenising with inferior male *Shendi* flower dust.

3. The following 50 suckers of varieties of Date (*Phoenix silvestris*) have been imported from Iraq and planted in June 1931 in the Horticultural Section of the Himayatsagar Farm:—

Female.—

1. Halavi, yellow, 2. Kasravi, 3. Gintar and 4. Briam.

Male.

(1) Vardi, (2) Gannami.

A second lot of 25 suckers have been received from Iraq and planted in May 1932. Varieties are same as above except with Halavi, of which a red type is received.

MELON.

(Cucumis Melo)

1. Grown in river and tank beds during summer. In my tours in January 1931, I saw young plants in Aurangabad and Vaijapur. Seeds are sown in November or December and fruits are ready in March—April.

2. *Manure.* Well rotten town rubbish and night soil with ash are used as manures.

3. *Cultivation.* In river beds, trenches 3 feet broad and 4 feet deep are made and half filled up again with sand. Shallow basins 2 feet apart, are made and a handful of rotted manure, is put in and mounded up. Melon seeds are sown therein. As cut worms destroy young seedlings after germination some 8 to 10 seeds are sown on the hill in excess of actual requirements. Only two plants are allowed to grow extra ones being pulled out after watching casualties. 20 days later first earthing up is done manure being used in the sides between basins.

Earthing is again done 20 days hence and manure is also given in the sides when fruits are as big as a marble, making the whole plot level.

4. *Varieties.*

1. *Musk (Kurbuj)*
 1. Jaldar.
 2. Nimbu
 3. Safed patti
 4. Sidhout
 5. Kurnool.
 6. Alampur.
2. Water Melon (Turbuj) (Puchapandu,)
 1. Sidhout, Striped.
 2. Surai, Long.
 3. Dark green oblong.

5. *Income.*

Yield:— 3 or 4 fruits per vine.

50' x 100' gives Rs. 100/-

which work out at Rs. 871/-, per acre

6. *Cost of Cultivation.*

For 50' x 100' - Rs. 60/-

which works out as Rs. 523/- per acre.

Details for a plot of 50' × 100'

Rental for 4 months.	Rs. 20/-
Trenches of night soil.	„ 10/-
Cooly for lifting.	„ 3/-
Carting, labour, digging trenches, and sowing seed etc. upto harvest.	„ 27/-
	<hr/>
	Rs. 60/-

(The cultivator's wages for 3 months are not taken into consideration).

7. *Diseases & Enemies.*

1. Cutworms destroy seedlings after germination.
2. A peculiar fly attacks fruits externally and damages them.
3. Mildew (*Boodadi Rogum*) attacks leaves.
4. *Kadapa rogum* scorches the leaves.
5. With thunder and clouds the edible portion in water melons will turn into liquid making it insipid.
6. Peculiar insects emerge out of larval deposit inside the melon fruit rotting the whole and resulting in complete loss to cultivators as in the 'Musi' river (in the year 1931.)

8. *Miscellaneous:—*

1. On a visit paid by me to the Musi river in Hyderabad from near the Poorana pul (old bridge) to Sangum, I found that melon crop was a total failure by disease No. 6 as noted above (4th, April & 5th, April 1931)

2. In addition gourds as luffa (*Turat*), dilpasand (vegetable marrow), pumpkin and cucumber are sown in the same way as the melons, which were attacked and destroyed.

3. Melon cultivation is pursued as a subsidiary occupation by agriculturists, sepoys, dhobies etc.

4. One month before *Shankranth*, pieces 50' × 100' in in the bed of Musi river are allotted by Government to the cultivators at a rental varying between 12½ to 20 rupees per piece to be paid on harvesting the fruit. Money is borrowed

from *baniyas* and *konties* and spent on cultivation. Owing to a failure of crop in 1931 the cultivators were in woeful plight. They preserve their own seed. Seed 2 to 3 years old is supposed to give better yield.

5. Going to the Subji Mandi near the Musi River I noticed some diseased melons brought by growers and sold by auction to retailers at Rs. 0-12-0 to Re. 1/- per basket, the usual price being Rs. 1-8-0 to Rs. 2/- per basket. The auctioneer charges a commission of one anna per basket.

6. At Sangum near Golconda I took weight of melons growing on vines.—

Water melons.—1. Small girth 15" x Length 8" Weight 1 lb.
 2. Large „ 20" x „ 12" „ 5 lbs.
 Musk melon.—Green striped 14" x „ 10" „ 3 „

But this is a diseased crop and the actual weight etc. should not be taken as the standard.—

At Afzulgunj market I paid 3 annas 2 pies for a good (though small) water melon weighing $6\frac{3}{4}$ lbs.

(26th April 1931.)

Opportunity was taken to study melons growing at the time in the bed of the river Girna, near Utran, East Khandesh. Method of cultivation is more or less the same as at Hyderabad (Bed of the Musi). Other gourds as cucumber, bitter gourd etc., are also sown. Well rotted Farm Yard Manure is used. Night soil is not used, as it is said to give room to insects to destroy fruit and also to affect the taste of the fruit. Planted in *Pushya* month (December) the melon crop will mature from 2 to 3 months and be over in 4 months in all. Yield 3 to 10 fruits per vine, diseases same as at Hyderabad. Melons sown in two lots in January and middle of March for late fruiting. At the time of my inspection the latter plants were flowering and extra leaves were being pinched off. I obtained a water melon whitish green, 9 lbs. in weight for 2 annas. It tasted sweeter than that raised in Hyderabad City. The rental for a piece of ground in the bed of the Girna is 4 annas for 25' x 25' which works out at Rs. 2/- for 100' x 50' against Rs. 12½ to 20 paid at Hyderabad, (Musi River). It is understood that the local Mamlatdar does not allow use of night soil as manure in the bed of rivers, where melon and other crops are raised.

APPLE.

(Pyrus malus)

Two classes are distinctly noticeable in the Dominions. One an indigenous shrubby tree 10 to 12 feet high with dark oval shaped leaves [seems to be Quince (*Cydonia Vulgaris*)] and the other imported, grafted or budded, obtained from different parts of India and other countries. For the last 8 years I have observed that these are not properly cultivated, but still they have borne fruit. The former at Sett Chammull's, Somajiguda, also at Arastubagh near Falaknuma, and at Ahmed Bin Syed Arab's gardens, Singanapur, Parbhani District, have yielded fruits of a greenish white colour, sweet and of good smell. Of the latter, plants of "Rome Beauty" variety have been imported from Australia, and are under careful cultivation at gardens of Raja Pratapgirji Narasingirji's Pratapbagh at Vikarabad, and Gyan bagh of Raja Dhanrajgirji Narasingirji Bahadur at Hyderabad and have borne fairly well.

At Vikarabad apples have been planted 15 feet apart in red soil with *murum* subsoil, in a mixture of sand, cattle and sheep manure, ash and night soil. The trees were put down on 1st November 1928 and they in spite of insufficiency and irregularity in watering bore fairly good fruits of bright rose colour in November 1930 and tasted well. They were wintered in February 1931, and treated for fruiting and bore fairly well. White ants attack roots rapidly and kill trees, irregularity and neglect in watering being the main cause. Watering done twice a week when there is no rain.

In the garden of Sangeeta Kajanna at Bichala, District Raichur, near the bank of the Tungabhadra in deep black soil (8' deep before reaching *murum*). 12 Apple (Rome Beauty) plants purchased from Messrs. Rudrappa & Son, Bangalore and planted 6 years ago and irrigated by a *nala* from the river are thriving well. Though no special treatment is given to them the trees are said to fruit once a year and ripen during summer, taste sweet.

Noticed in March 1932. Imported Australian Apple at Parsoda flowering and forming fruits in spite of neglect and no treatment, showing possibility of success even in Mahratwada soils.

A L M O N D (Country)
(*Terminalia Catappa*)

A large tree, handsome, stately growth with long spiral branches spreading like an umbrella, planted, with a double purpose in gardens at Hyderabad and Vikarabad. This tree affords a fine sitting place on the ground and is clothed with dark green polished foliage. Bears twice a year a nut with kernel inside resembling almond in taste, ripe fruits on trees seen at Vikarabad in February 1931. Propagated from seed.

Badal (*Artocarpus Lacoocha*), Monkey Jack.

A tree of moderate size with handsome oblong entire dark green leaves 8' by 4". In rains it produces an ill shapen fruit of the size of an orange with a smooth thin rind of the colour of dry dirty wash leather. It is of an austere taste but is sometimes eaten. Propagated by seed. Grown at Vikarabad.

Bullock's Heart:—(*Rampal*) (*Anona reticulata*) Grown throughout the Dominions. Wild in gardens of the Aurangabad District. Yields sweet fruit of greenish pink colour and heart shaped. Grows to the size of a large graft mango tree. I have seen fine coloured fruits at Koheer, planted sometimes 25' apart.

Bread Fruit.—(*Artocarpus Incisa*) growing well at Mr. Justice Giri Rao's garden at Begumpet and also at Sir Ameen Jung's at Hyderabad.

Bilimbi.—(*Averthoa Bilimbi*)

A small tree grown in gardens here and there. I have seen the tree bearing thin pale green fruits 3 inches by $\frac{1}{2}$ inch with a mild acid taste. Used in pickling and cooked with fish. Propagated easily from seed, but a slow grower. A few trees are noticed in Hyderabad Arastubagh near Falaknuma and Vikarabad and Warangal flowering in September to October.

Bael.—(*Aegle Marmelos*)

A small tree, covered with sharp spines. Leaves are used by Hindus in Shiva worship. Two varieties are noticed. Wild and cultivated. One bearing large sized fruits as big as cocoanut and the other as big as a ball of the ordinary size. The fruits have a thick pale green rind with a soft

yellow substance of fragrant scent with medicinal properties. Noticed in gardens of Mahratawada and Telingana. Trees do well at Vikarabad and bear drought well.

Brazil Cherry.—(*Eugenia Michelli*).

Bushy shrub, pale green plants can be seen in Public Gardens in Hyderabad and private gardens at Vikarabad. The fruit is about the size of a button, round and ribbed. Propagated by seeds and layers.

Cashewnut (*Anacardium occidentale*) A large hardy tree, bearing sweet smelling flowers in summer and fruiting in rainy season with a nut attached thereto. A few trees found in Mahratwada and Telingana (Vikarabad, Warangal, Shamshabad and Hyderabad) are doing well. Fruits are eaten raw and nuts roasted. Kernel largely used in Indian sweets.

Chulta (*Dillenia speciosa*) growing and fruiting at Raja Pratapgirji Bahadur's garden at Hyderabad, grows in poor *murum* bears pure white fragrant flowers, fruits resemble apples. Part used is the large thickened sepals of the Calyx, mixed in curries (Prawns).

Cherimoyer (*Anona cherimolia*) An uncommon fruit tree 7 to 8 feet high growing and fruiting at Raja Pratapgirji Narasingirji Bahadur's garden (Mehdi Bagh) at Vikarabad. The fruit resembles a Custard Apple in appearance with a peculiar sweet taste midway between a Custard Apple and Bullock's Heart. Cherimoyer fruit was exhibited at the Hyderabad Horticultural Show 1931. Propagated by seeds.

Cocoanut (*Cocos nucifera*) Cultivated in small numbers throughout the Dominions, along with Arecanut and Plantain. These can be easily found in most of the gardens. The tree bears an oval nut which is used in all Hindu worships and in cooking. The whole fruit serves as a seed which takes 5 to 6 months to germinate. Cocoanut thrives best on river banks with good alluvial soil or on well drained terrace with madeup soil and abundant water. Cocoanut requires constant irrigation during the earlier stages of its growth. I have seen cocoanut trees planted irregularly in Hyderabad City at distance varying from 12-30 ft. Manures used are cattle dung and salt. Two years old seedlings transplanted by me n 1923 at Raja Pratapgiriji Narsingirji Bahadur's garden at Hyderabad fruited in 1929 and are

yielding well since, water level in well 12 feet in summer. Yield in Hyderabad City 100-125 nuts, in Alir 50-60 nuts per year.

Tender shoots are attacked by Rhinoceros beetles, which are to be probed for by a wire hook, caught and killed. A handful of common salt dipped in curds tied on to the tender shoots prevents further attack. All manure pits are carefully closed and watched to prevent breeding of the Rhinoceros beetles.

Custard Apple.—(Sitaphal) This fruit is grown wild throughout the Dominions very largely in State Forests. In the gardens surveyed, they are found to grow at random and in many cases serve as hedges. In the Dominions 56,000 acres are estimated to be available. Fruits mature in the cold season and are sold in weekly markets at 4 annas per 100 but in Poona and Bombay they fetch as high at Re. 1 to Rs. 3 per dozen. Waggon loads are sent out from Tandur and other places for sale in Bombay. Fruits raised naturally in Hyderabad taste better than those cultivated round about Poona. This fruit has great possibilities in the way of marketing and preserving and making sweet products.

Guava.—(Small leaved,) probably *Psidium pumilinum* a slow grower moderate sized, small leaved, bears sweet fruits of myrtle flavour, full of seeds, Propagated from seed. Noticed at Vikarabad, Hyderabad Public Gardens and Secunderabad.

Gooseberry, Hill.—(Phyllanthus emblica). *Awla*. A fairly large tree with small leaves. Bears in cold season small round, green fruit. Exceedingly acid used in pickle and preserves. Noticed in Bhir, Hyderabad and Vikarabad.

Gooseberry, Star.—(Phyllanthus distichus)

Syn. (Cicca distichus)—(*Harpalevdi*)

A small tree with graceful foliage. Fruits small, round, green, ribbed, acid in taste. Used in pickles and preserves.

Grown in Hyderabad and Vikarabad. Fruits mature in cold season.

Jack.—(*Artocarpus integrifolia*).

This tree grows to a considerable size in a reddish loamy soil rich in vegetable matter and is raised from seeds. Flowers in November to March. Bears well at Vikarabad, Bidar and Hyderabad City, Bhir, Shamsabad but somehow a portion of the fruit rots.

Flowers and fruits, when ripe give out an agreeable and strong smell. Seeds are roasted, cooked and eaten. Yield per tree of 15 years old, 20—25 fruits.

Jamoon.—(*Eugenia Jambolanum*).

Grown wild and cultivated in some gardens throughout the Dominions. A large tree with dark green smooth leaves. Fruits opaque with a blush of red, flavour fine delicate rosewater perfume, cooling, sometimes used to make *Sherbath*. Two varieties of fruits one small round and the other long, 2 to 2½ inches long.

Jumrool.—(*Eugenia Alba* & *Eugenia Acquea*).

A large tree, with large leaves, bears fruit in Hyderabad in March. Fruit small of the size of an apple, waxy appearance, aromatic taste, with very little of edible matter. Two varieties, one perfectly white, and the other lively pale rose colour. Propagated from seed. Trees are noticed in private gardens at Vikarabad and are doing well in red *murum*.

Kamrac.—(*Averrhoa Carambola*).

A few trees growing in gardens at Vikarabad and Hyderabad bear deeply ribbed or winged green fruits of firm rich amber colour, propagated from seeds and layers; sweet and sour varieties.

Kirnie.—(*Mimusops Hexandra*) A large tree, fruits of the size of a large round grape, bright yellow, very sweet, juice milky. Propagated by seed. Found occasionally in gardens in Vikarabad and other places. Very large specimens of trees as big as a Banyan noticed near Doulatabad, Aurangabad etc., used as stock to graft Sapota on. This stock is not said to make Sapota bear so well. Large specimens are noticed near Narayanguda Distillery in Hyderabad City.

Fruits sold in Hyderabad Afzulgunj market from March to April.

Litchi.—(*Nephelium Litchi* and *N. Longanum*.)

A small tree, of dense foliage, flowers in February, and fruits ripen at the end of April or beginning of May.

A specimen tree can be seen at the Public Gardens Hyderabad, growing in a low lying damp place. Litchi does well in Vikarabad.

The fruit is of the size of a large plum with a rough, thin, scale like rind which while the fruit is hanging ripe upon the tree, is of a beautiful red tinge but gradually becomes of a dull brown colour a short time after being gathered. The pulp of the fruit which is delicious has a stone in the centre, turns to sweetness when ripe.

Two types of Litchi were noticed flowering, fruiting and riping (on 12th April 1932.)

Loquat.—(*Eriobotrya Japonica*). A small tree with dark green leaves. Fruits yellow, borne in clusters, flowers sweet smelling, resembling a small pear, slightly acid and turning to sweet when fully ripe. Noticed one tree growing and flowering well at Jalna in February 1931.

Mulberry.—(*Morus* sp). There are 3 or 4 types cultivated in small numbers in the gardens of the Dominions. One a small fruited and the other large and long fruited 1 to 1½ inches. Colour pink turning to black. The former has small leaves and grows to a middle sized tree about 15 feet high and the latter large leaves growing into a shrub of about 10 feet high. Propagated by cuttings. Leaves are used for feeding silk worms. Fruits eaten.

Nectarine.—(*Amygdalus persica* var *laevis*) A few trees are noticed at Vikarabad, also near Hyderabad, not fruiting. Resembles Peach.

Olive.—(*Olea Europea*) A middle sized tree with whitish green small leaves found at Vikarabad does not fruit.

Peach.—(*Amygdalus persica*). A few trees are noticed in a neglected condition at Vikarabad. One variety imported from Bangalore, fruits at Hyderabad and another from Ootacamund fruits at Shamshabad, propagated from seeds, layers and grafts.

Noticed Bangalore Peach fruiting at Raja Dhanrajgirji Bahadur's garden, Hyderabad, also at Mr. B. A. Collins's, Begumpett.

Pear.—(*Pyrus communis*) A small sized tree 10 feet high found in cultivation at Vikarabad but badly neglected and attacked by white ants. Flowering in February 1931. The trees developed a few fruits subsequently. Nawab Sir Nizam Jung said that two varieties got out from Saharanpur, did well at Vikarabad and bore good sized fruits. The trees died of neglect.

Phalsa —(*Grewia asiatica*) A small shrub yielding a sub acid fruit common in all parts of the Dominions. Easily propagated from seeds and cuttings put down in the rainy season.

In the early part of January soil round the plants is opened out, and the stumps cut a little above ground level, put straw there on and set fire. A mixture of ash, tank silt and sheep mould is given to each plant and thus treated and irrigated fruits of the size of a large pea with a stone in the centre are produced from March onwards. The fruit is made into a cooling drink or *Sherbath* and is in great demand during summer months. Sold at 4 seers per rupee wholesale to dealers in Hyderabad Afzulgunj market.

Phalsa is said to be flowering and fruiting throughout the year at Shamshabad though neglected at Mr. Ahmed Ali's garden.

Phalsa Wild.—(*Grewia Sapida*) is found growing in some gardens at Vikarabad. Berries are sometimes used to make *Sherbath*.

Pine Apple —(*Ananasa Sativa*) Found only one or two plants cultivated in pots and grown in Hyderabad City. Pine apple fruits here. I have seen Pine Apples doing well

in ground under mango trees at Malkajgiri. Name of variety not known. Experiments made at Raja Pratapgirji Bahadur's garden at Hyderabad were discouraging.

Pine Apple.—Red—noticed—doing well, throwing out suckers at Sir Amin Jung Bahadur's Jagir (Venkatapur) Aftarnagar, Mahbubnagar District. Soil sandy black, in a valley, a soil ideally suited for citrus culture.

Planting Top Shoots.—Top shoots take 3 years to fruit and side shoots one year, as ascertained recently at Bangalore.

The following account of the cultivation of Pine Apples in Nawab Salar Jung Bahadur's garden at Moula Ali will be of interest. It appears to be the only garden of all places toured by me where systematic cultivation of the Pine Apple has been carried on during the past 50-60 years, when suckers, it appears were originally brought from Masulipatam. They are planted 3 ft. to 4 ft. apart in trenches 8 ft. apart dug 3 feet deep. Suckers planted in September and June (they can be planted any time except in the hot season) are irrigated when there is no rain, twice a week in the cold season and in summer every other day, weeding is carried out whenever necessary, but in any case more frequently during the rains when the whole plot including the trenches are weeded.

The plants begin to develop fruit in about 4 months from the time of planting and mature within another 4 months or within one year, when half developed the side leaves are drawn over to encase the fruit and the leaves are bound with fibre—the object of this being to prevent damage by squirrels rats, birds, etc,

The soil of the garden plot is red varying in depths with *murum* subsoil.

Pine Apples have been cultivated for nearly 60 years, new trenches being prepared annually for successive plantings which are also carried out in the vacated trenches from which the soil is first removed and replaced with fresh soil mixture.

Young side suckers emerging from the base stem are removed and planted—first into a pot nursery in a compost of red soil. Leaf mould and fine silver or river sand. The rooted suckers are repotted three times before they are finally transplanted in the prepared trenches. In its final growth the plant attains a height of 2 $\frac{1}{2}$ to 3 ft.

Fish, common salt, saltpetre, horse dung, *Shendi* and Butch (Sweet flag) are generally used as manure, the last named as a preventative and preservative against white ants. A mixture is prepared of the above and about one pound applied to each plant where water supply is scarce and double the quantity where water is plentiful—every other day in the former case and in the latter case once in every 2 days.

Rose Apple.—(*Eugenia Jambos*) Found growing in Hyderabad, Vikarabad and Koheer. This is an evergreen tree of large size, flowers in February and bears fruit in rainy season and cold season. Fruit is of the size of a small apple, of a fine opaque Apricot colour with a blush of red upon it and with a fine delicate rose water perfume.

Soursop.—(*Anona muricata*). Found growing in Hyderabad, and Vikarabad. A small shrubby tree with dark green shining leaves bearing large green heart-shaped fruits with flexible prickles. The fruits when ripe have a peculiar sweet and acid taste, cotton-like consistency. Fruits were exhibited by Raja Pratapgirji Narsingirji Bahadur, at the Horticultural Show of 1931. Flowers at the end of rainy season. Trees in shade fruit in the Public Gardens at Hyderabad.

Soursop is known as 'Ram Lakshman Sitaphal' in Mahabnagar. It is thriving in red and brown soil (thin layer) and *murum* subsoil.

Sapota.—(Chickoo) (*Achras Sapota*). An evergreen tree of moderate size bearing small fruits of brown colour. There are two varieties one being round and other egg shaped, bears two crop sin a year,

Propagated by seeds and grafting on Sapota, Mahwa and Kirni stocks. Thrives in Mahratwada and Telingana soils. Fruits well at Hyderabad Shamshabad and Vikarabad.

Sapotas give good results under charcoal as manure at Shamshabad.

Grafts got out from Nuzvid are fruiting well at Marredpalli—with silt, leaf mould, and fish manures, Chickoos grafted on Kirnie stock do not bear well.

Sapota grafts on Kirnie stock planted in the Dominions flower and fruit poorly. Produce of Sapota from one tree is said to fetch Rs. 50/-per year (At Sir Khurshid Jha's Palace, Hyderabad City).

Wood Apple.—(*Feronia elephantum.*)

A Common jungle tree, sometimes cultivated in gardens throughout the Dominions. Fruit round, of the size of a cricket ball with a hard shell like cocconut. The interior is full of a brown soft, mealy kind of substance rather acrid having strong smell of rancid butter. Propagated by seed. Fruits ripen in cold season.

Walnut.—(Desi Akrot.) Noticed in gardens at Vikarabad and Hyderabad- The tree grown under this name is not the genuine Walnut. It appears to be the *Aleurites Moluccana* (Belgaum Walnut.) Tree of moderate size with large round lobed leaves, producing nut resembling the flavour of Walnut but of a dense pithy consistency. Flowers in March, ripens its crop in August. Propagated by seeds.

Baobab.—Monkey Bread (*Bilaetee Imli.*) (*Adansonia Digitata.*)

Noticed at Hyderabad and Addigmet. A large tree but the trunk even in small trees has an inflated gouty appearance. The fruit is a woody capsule, pointed at the ends, with a thick woody skin and a pulp in which hard seeds are embedded. The pulp contains starch, sugar and other matters and rapidly ferments and acidifies.

Gooseberry.—Cape (*Physalis Peruviana.*)

Tiparee, raised from seed. Sown in May and transplanted in July, will ripen fruit in January. The fruit is concealed in a dry leafy appendage, is of a bright amber colour of the form of a cherry, good for preserves.

Raspberry, Mysore.—(*Rubus Albescens.*)

A thorny white shrub, yielding blue fruits really a cross between Raspberry and Blackberry imported from Bangalore and grown at Arastubagh near Falaknuma, Vikarabad, Aurangabad, Shamshabad etc. Can be used as a hedge plant.

Strawberry.—(*Fragaria Vesca*.) Imported from Bangalore and grown successfully at Vakilpalya near Safdarnagar station N. S. Rly. Suckers of 'Royal Sovereign' variety recently imported from Darjeeling Government Farm fruited at Himayatsagar Government Farm.

Wampee.—*Ampis*—(*Cookia punctata*.)

A small tree about 15' high-bears white flowers in clusters, and fruits twice a year—Fruits borne in clusters, of the size of small marble with rough orange like rind. The juicy pulp is sweet and smells turpentine.

Noticed at Raja Pratabgirji Bahadur's garden at Vikarabad and Sait Ranchordass's at Aurangabad.

Garcinia Sp.—

An evergreen tree, 20 feet high, bears fruits in Hyderabad City, colour brown — very little edible matter, taste sweet — wrongly called locally "Mangosteen."

WILD FRUITS (EDIBLE)
in the Hyderabad State

Local name	Botanical Name	Remarks.
Tad, Tati ...	<i>Bcrassus flabelliformis</i> ...	
Shendola, Shendi ...	<i>Phoenix sylvestris</i> ...	
Sitaphal, Sharifa ...	} <i>Anona squamosa</i> ...	
Custard apple ...		
Wood Apple, Kaweit	} <i>Feronia Elephantum</i> ...	
Elkapandu ...		
Karunda ...	<i>Carissa Carandas</i> ...	
Kirnie ...	<i>Mimusops hexandra</i> ...	
Bhilawan, Jidi ...	<i>Samecarpus anacardium</i> ...	Also cultivated
Tindu, Tuniki ...	<i>Diospyros melanoxylon</i> ...	
Charoli, Chironji ...	} <i>Buchanania latifolia</i> ...	
Morli, Mosi ...		
Bhere, Gangareni ...	} <i>Zizephus Jujuba</i> ...	Also cultivated.
Regu ...		
Jamun ...	<i>Eugenia jambolana</i> ...	do
Phalsa ...	<i>Grewia asiatica</i> ...	do
Guller ...	<i>Ficus glomerata</i> ...	do
Bael ...	<i>Aegle marmelos</i> ...	do
Bada ...	<i>Grewia tiliæfolia</i> ...	
Chitmiti ...	<i>Gardenia gummifera</i> ...	
Pargi ...	.....
Chintapandu ...	<i>Tamarindus indica</i> ...	Also cultivated.
Awla (Hill Goose- berry ...	<i>Phyllanthus emblica</i> ...	do
Bhokri ...	<i>Cordia myxa</i> ...	
Gondni ...	<i>Cordia Rohtii</i> ...	
	<i>Cordia sebestina</i> ...	
Konda mamidi, Ambada, Hogplum	<i>Spondias mangifera</i> ...	Also cultivated
Mamidi, Mango ...	<i>Mangifera indica</i> ...	do

CUSTARD APPLE (Sitaphal).

This fruit is grown wild throughout the Dominions very largely in State forests. In the gardens surveyed, they are found to grow at random and in many cases serve as hedges. But in the Dominions 56,000 acres are estimated to be available. Fruits mature in the cold season and are sold in weekly markets Annas 4 per 100 but in Poona and Bombay they fetch as high as Re. 1/- to Rs. 3/- per dozen. Waggon loads are sent out from Tandur and other places for sale in Bombay. Fruits raised naturally in Hyderabad taste better than those cultivated round about Poona. This fruit has great possibilities in the way of marketing and preserving.

SAMPLE OF SOILS FROM FRUIT GARDENS & LANDS SUITABLE FOR FRUIT CULTURE SENT FOR ANALYSIS.

During the tour in the Districts opportunity was taken to collect typical soils from fruit gardens in the Mahratwada and Telingana and sent to Government Industrial Laboratory at Hyderabad for analysis. 28 samples in all were analysed as noticed below:—

District	Tehsil	Village or Town	Land of	Remarks
1	Aurangabad	Vaijapur	Mr. Rupchand	Soil medium black, <i>murum</i> 2 to 3 ft. below. Good <i>mosambi</i> and <i>santra</i> oranges are grown.
2	Aurangabad	Vaijapur	Mr. Daluseth	Soil same as above, good <i>mosambi</i> oranges are grown.
3	Aurangabad	Maliwada	Jamedar Ali Khan	Soil medium brown, mixed with lime. Good soil for grapes.
4	Aurangabad	Deulatabad	Mr. Mhetarji	Pandari soil, best for grapes, figs and other fruits.
5	Aurangabad	Jalna	Mr. Gamaji	Very fine oranges are raised on this land.
6	Bidar	Bidar	Mr. Abdul Haq Sawdagar	Very fine fruits can be raised.
7	Atrafbalda	Vikarabad	Raja Pratapgirji Narsingirji Bahadur	Typical soil for growing apples, which have succeeded.
8	Atrafbulda	Alampalli	Bank of the Musi (Eastern)	Typical soil for fruit growing including vines.
9	Atrafbulda	Alampalli	Bank of the Musi (Western)	" " "

THE SOILS CONSISTED OF THE FOLLOWING FRACTIONS.

Particulars	Soil No. 1.	Soil No. 2.	Soil No. 3.	Soil No. 4.	Soil No. 5.	Soil No. 6.	Soil No. 7.	Soil No. 8.	Soil No. 9.	Remarks.
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	
Gravel	8.99	36.78	19.40	17.50	5.40	47.55	13.64	10.26	38.71	The gravel fraction obtained from Laboratory No. 96 or Serial No. 7 contained a large amount of Lime Stone.
Fine Gravel	7.25	16.08	14.03	12.70	16.54	27.99	15.69	19.25	27.54	
Fine Soil	83.76	47.14	66.57	69.80	78.06	24.46	70.67	70.50	66.25	
Total Per cent...	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	

THE FINE SOIL FRACTIONS ON ANALYSIS GAVE THE FOLLOWING RESULTS

Moisture	5.30	7.25	3.08	2.81	2.31	4.90	4.07	3.97	1.90	
Loss on ignition excluding moisture	7.81	9.66	7.52	6.08	11.62	10.32	11.74	9.13	12.00	
Insoluble SiO ₂	58.27	54.29	61.81	68.56	43.00	51.05	50.98	58.89	44.67	
FeO & Al ₂ O ₃	16.55	16.80	16.01	14.64	40.64	28.83	29.68	17.66	38.06	
Soluble SiO ₂	0.45	0.55	0.60	0.20	0.81	0.44	0.78	0.66	0.43	
PO ₂	0.24	0.17	0.21	1.01	0.08	0.08	0.01	0.29	0.23	
CaO	7.76	9.25	7.34	4.75	0.49	3.23	1.49	6.79	0.73	
MgO	1.89	0.85	2.40	0.65	0.11	0.78	0.49	1.29	0.75	
K ₂ O	1.09	0.60	0.54	0.76	0.62	0.85	0.61	0.87	0.84	
Undetermined salts	0.64	0.58	0.49	0.54	0.32	0.12	0.12	0.13	0.45	
Total Per cent...	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Nitrogen	.07	.05	.09	.16	.05	.03	.07	.12	.10	

No.	District	Tehsil	Village or Town	Land of	Remarks
10	Nalgonda		Gollaguda	Mr. M. Shamshuddin, Second Talukdar, Jedcherla	Typical <i>chalka</i> soil where mangoes and citrus trees are raised successfully.
11	"		Local Fund Garden, Nalgonda	Local Fund	Good <i>santra</i> orange and other fruits are raised.
12	"		Vedarevarigudium Kaisarabad	Mr. V. Ramchandra Reddy to the north of Musi river	Good paddy is being raised. Suitable for cocoanut, arecanut and orange cultivation.
13	"		A. B. Mission Garden Suriyapet	A. B. Mission (Rev. J. Hubert)	All sorts of fruits are being raised. Soil bad, results not satisfactory.
14	Warangal		Hanamkonda	Local Fund Garden (Mahbub Bagh)	Black soil and brown <i>murum</i> suited for nursery work when drained.
15	"		"	"	Red soil and soft <i>murum</i> fit for citrus and other fruit trees and vegetables.
16	"		Warangal	Site for Agricultural Farm	Good for fruit growing.

THE FINE SOIL FRACTIONS ON ANALYSIS GAVE THE FOLLOWING RESULTS

Particulars	Soil No. 10	Soil No 11	Soil No. 12	Soil No. 13	Soil No. 14	Soil No. 15	Soil No. 16
Moisture ...	3.04	3.90	4.24	2.36	3.34	2.61	0.46
Loss on Ignition ex- cluding Moisture ...	3.45	4.98	4.31	7.02	5.15	3.97	1.25
Insoluble Si O ₂ ...	81.53	77.00	75.89	30.94	72.85	80.41	92.91
Soluble Si O ₂ ...	0.17	0.13	0.13	0.10	0.09	0.14	0.10
Fe O & Al O ₂ ...	9.61	9.94	11.42	8.418	12.25	9.51	4.16
P O ₂ ...	0.06	0.10	0.12	0.002	0.39	0.20	0.12
Ca O ...	0.74	2.46	1.13	...	4.16	1.20	0.19
CaC O ₃ ...	...	...	...	49.19	...	...	...
Mg O ...	0.38	0.46	0.52	0.82	0.62	0.42	0.17
K O ₂ ...	0.59	0.58	0.60	0.57	0.72	0.49	0.29
Undetermined Salts ...	0.43	0.45	0.64	0.58	0.43	0.55	0.47
Total ...	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Nitrogen per cent ...	.08	.1	.08	0.03	.07	.04	.05

No.	District	Tehsil	Village or town	Land of	Remarks
17	Mahbubnagar	Kalvakurti	Padakal	Nawab Syed Sufdar Hussain	Good paddy and vegetables are being raised at present.
18	Warangal	Khamammett	Wyra	Mr. Ramanujam	"
19	"	Wyra Project	Gandagulpad	Moodaliar	"
20	"	"	Somaram (old Venkatapuram)	Mr. A. L. Srinivasa Moodliar	Nil
21	"	"	Lashmipuram	Mr. Ramanujam	Nil
22	"	"	(Thatigadda) Gandagulpad	Moodliar	By the side of right Flank channel.
23	"	"	Palair Project	Mallapuram	Beside right Flank Channel.
24	"	"	"	Eramma	
25	"	"	"	...	
26	Nizamabad	Bhodan	Desaipet	Mr. Manzur	1½ miles from Dam, beside right Flank Channel.
27	"	"	Rudrur Farm	Mr. Lakshman Rao retired Police Inspector, Desaipet	Beside right Flank Channel, 11 miles from Dam.
28	"	"	"	Agricultural Department	Fruit trees are being grown under <i>nala</i> irrigation.
				"	Red <i>chalka</i> from plot sloping from hill side.
				"	Deep black soil.

RESULTS OF MECHANICAL ANALYSIS.

Particulars	Soil No. 17	Soil No. 18	Soil No. 19	Soil No. 20	Soil No. 21	Soil No. 22	Soil No. 23	Soil No. 24	Soil No. 25	Soil No. 26	Soil No. 27	Soil No. 28
	Per cent	Per cent	Per cent	Practically all stone very little soil	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Gravel & Fine Gravel	30	20	30	10	85	80	60	60	60	70	70	50
Loss on Ignition	7.69	9.14	8.73	6.9	1.18	6.16	6.64	6.16	6.16	5.61	5.23	6.59
PO ₂ 5	0.08	0.12	0.07	0.08	0.02	0.02	0.02	0.02	0.07	0.08	0.04	0.03
KO ₂	0.47	0.38	0.44	0.58	0.28	0.65	0.73	0.64	0.64	0.42	0.39	0.43
Nitrogen	0.5	0.03	0.09	0.04	0.03	0.06	0.05	0.05	0.05	0.04	0.05	0.03

N. B. The Samples are mostly full of stone and grit.

NOTE:—Samples No. 1 to 16 are analysed in detail as given above. As to Nos. 17 to 28 beyond the limited details given the Industrial Laboratory could not work out a complete chemical analysis, more so, since samples of Soils were being sent to the Laboratory at intermediate periods and it is assumed that what could be furnished by them in time giving the important proportions of soil contents as Nitrogen etc., for inclusion in this report, would suffice.

WATER SUPPLY.

Sources.

1. Wells.
2. Tanks— Water taken by channels for irrigation.
3. Rivers.
4. Large reservoirs, built by damming rivers & taking water by *nalas*.

From No. 1 and 3, water is mostly lifted by *mhote* with bullock power, pumping of water is done to a small extent by using power from oil engines, steam engines and electricity.

Land lords are keen on installing oil-engines for pumping and other agricultural purposes.

The general decrease of late years in the average rainfall has affected water supply.

I note below water levels in wells at the time of my visit.

- | | |
|--|------------------------|
| 1. Aurangabad—20', 25', 30', 45' | January-February 1931. |
| 2. Parbhani—20', 25', 30' 35' 40' | do |
| 3. Nanded—35', 40', 50' | do |
| 4. Atraf-i-balda—(Vikarabad) 40', 45', 60' 70' | do |
| 5. Bidar (Koheer)—40' 45' 50' | do |
| 6', 8', 15', 20', 60.' | August, 1931. |
| 6. Bhir—15' | March 1932. |
| 7. Gulbarga—25', 30' | August 1932. |
| 8. Raichur—40', 50' | September 1932. |
| 9. Mahbubnagar—12', 25', 30', | January 1932. |
| 10. Medak—35', 40' | do |
| 11. Nizamabad—10', 12', 15', 20', 25', | do |
| 12. Nalgonda—26', 27, 30', 39', 42' | July 1931. |
| 13. Warangal—18', 19', 20', 25', 31' | August 1931. |

STATEMENT OF IRRIGATION PROJECTS.

(Completed and under Proposal)

Serial No.	Name of Project.	Kharif.		Irrigation Rabi.		Fruit garden.		Single Abi.		Double Crop.		Sugar Cane.		Bagat.		Remarks.
		Area.	Assessment	Area.	Assessment.	Area.	Assessment.	Area.	Assessment.	Area.	Assessment.	Area.	Assessment.	Area.	Assessment.	
1	Wyrā, Warangal.	...	Rs.	...	Rs.	...	Rs.	Completed	Rs.	1,000	28	1,600	40	...	...	...
2	Palair	...	...	...	...	...	...	14,000	14	1,500	26	...	...	...	...	...
3	Royanpally	...	...	...	...	...	...	19,000	13	413	26	...	...	...	...	...
4	Pocharam.	...	...	...	...	...	...	1,470	18	...	...	...	...	...	...	...
5	Nizambad	...	...	...	...	...	...	13,069 acres	...	...	...	...	...	...	...	...
6	Nizamsagar	...	...	...	...	...	...	2,20,000	16	30,000	32	20,000	64	5,000	9	...
6	Singbupalyam	...	...	...	...	...	...	1,670	12	830	22	...	...	...	...	...
								Total irrigable area is								
								Under proposal								
7	Tungabhadra	...	...	...	...	...	...	1,00,000	12	50,000	18-8	36,000	40	60,000	14	...
8	Baichur	...	...	...	...	...	...	5,00,000	13	1,75,000	19-8	...	...	...	...	...
8	Kristna	1,55,000	3-8	...	...	...	...	75,000	12	...	...	40,000	45	1,50,000	15	...
9	Jaldroog	20,400	3-8	3,400	30	...	...	9,000	10	...	...	14,900	45	19,000	15	...
10	Furna, Parbhani.	...	...	...	...	...	...	4,000	12	1,000	18	...	...	...	...	...
11	Pendipakala	...	...	...	...	...	...	16,000	14	...	...	8,000	56	...	...	...
12	Manair	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

NOTE.—Information kindly furnished by the Special Superintending Engineer, Capital Works Circle, Hyderabad. Of the Projects No. 1, 2, 5 and 7, parts of the land available was inspected by Horticultural Survey Officer and it has been found that with careful selection suitable land for fruit cultivation can be had for starting plantations on a commercial scale.

FRUIT MARKETING.

(1) General - in the State.

Fruit is generally sold to a *Bagwan* at a certain amount per crop, per annum or for a number of years and he arranges for watching them, packing them selling them locally, in weekly markets or when there is not sufficient demand to send them out by rail to Hyderabad, Bombay, Surat etc. Some rich landlords who own gardens as at Vaijapur, sell fruit direct at Bombay and other places through Commission Agents.

Fruit is transported on bullocks, camels or in country carts. Baskets made of bamboo or twigs are made use of to pack them and despatch by rail to distant places. Sometimes sour limes and mosambi oranges are packed in gunny bags. At Jalna I saw a *Bagwan* using empty kerosine deal-wood boxes with lock arrangement to pack and despatch oranges by rail. On the whole packing arrangements are crude and leave much to be desired. No grading is practised. The indifferent packing without sealing gives room to pilfering *en-route*.

The following fruits can be exported to Bombay market and sold at times to better advantage of growers of Hyderabad.

1. Custard Apple.
2. Mango.
3. Orange, Santra.
4. Orange, Mosambi.
5. Sweet Lime.

These as well as plantain, guava, sour limes, bhare grapes, figs etc., are required for consumption in the Hyderabad and Secunderabad cities which in the present conditions are quite inadequate to meet local demands.

Considering the vast scope that exists for successfully raising oranges in the Mahratwada tracts of H. E. H. the Nizam's Dominions, it would not be perhaps out of place in dealing with this part of the report to give below an account of the efforts that are being made in the Punjab for marketing of oranges which appeared in the "Weekly illustrated Times of India" of 29th March 1931.

A "PEEP" INTO THE FUTURE.

With the arrival of the first consignment of Indian oranges to Great Britain, a new link in the trade relationship between the two countries has now been forged. The consignment consisted of a few cases of Punjab oranges grown by Captain Mitchell of the Indian Mildura Fruit Farm, Montgomery district. Undoubtedly this venture has created a great stir in the Fruit markets of Great Britain and the Press and the British Broad-casting Corporation gave wide publicity. Her Majesty the Queen took a very lively interest in the exhibit of a sample of these oranges at the British Industries Fair and graciously accepted one case of these as a gift. The credit of this undertaking goes to Mr. K. C. Naik, of the Punjab Agricultural Department, who is at present a post graduate student in Pomology at the National Horticultural Research Station in Bristol. As several papers have pointed out, Mr. Naik certainly deserves high praise for pointing out the way for a new opening in the fruit trade of India, and it is very encouraging to hear that Trade Commissioner for India has now undertaken to push ahead the work started with so much foresight by Mr. Naik. The notable work of Mr. Naik seems to indicate the possibility of India joining the ranks of the Empire orange producers who at present contribute only 24 percent of the British Market requirements.

**STUDY OF IMPORTS AND EXPORTS OF FRUIT
AT RAILWAY STATIONS.**

Hyderabad B. G.

Goods.

Name of fruit	Imported from.
1. Apple	Rawalpindi
2. Grapes	Rawalpindi, Bombay, Quetta
3. Melon, Water	Cuddapah, Yerraguntla
4. Mango	Rajahmundry, Thadepalligudiam, Kadium Tuni, Nuzvid, Ellore, Kovvur, Kodu- ra, Kudur, Kutur, Anantharajpet, Tirupati West, Shettigunta, Nagari, Chandragiri, Pudi.
5. Orange.	Nagpur, Kamptee, Dhamangaon, Arvi, Phulgaon.
6. Pear.	Mettupalyam.
7. Pine Apple.	Waltair.
8. Plantain.	Sankaridrug, Dwarapudi, Guntakal, Rajahmundry, Erode, Manganur, Kadium.
9. Walnut.	Amritsar, Rawalpindi.

RAILWAY PARCEL (Foreign)

1. Apple.	Rawalpindi, Ludhiana.
2. Fig.	Alandi.
3. Lime.	Poona, Akkalkot,
4. Mango.	Tinnevelly.
5. Orange.	Thadepalligudiam, Rajwadi.
6. Pomegranate.	Poona.
7. Plantain.	Bassein—Gulbarga.

Parcels, Local.

Name of Fruit.	Imported from,
1. Custard Apple.	Nekonda, Tandur, Dharur, Rukmapur.
2. Grape.	Gulbarga, Peddapalli.
3. Mango.	Vikarabad, Bidar, Kondapally, Warangal, Shankerpalli, Dornakal, Jalna, Koheer.
4. Melon.	Kurnool.
5. Orange.	Jalna, Rotagaon, Nanded.
6. Pomegranate.	Nawandgi.
7. Plantain.	Gulbarga.
8. Sour Lime.	Nawandgi, Seram, Tandur, Warangal.

ROTAGAON.

Local.

Name of Fruits.	Exported to.
1. Grape.	Nizamabad.
2. Lime.	Nizamabad.
3. Mango.	Hyderabad M. G.
4. Orange, Santra.	Hyderabad M. G.
5. Orange, Mosambi.	Jalna, Aurangabad.
6. Pomagranate.	Sailu.

Foreign.

1. Lime, Sweet.	Surat.
2. Lime, Sour.	Madras.
3. Orange, Santra.	Bombay.
4. Orange, Mosambi.	Bombay.
5. Melon (Water)	Baroda.
6. Papaya.	Ahmedabad.
7. Pomegranate.	Jalgaon.

PARSODA.

Parcels Local.

Name of Fruit.	Exported to.
1. Fig.	Aurangabad, Jalna.
2. Lime, Sour.	Aurangabad, Hyderabad.
3. Lime, Sweet.	Hyderabad.
4. Orange, Santra.	Jalna, Hyderabad,
5. Orange, Mosambi.	Hyderabad,

Foreign.

1. Guava.	Bombay.
2. Lime, Sweet.	Bombay.
3. Lime.	Bombay, Surat, Ahmedabad.
4. Orange, Mosambi.	Bombay, Ahmednagar, Nasik, Igatpuri.
5. Santra.	Bombay, Ahmednagar, Nasik, Igatpuri.

LASUR.

Local.

1. Mango.	Rotagaon, Secunderabad.
2. Orange Mosambi.	} Hyderabad City, Aurangabad.
3. Orange Santra.	

Foreign.

1. Lime.	Bombay, Surat.
2. Orange, Santra.	Bombay, Surat, Ahmednagar.
3. Orange, Mosambi.	Bombay, Surat.

DAULATABAD.

Local.

1. Bhere.	Lasur, Hyderabad City.
2. Custard Apple.	Hyderabad City, Secunderabad.
3. Fig.	Warangal.
4. Guava.	Jalna, Warangal.
5. Orange, Mosambi.	Jalna.
6. Orange, Santra.	Aurangabad.
7. Papaya.	Jalna.

Foreign.

Name of fruit.	Exported to.
1. Bhere.	Bombay.
2. Bullock's Heart.	Poona.
3. Guava.	Poona.
4. Lemon.	Bombay, Poona.
5. Lime.	Bombay.
6. Orange, Mosambi.	Bombay, Surat.
7. Orange, Santra.	Bombay, Surat.
8. Papaya.	Bombay.

AURANGABAD.*Local.*

1. Bhere.	Doulatabad, Rotagaon, Partur, Lasur, Satona, Nagarsol, Parsoda, Kodi, Dharmabad, Karmad.
2. Grape.	Hyderabad City, Sailu.
3. Mango.	Hyderabad City, Sarwadi, Parbhani, Sailu, Satona, Kodi.
4. Orange, Santra	Hyderabad City, Secunderabad, Karmad.
5. Orange, Mosambi.	Hyderabad City, Secunderabad, Karmad.

Foreign.

1. Bhere.	Nasik, Yeotmal, Akola.
2. Lime.	Bombay, Akola.
3. Mango.	Delhi, Poona, Burhanpur, Yeola, Dhooraji.
4. Orange, Santra.	Bombay, Delhi.
5. Orange, Mosambi.	Bombay, Poona, Surat.

JALNA.*Local.*

1. Lime.	Hyderabad City.
2. Mango.	Failu, Satona, Partur, Ranjani, Sarwadi, Aurangabad, Badnapur.
3. Orange.	Hyderabad City.
4. Plantain.	Aurangabad, Secunderabad.

Name of fruit	Exported to.
<i>Foreign.</i>	
1. Bhere.	Poona, Bombay.
2. Lime,	Sholapur, Bombay, Ahmadabad, Ahmednagar.
3. Mango (May-August)	Bombay, Raipur.
4. Orange.	Bombay, Ahmedabad, Bellary, Guntakal.
5. Lime Sweet.	Hingoli, Raichur.
PARBHANI.	
<i>Local.</i>	
1. Grape.	Hyderabad, Parli, Hingoli, Basmath- nagar, Nandgaon.
2. Lime.	Charmaha.
3. Mango.	Nanded, Purna, Hingoli, Basmath- nagar, Parli, Charmaha, Mudkhed.
4. Orange, Santra.	Hyderabad, Secunderabad.
5. Orange, Mosambi.	Nanded, Parli.
6. Plantain.	Hyderabad City, Gangakhed, Sailu.
<i>Foreign.</i>	
1. Orange, Santra.	Bombay, Jodhpur.
2. Orange, Mosambi.	Bombay, Indore C. I., Latur, Lasgaon, Jodhpur.
NIZAMABAD.	
<i>Local.</i>	
1. Mango.	Hyderabad, Nanded, Umri, Dharma- bad, Bolarum, Purna, Mudkhed.
2. Orange.	Hyderabad, Secunderabad, Nanded.
GULBARGA.	
<i>Local.</i>	
1. Red Plantain.	Hyderabad City.
2. Sour Limes.	Hyderabad City.
BIDAR	
1, Mango.	Hyderabad City.
VIKARABAD.	
<i>Local.</i>	
1. Mango.	Hyderabad City.
<i>Foreign.</i>	
1. Mango.	Bombay.

HYDERABAD B. G. CITY CUSTOMS RECORD

(For Six months in 1339 F.)

Name of Fruit:	Coming by road from.
1. Guava.	... Chinchod, Vikarabad.
2. Lemon.	... Adilabad (by Motor),
3. Mango.	... Masaipet, Lingampalli, Kaknoor, Narsampalli, Bahadurguda, Kondiguda, Mananpalli, Reddyguda, Faruknagar, Mughalgaon, Tuninapur, Koheer, Ekhele, Kaknur, Janampalle, Uppal, Nagalapalle, Gangapur, Narsapur, Mominabad, Gagunpahad and Ambajipet.
4. Orange, Desi (Narangi).	... Balanagar, Nalgonda, Shamshabad, Kismatpur, Patancheru, Medchal and Pingli.
5. Phalsa.	... Mohunkunti, Kondapally, Nacharam, Raipalle, Satalguda and Bhongir,
6. Plantain	... Narsingi, Indur (Nizamabad) and Tuljapur

STUDY OF WEEKLY MARKETS

*Aurangabad Cantonment**(1st January 1931.)*

Fruit sold were good:—Mostly used for local consumption.

- | | |
|------------------|--------------------------------------|
| 1. Bhere, Round. | 5. Papaya. |
| 2. Guava. | 6. Plantain, Green, Bassi and Botha. |
| 3. Lemon. | 7. Orange, Mosambi. |
| 4. Sour Lime. | |

LASUR, (*4th January 1931.*)

Fruits sold :—Mostly used for local consumption.

1. Bhere, small round.
2. Guava, quality good.
3. Papaya.
4. Plantain, Basai and Botha (quality good).

VAIJAPUR, (*5th January 1931.*)

Fruits sold :— Quality all good.

1. Guava. $\frac{1}{2}$ anna B. G. per seer.
2. Papaya.
3. Plantain, Basai and Botha. 6 per anna B. G.
4. Sour Lime.

JALNA, (*20th January 1931.*)

Fruits sold :—Quality fair.

- | | | |
|---|---|-------------------|
| <ol style="list-style-type: none"> 1. Bhere. 2. Guava. 3. Papaya. 4. Plantain. 5. Sour Lime. | } | Locally consumed. |
|---|---|-------------------|

There were only a few good Santra Oranges exposed for sale at 2 annas each, these are largely exported.

PARBHANI (*29th January 1931.*)

Fruits sold :—Consumed locally.

1. Bhere, long, fair.
2. Guava, poor, 12 seers per rupee.
3. Papaya, poor.
4. Plantain, Rai and Botha 3 to 4 annas per dozen.
Good.
5. Pomegranate, white and red, very poor.
6. Sour Lime, poor.

VIKARABAD (*7th February 1931.*)

Fruits sold :—

1. Sour Lime. Good.
2. Plantain, Basrai, long green, grown at Chittigidda.
3. „ Botha, good, 8 pies each.
4. „ Sone, fair 4 „
5. Sapota (brought by Pardhi fruit seller from Hyderabad, also plantains (imported from Sankaridrug) and oranges, (poor also imported.)

KOHEER (*12th February 1931.*)

Fruits sold :—

1. Bhere, common round.
 2. Guava, fairly good.
 3. Papaya, fair.
 4. Plantain, Basai, good.
 5. Pomegranate, very poor.
-

FRUIT MARKETING AT POONA.

Reay Market is the largest in Poona. Here wholesale as well as retail business is done in fruit, vegetables etc. Fruit is brought by growers and wholesale contractors from the neighbourhood of Poona early in the morning, 5 o'clock. Auctioning of fruit is done by commission agents who charge annas 2 per rupee on the sale proceeds. Fruits from outside stations in the Poona District are received by Commission Agents by carts and rail and exposed for auction. Against these are debited all clearance and carting charges besides the usual commission on sales. There are about 100 Commission Agents with no financial status and great is the loss incurred by the grower when fruit is sold at any price due to glut or a combination of these men.

Fruit from growers is not graded.

The market dealer on getting his lot at the auction exposes the best ones in his stall, selling inferior stuff to hawkers. Retail rates vary considerably they are 50% to 300% higher than wholesale prices.

There is no cooperative or official control over the fruit market, the growers are completely at the mercy of the middlemen. They and contractors who send fruit for sale do not at times realise even the cost of packing carriage and commission charged. Fruits are packed in bamboo baskets except in some cases of sour limes and mosambi oranges gunny bags are used whilst for grapes, dealwood crates are used. Empties are returned by rail at concession rates of $\frac{1}{4}$ th parcel rates.

The leading wholesale auctioners and merchants at Poona are:—

1.	Mr. Kishen Sitaram Kachi.	Reay Market
2.	Mr. Laxman Narayan Borate.	do
3.	Mr. Husain Bhai Mukdam.	do
4.	Mr. Babu Sait Baliram Kachi.	do
5.	Mr. Kamal Bhai Chanbhai.	do
6.	Mr. Jagannath Babaji Sonawane.	do

The following fruits were for sale (wholesale) :—

1. Custard Apple.	from Poona.
2. Orange, Santra.	from Saswad,
3. Orange, Mosambi.	” ”
4. Pomegranate.	from Diva.
5. Plantain.	from Poona.
6. Papaya.	” ”
7. Guavas.	” ”
8. Limes.	” ”
9. Grapes.	from Nasik.

FRUIT MARKETING AT BOMBAY.

(*Extract from Times of India dated 27th October 1930.*)

“ In many cases the contractor has purchased the fruit while on the tree and to him falls the task of guarding it and harvesting it. Finally it is picked and the men to whom the fruit now belongs are entirely their own masters so far as the class of fruit sent to the city is concerned. If fruit is obviously rotten it is discarded. If it looks allright on top away it goes. No real care is observed in packing and there is no regular method of grading. Standardisation is unknown. The fruit is packed in the familiar baskets of split bamboo or similar material, which vary in size and shape according to the fruit they are destined to contain. Packing, such as saw dust, rice husk and moss is sometimes used. The baskets are cheap but unsuitable because the fruit is easily damaged in them. So little do the packers know about packing and grading that the child-like dodge of putting a few layers of the fruit on top of the basket is still persisted in with the result that buyers now disregard the top half of the basket and judge it by the lower half which, on account of the pliability of the material with which the basket is made and the rough and careless handling the fruit is given at every stage *en-route* is often knocked about in addition to being of a poor grade.

Each basket is carelessly covered by a lid of the same material and a flimsy label is attached. The basket is not sealed and the label often becomes lost. Seldom is a basket sufficiently marked to prevent its loss. Much loss, therefore, occurs *enroute* and it goes without saying, a good deal of pilfering is unavoidable and, on account of the method of packing, it is the best fruit that goes.

DAMAGE IN TRANSPORT.

The fruit comes into Bombay by rail, steamer or road transport. In the first two cases, it is subjected to much additional handling before reaching the stand of the wholesale dealer to whom it is consigned. To save transport in the city the fruit of all consignors is dumped into one conveyance as rapidly as possible and with very little consideration for the delicate nature of the product that is being handled, and further damage is done.

The wholesale dealers or agents in the market find large quantities of fruit coming in on them from all quarters and from many different people. They get busy and have it graded to suit to a certain extent, the wholesale market and the fruit is lumped and the different grades sorted out, in most cases entirely irrespective of the original consignments to which they belonged. The top grades are for the high class trade, and they are found on the tables of the wealthy people in Bombay. Second grades go finally to the middle classes and so on down the scale. The grading of the fruit completed, the agent is ready to deal with the retailer or the dealer and jobber. He is completely master of the situation in fact he controls the entire trade and incidentally, as will be shown when actual facts and figures are produced, makes a most excellent living out of it. He is, indeed, in many cases a fruit *Pooh-Bagh* in that he may be contractor, commission agent, jobber and retailer with obvious results. Once the fruit is ready the retail merchants gather round. In ordinary circumstances an auction would be expected, not so in Bombay according to those who have studied the market methods from the beginning to the end over a period of five years.

METHOD OF SELLING.

In fact the method of selling and buying is probably unique. A basket of fruit is offered for sale and the nearest buyer approaches the dealer. Both place their hands under the cover of a cloth which hides their hands from the rest of the ring. The buyer then indicates how much he is prepared to pay the seller by pressing or bending the agent's fingers or by making certain moves in the palm of his hand, each touch being known as an offer of so many annas or rupees as the case may be. Thus the man standing next to them does not know how much is offered. He, in turn, places his hands under the cloth and makes his offer, but he has no idea whether he is underbidding or overbidding his rival and he does not know that if he bids more he will get the fruit. For here is the extraordinary fact about this "Auction" of fruit by a so-called commission agent no matter what price the fruit fetches, the agent's commission remains the same a fixed sum of 4 annas per basket. He has no interest, therefore, in whether the price is a good one or not and if his own dummy or a personal friend bids much less than a retailer who is bidding a fair price, he is not bound, as in open auction, to give it to the highest bidder. So the contractor and the grower suffer. Again there is nothing whatever to prevent him buying up the fruit himself at what he may consider market price, charging his four annas per basket commission and then re-selling at a profit or sending it along to his own private stall for retail at the highest figure he can get and those who know the retail market know that the tricks resorted to in order to secure enhanced prices are legion. So this commission agent has at least three separate possible sources of income with very little chance of loss as bad or damaged fruit is removed at the outset and debited to the grower or contractor or whoever the consignor may have been. In addition there are many charges to be levied, one of which at any rate, may or may not be a source of income, according to the character of the agent. A definite charge on each package is made for charity. Books are not usually kept showing when and where and if this money is paid over as charity in addition to the merchant's own personal charitable contributions. There is no supervision in this respect at all.

There are 193 registered brokers and wholesale dealers in Fruit at the Bombay Arthur Crawford Market. There is no registered Association of Fruit Merchants at Bombay but there is an informal body of the leading fruit merchants which functions as an Association. No co-operative fruit marketing society has been formed in Bombay. The Municipal Corporation owns Cold Storage arrangements. The following private firms dealing in fruits and other perishables own Cold Storage arrangements in Bombay :—

1. B. K. Irani, Sitaram Building, Hornby Road, Bombay.
2. The City Ice Supplying Co., Byculla, Bombay.
3. The Army and Navy Co-operative Society, Elphinstone Road, Bombay.
4. Dhanjiboy Pestonji, Arthur Crawford Market, Bombay.
5. Shripatrao Ganpatrao, Arthur Crawford Market, Bombay.

The attached statements give the names of fruits, sources of supply, season, wholesale and retail prices in Bombay.

BOMBAY FRUIT

(WHOLE)

S. No.	Name of Fruits	Places from which the fruits are imported.
1	Mangoes	Ellors, Chittur, Nilam, Salem, Trichinopally, Madras Presidency, Ratnagiri District, Vengurla, Malvan, Surat District, Balsad, Virar, Dhenoo, Bombay, Thana District, Goa. } <i>Hyderabad, Deccan.</i>
2	Apples	Rawalpindi, Chaman, Kashmir. Jammoo, Kulu, Nainital. America. } <i>Australia.</i>
3	Grape Fruits	South Africa } South Africa } <i>Jaffa in Palestine</i>
4	Grapes	Chaman, Kabul, Quetta } Nasik } South Africa } Spain } Australia }
5	Sweet Limes	Saswad, Rowai, Telegaon, Poona, } Nasik. } Ahmadnagar, Khandesh, Aurangabad, Jalna. }
6	Oranges	" " " " } <i>South Africa</i> <i>Jaffa in Palestine</i>
7	Peaches	<i>Quetta, Chaman, Peshawar</i> <i>Mahableswar</i> <i>South Africa</i>

MARKET**SALE)**

Season of fruits	Wholesale prices in seasons
July to December	Rs. 4 to 6 per basket of four dozens.
March to July	The prices depend on quantity and sizes and sold in baskets, boxes, trunks and on numbers. per hundred 136 Nos.
June to August	Rs. 6 to 12 per basket or 4 dozens.
August to March do	Rs. 8 to 18 per box of ten dozens. Rs. 8 to 15 do
July to December	Rs. 15 to 20 per box of 80 to 252 Nos.
Middle of February to May	Rs. 10 to 25 per box of diameter 2" to 3½".
February to May	Rs. 15 to 25 per box.
July to November	Rs. 30 to 40 per box of 64 to 252 Nos. in a box.
December to May	Rs. 25 to 30 per box of 64 to 112 Nos. in a box.
August to November	Rs. 20 to 22 per basket called 'Kulu'.
April to June	Rs. 2 to 4 per basket.
May to July	Rs. 20 per box of 20 lb.
October to January	Rs. 20 to 40 per barrel of 50 lbs.
February to June	Rs. 15 to 25 case of 28 lbs.
Throughout the year	Rs. 2 to 5 per Basket of 4 dozens.
do	Rs. 6 to 8 per box of 6 to 8 dozens.
do	Rs. 3 to 5 per basket of 4 dozens. Rs. 5 to 9 box of 6 to 8 dozens.
June to November	Rs. 15 to 20 box of 80 to 252 Nos.
December to May	Rs. 12 to 18 box of 100 to 150 Nos.
June to November	Rs. 4 to 12 box of 6 to 10 dozens.
April to June	Rs. 3 basket of 6 dozens.
May to July	

BOMBAY
(Whole)

S. No.	Name of fruits	Places from which the fruits are imported.
8	Pomegranates	Muscat Dholka Poona and Bhawnagar Kabul, Quetta, Kandhar
9	Cihokoos	Bombay, Poona and Golwad
10	Guavas	Poona District, Nasik, Dhenoo, Jubbulpur, Surat and Golwad
11	Custard Apples	Poona District, Nasik, Bombay, Thana, Hyderabad (Dn.) Billi- moria
12	Water Melons	Ali-bag, Readanda. Jamnagar, Ahmadabad
13	Bananas (All Kinds)	Bassein, Virar Kelva, Mahim and Palgar
14	Pineapples	Harnai, Dabhol, Goa
15	Papayas	Madras, Singapore Bombay and Poona
16	Pears	Naiutal, Rawalpindi, Peshawar
17	Pears, South African Naspati	Peshawar
18	Pumeloes	Bombay, Dhenoo, Golwad, Goa
19	Plums	South Africa Quetta
20	Strawberry	Mahableshtar
21	Lichis	Calcutta and Dhrargarah
22	Figs	Poona
23	Apricots	Quetta
24	Lemons	Jaffa in Palestine
25	Seur Limes	Ahmadnagar, Poona, Surat, Nadiad Anand, Gujarat District
26	Melons Muski	Kabul, Peshawar, Quetta, Alibag, Pen, Panvel

FRUIT MARKET—Continued,
Sale)

Season of the fruits	Wholesale prices in seasons
September to January June to August Throughout the year generally August to September October to December	Rs. 60 to 100 for 108 (Pacca 100). Rs. 5 to 12 per box of 4 dozens. Rs. 3 to 4½ per basket of 4 dozens and Rs. 5 to 12 per box of 4 dozens.
Throughout the year do	Rs. 10 to 15 per basket of 4 to 5 dozens. Rs. 2 to 10 per basket of 10 to 15 dozens, or Rs. 2 to 3 per 100. Rs. 2 to 3 per basket of 10 to 12 dozens.
September to December	Rs. 3 to 3½ per basket of 3 to 4 dozens.
November to March	Sold in Nos. or dozen or hundred according to size and quality.
Throughout the year April to June March to June	Red Bananas Rs 5 to 6 for 105. Rs. 2 to 2½ for 105 (Green Bananas) Rs. 4 to 7 per basket of 1½ to 2 dozens.
do Throughout the year August to March March to May July to September	Rs. 1 each. Rs. 3 to 6 per dozen. Rs. 8 to 12 per box of 6 dozens. Rs 5 per tray 20 to 30 Nos, Rs. 5 to 6 per basket of 16 to 18 dozens.
Throughout the year March to May April to May April to June	Rs. 3 to 9 per dozen. Rs. 7 per tray of 25 to 30; Rs. 1 to 1½ per basket of 15 to 20 dozens.
May to July	Rs. 4 to 6 per basket of 200 to 250 Nos.
December to March April to May October to March	Rs. 2 to 4 per basket of 10 dozens. Rs. 12 to 15 for one box of 250 to 350 Nos.
do	Rs. 12 to 14 for one thousand.
September to November July to October	Rs. 12 to 24 per dozen. Annas 4 to Annas 6 each.

BOMBAY GENERAL MARKET RETAIL PRICES.

On 6th October, 1930.

No.	Name of Fruits.	Rate.	From		To		
			Rs.	A. P.	Rs.	A. P.	
1	Pine apple, Singapore, large	...	Each.	2	0	0	...
2	Do do small	...	do	...	...	...	...
3	Do large	...	do	...	...	...	...
4	Do small	...	do	...	...	...	...
5	Custard Apples	...	Per doz.	0	12	0	2 0 0
6	Pumeloes, large	...	Each.	1	4	0	...
7	Do small	...	do	0	8	0	0 12 0
8	Guavas, large ...	...	Per doz.	0	12	0	...
9	Do small ..	...	do	0	4	0	...
10	Oranges, South Africa	...	do	...	...	...	...
11	Do Nagar	...	do	0	12	0	2 0 0
12	Do Nagpur	...	do	0	12	0	2 0 0
13	Grapes, Poona ...	...	Per seer.	...	...	...	...
14	Do Black Nasik	...	do	...	...	...	...
15	Do Malta ...	...	do	0	10	0	0 12 0
16	Do Kabul	...	do	0	10	0	0 12 0
17	Melons, Water, large	...	Each,	...	...	...	...
18	Do do small	...	do	...	...	...	...
19	Do Musk, large	...	do	2	8	0	...
20	Do do small	...	do	0	12	0	...
21	Plantains red ...	...	Per doz.	1	0	0	...
22	Do green	...	do	0	4	0	0 5 0
23	Do yellow (<i>gawthi</i>)	...	do	0	7	0	0 9 0
24	Do do Table	...	do	0	4	0	0 10 0
25	Limes Sweet ...	...	do	0	12	0	1 2 0
26	Do Sour ...	...	do	0	2	0	0 4 0
27	Pomegranate, Muscat	...	do	3	0	0	9 0 0
28	Do Poona	...	do	0	12	0	1 8 0
29	Do Dholka	...	do	...	...	...	...
30	Do Kabul	...	do	8	0	0	6 0 0
31	Apples, Australian	...	do	...	...	...	...
32	Do Kulu ...	...	do	1	8	0	3 0 0
33	Do Cashmere	...	do	...	...	...	...
34	Do Quetta	...	do	...	...	...	...
35	Do Nainital	...	do	...	...	...	...
36	Mangoes, Aphoos	...	do	5	0	0	9 0 0
37	Do Payrie	...	do	...	...	...	...
38	Do Common	...	do	...	...	...	...
39	Do Madras	...	do	...	...	...	...
40	Do Mangalore	...	do	...	...	...	...
41	Do Salem	...	do	...	...	...	...
42	Figs, Poona	...	do	0	8	0	0 12 0
43	Pears, Ordinary	...	do	1	8	0	3 0 0
44	Do Kulu ...	...	do	...	...	...	...
45	Do English	...	do	...	...	...	...
46	Chickoos	...	do	0	12	0	1 4 0
47	Peaches	...	do	1	0	0	2 8 0
48	Plums	...	do	...	...	...	...

The article on "Fruit Marketing at Bombay" extracted from the 'Times of India' of 27th October 1930 deals with the actual methods of disposal in Bombay of Fruit imported from the interior of the Presidency as well as from all quarters outside the Presidency, whether by rail, steamer or road transport, by registered brokers or wholesale dealers or commission agents or contractors in the market.

In a previous article dated the 21st October 1930, the 'Times' dealt with the causes which deprive at once the city "workers of wholesome food and the ryot of his living, at the same time giving the foreigner, Eastern and Western, the opportunity of which he is not slow to take advantage of exploiting a lucrative and quite unguarded market.

The startling position too, is that there is today not a semblance of progress being made either in the development of orchards or in the exploiting of markets. Rather is reverse the case. Fruit growers are tiring of growing fruit and markets are being lost to outsiders.

"A healthy and active department of Agriculture, with experts in charge of the Fruit Department, who have studied fruit growing in many different countries of the world, sends out into the districts men with the knowledge and the ability to impart to the cultivator all that he ought to know to grow successfully the particular varieties of fruit which suit his district. But they leave to the cultivator the plans for the marketing of the fruit when it is produced. They dare not discuss prices with the cultivator, one cannot blame them. It is not their job. They have not studied the economic side of the industry while those who have do not have the opportunity so far of doing anything which might solve the puzzle."

"In a country where the standard of living is low the price of fruit is inordinately high and, mark this, it is rising continually and out of proportion to the rise in the wages of the worker, considerable as that has been. Many varieties can now be called nothing else but luxuries. But the cultivator remains as poor as in the days when they were common food."

So the answer to the puzzle is found to be contained in the one word "Marketing". But the answer is in itself just as much a puzzle as the primary problem. There is at present no such thieves as organised marketing of fruits or

vegetables in Bombay. One word to describe the sale fruit in the city might be "System." It will be proved that a word considerably more apt is "Scheme." The plight of the fruit grower has been placed in a general way against the plight of the consumer in this article. Who holds the balance? The answer to the question will give the answer to the puzzle in the word "Marketing" and at the same time get down to financial detail on both sides which will astound the dweller in the City of Bombay who is today taking things as they come and blaming everybody but the right person.

The object in giving these articles a place in this Report is mainly to draw attention to the importance of a problem serious to Hyderabad as to Bombay, the solution of which is perhaps of primary concern in the development of the Fruit Industry.

8. (3) FRUIT MARKETING AT BOMBAY.

A second visit was paid to Bombay Crawford Fruit Market between the 21st and 23rd November 1931.

A Buyers' Association of 25 members with Mr. D. R. Benke as Secretary has been formed to go round to Bassein and other places and buy plantains for retailing in the Crawford Market. It is, I am informed, benefitting the middlemen. A new Association in the interests of Fruit Growers has been started at Ravalgaon headed by Mr. Walchand Hirachand called "The Bombay Presidency Fruit Growers' Association" and registered within the last one year. This body has started moving the Railway companies for the reduction of railway freight on fruits.

Of Hyderabad produce Sitaphal (*Anona squamosa*) was noticed to arrive in a badly damaged and rotting condition by Railway Parcel from Tandur and Shankerpalli. The importers told me that delay occurs in transshipping at Wadi and reduction of freight is desirable.

Attached is a copy of List of Fruits available for sale with retail rates that prevailed on 21st. November 1931.

BOMBAY CENTRAL MARKET RETAIL PRICES.

27st. November, 1937.

No.	Name of Fruits.	Rate.	From			To		
			Rs.	A.	P.	Rs.	A.	P.
1	Pine apple, Singapore, large	Each.	4	0	0	...	...	...
2	Do do small	do	3	0	0	...	...	...
3	Do large	do	1	8	0	...	...	...
4	Do small	do	0	12	0	...	...	...
5	Custard Apples	Per doz.	1	0	0	3	0	0
6	Pumeloes, large	Each.	1	8	0	...	...	...
7	Do small	do	0	12	0	...	...	...
8	Guavas, large	Per doz.	0	8	0	...	...	...
9	Do small	do	0	4	0	...	...	...
10	Oranges, South Africa	do	2	0	0	2	8	0
11	Do Nagpur	do	1	0	0	3	0	0
12	Do Nagpur	do	...	...	...	...	...	...
13	Grapes, Poona	Per seer.	...	...	...	...	...	...
14	Do Black Nasik	do	...	...	...	...	...	...
15	Do Malta	do	1	0	0	...	...	...
16	Do Kabul	do	0	8	0	0	12	0
17	Melons, Water, large	Each.	...	...	...	...	...	...
18	Do do small	do	...	...	...	...	...	...
19	Do Musk, large	do	2	0	0	...	...	...
20	Do do small	do	1	4	0	...	...	...
21	Plantains red	Per doz.	0	12	0	1	0	0
22	Do green	do	0	4	0	0	5	0
23	Do yellow (gawthi)	do	0	4	0	0	5	0
24	Do do Table	do	0	4	0	0	6	0
25	Limes Sweet	do	1	0	0	3	0	0
26	Do Sour	do	0	3	0	0	4	0
27	Pomegranate, Muscat	do	3	0	0	9	0	0
28	Do Poona	do	1	0	0	2	8	0
29	Do Dholka	do	...	...	...	...	...	...
30	Do Kabul	do	3	0	0	3	0	0
31	Apples, Australian	do	2	0	0	4	0	0
32	Do Kulu	do	3	0	0	5	0	0
33	Do Cashmere	do	2	0	0	4	0	0
34	Do Quetta	do	...	...	...	...	...	...
35	Do Nainital	do	2	0	0	6	0	0
36	Mangoes, Aphoos	do	...	...	...	...	...	...
37	Do Pyrie	do	...	...	...	...	...	...
38	Do Common	do	...	...	...	...	...	...
39	Do Madras	do	4	0	0	8	0	0
40	Do Mangalore	do	...	...	...	...	...	...
41	Do Salem	do	...	...	...	...	...	...
42	Figs, Poona	do	0	4	0	0	12	0
43	Pears, Ordinary	do	2	0	0	2	8	0
44	Do Kulu	do	...	...	...	...	...	...
45	Do English	do	...	...	...	...	...	...
46	Chickoos	do	1	0	0	2	0	0
47	Peaches	do	...	...	...	...	...	...
48	Plums	do	...	...	...	...	...	...

8—(4) FRUIT MARKETING AT BEZWADA.

A visit was paid to Bezwada on the 3rd. August 1931 went through markets of Governorpet, Arundelpet and Old Town. The following fruits were for sale:—

1. *Orange*:—

(a) Narangi from Vaddlapudi.

(b) Batai from Narsapur, annas. 12 to Re. 1/- per dozen.

(c) Salem Chini from Salem, sold at annas six per dozen.

2. *Plantain*:—

(a) Botha, for cooking, poor.

(b) Karpur Chaker-keli-fruits 100-200 per bunch, sold at 10—12 annas per 100.

(c) Amritapani from Godaveri District.

(Four years ago these used to be imported from Salem.)

3. *Pumelo*:—

Pink pulped and white pulped round varieties from Narsapur 1 to 2½ annas each.

4. *Cocoanut*:—

Half anna each.—Rs. 2-4-0 to Rs. 2-0-0 per 100.

5. *Lemon*:—

Round with a flat bottom commonly known as Gadiyarkayi—sold at ¾ anna each.

6. *Sour Lime*:—

Local from a village 6 miles off. Sold at 8 to 12 annas per 100.

7. *Mango*:—

(a) Totapari, imported from Tirupati and Chittur. Locally known as Collector Mamidi and sold at Re. 1 per dozen.

(b) Neelum, imported from Chittur and Kalahasti and sold at 6 to 7 annas per dozen.

8. *Pears*:—

From Mettupalayam sold at Rs. 25 per 1,000.

9. *Grapes*:—

Blue from Bangalore sold at 5 annas per seer of 30 tolas.

10. *Sitaphal*:—From Warangal.

I was informed that Fruit comes to Bezwada from Palkol Narsapur, Dwarapudi, Tuni, Pithapuram etc. It is understood large numbers of Pine Apples grown wild on hill slopes of Simhachellam near Waltair are sent to Bezwada for sale and transhipment to Hyderabad City.

The leading wholesale dealers and Fruit Commission Agents are:—

- (1) Messrs. Abdul Rahman.
- (2) Messrs. Kammana Ankama Chetty.

Fruits are mostly brought in by rail for sale on commission basis. Cartage and clearance charges come to about 2 annas per basket, charity 1 to 4 annas on every Rs. 100 realised by sale. Commission charged is one anna per rupee on the gross realisation and the balance is remitted to senders of fruit. Retailers buy fruit from the wholesale agents and sell them locally and in weekly bazars near to Bezwada. Sometimes fruit is sent to stations within the Hyderabad State. I was informed that Railway Receipts posted by senders reach the consignees a day or more later. Meanwhile on account of Customs objections, fruit clearance is delayed and the senders are put to loss.

In the Bezwada Markets it was interesting to find the following Hyderabad Vegetables:—

- (1) *Bhendi* long smooth from Vikarabad and Shankerpalli.
- (2) Ginger from Vikarabad, Shankerpalli and Bidar.
- (3) Onion from Hyderabad.

I was informed that sometimes in their season even cabbages are got out from Hyderabad city for sale at Bezwada.

9. PLANT AND SEED MATERIAL.

At present there are very few reliable sources of plant and seed material locally though sporadic attempts by private enterprise are not wanting. Government Farms are yet in the early stages of development, but a beginning has been made at Saangareddy where Mango, Orange (Mosambi and Washington Navel), Fig, Pomegranate and Papaya are doing well. At Himayatsagar mango (21 typical Local varieties), Sapota (2 varieties), Orange (6 varieties), Grape Fruit, Fig (3 varieties), Papaya (3 varieties), Guava (5 selected varieties), Date (6 varieties from Iraq), Plantains (9 varieties), Grape Vines (7 varieties including the famous Daulatabad ones), Pine apples and Strawberry have been planted. At Parbhani experimental plots have been started of the Mango, Orange, Fig, Pomegranate, Papaya, Guava, Sour Lime, Grape Fruit and Grape Vines, most of these are thriving well. It is hoped that in course of time they will serve as parent plants for raising reliable stock for distribution to the ryots. For the last 9 years the Pioneer Horticultural Institute, 15, Residency Road, Hyderabad, has been supplying vegetable and flower seeds procuring plants on orders, giving technical advice on gardening matters, laying out gardens and training Malies.

Nawab Wahiduddin Khan Bahadur, Shibly Gunj, Hyderabad, has a fine nursery of foliage plants, including fruit trees, etc. Other persons who sell plants are :—

1. Mali Baganna, Parsi Fire Temple, near Imperial Post Office, Hyderabad.
2. Mr. Ahmed Hussain, Mangal Bazar, Hyderabad.
3. Mr. Mahadev Rao Devdhar, Pleader, Sailu, Pathri taluka, District Parbhani (Supplies reliable budded Santra Orange Plants at B. G. Re. 1 each.

Vegetable seeds are stocked and sold by a few Marwadi and Komati merchants at Mir Alam Mandi and Mashirabad in Hyderabad and Secunderabad. Major portion of plant and seed material is being imported from places outside the State as Poona, Bangalore, Saharanpur, Calcutta etc.

Large number of fruit trees are brought during rainy season from July to September from Nuzvid, Salem, etc., outside the limits of the Dominions, and sold near Putli Bavli, Residency Bazars, Hyderabad, Deccan.

10. MALIES.

Extract from Dr. Sirajul Hasan's "Caste & Tribes of H. E. H. the Nizam's Dominions."

"An Industrial race of fruit and vegetable growers, found in large numbers in and around Daulatabad extending as far north as the Central Provinces and the Berars, moving from this point into the District of Adilabad, they have spread over the tract of country comprising the present Talukas of Rajura, Sirpur and Jangaon under the popular designation of *Marar* have now entirely occupied many villages in the Districts. The current tradition avers that early in the 14th century, they were brought from Delhi, by the Emperor Mohamed Taglakh who desired to furnish his new capital with beautiful gardens and that their immigration continued while Mughal rule prevailed in Deccan. Mali literally means garland maker."

Occupation:—"Malies are very industrious and skilful gardeners, growing and selling all kinds of vegetables, fruits and flowers. They also raise staple crops, but are more profitably engaged in rearing tobacco, cumin seeds, turmeric and other special produce which require careful cultivation. Their talent for all forms of gardening and spade husbandry is remarkable and most of the vineyards of Daulatabad and its neighbourhood, yielding the highly esteemed Grape known as 'Habshi' were owned by members of this caste. In towns they work as market gardeners while in villages they supply flowers and flower wreaths for the worship of household gods."

The Kachis of Hyderabad City are similar professional gardeners. A number of them growing vegetables around Hyderabad visited the Hyderabad Horticultural Shows of 1931 and 1932. One Ballu Singh Kachi exhibited a fine collection of vegetables of the right type and quality and won a number of prizes and silver medals and cups on both occasions.

In my survey in Daulatabad and Maliwada, I have found that a number of small gardens were owned by this community and they follow fruit culture as their main occupation.

Some Muslims pursue gardening as their hereditary avocation. I have come in contact with some smart gardeners at Daulatabad, Aurangabad and Jalna. A capable and efficient Mali who understands the art of budding and grafting commands Rs. 20 to 30 per month in fruit gardens of Aurangabad District and elsewhere in Mahratwada. An ordinary Mali earns Rs. 12 to 15. Valuable information was given by some Malies at Jalna regarding certain fruits particularly Oranges and Bheres.

There is an incessant and persistent demand for trained and efficient *malies* throughout the State.

To cope with pressing and specific demands the Pioneer Horticultural Institute has from its inception in 1923 been recommending suitable men from outside the State, who have justified their selection by their good work in the gardens of Land owners, Noblemen and Local Fund Gardens (at Warangal). But this is a costly arrangement.

With a view to meet the situation a start was made three years ago by the Pioneer Horticultural Institute to train *Mulkis* of the right class. Some of the trained men are now holding responsible appointments as Head Gardeners on Rs. (60-4-100) and Darogas on Rs. (30-2-60) in the Horticultural section of Agricultural Farms of H. E. H. the Nizam's Government.

In this connection it may be stated that a scheme for a regular course of training of Malies in the City of Hyderabad formulated by the Institute is under the consideration of Government. A similar class is under trial at the Himayatsagar Main Farm.

11. BAGWAN.

Bagwan is a businessman and Mali combined. Once the owner of a land plants his orchard and takes care of it himself or through his Mali till the trees attain an age of fruiting, the *Bagwan* steps in, offers a certain fixed amount for the crop and takes charge of the cultivation as opening out the soil, weeding, manuring, interculturing and watering. The owner has simply to supply water from the *mholes* or engine and manure. The *Bagwan* tries to make as much as possible for himself, sometimes to the detriment of proper health of the trees and interest of the owner. One *Bagwan* at Jalna gave me information on local manures used for oranges.

In Hyderabad City the *Bagwan* class is being replaced by *Pardhis* their occupation originally being confined to snaring of partridges and other birds etc. But owing to the restrictions in the game laws of the country they have turned their attention to fruit selling. They buy fruit gardens on contract, do the watching till the fruit is ready for sale, pick them out and hawk them in the city and town. They give no attention to cultivation as the *Bagwan* did before their time. These *Pardhis* purchase imported fruit from the Afzulganj Fruit Commission Agents and retail them in the City when their garden contracts cease.

12. HORTICULTURAL SHOW, 1931.

In connection with the Fruit Survey with a view to study the possibilities of Fruit Culture, a Horticultural Show was organized and held on the 24th and 25th February 1931 (22nd and 23rd Farwardi, 1340 F). The Horticultural Survey Officer acted as Assistant Secretary. The Show was opened to the public at 4-30 p. m. on the 24th February, 1931 by the patron H. E. Maharaja Sir Kishen Pershad Bahadur, G. C. I. E., K. C. I. E., the President of H. E. H. the Nizam's Executive Council. H. E. H. the Nizam, the Princes and Princesses honoured the Show with their visit.

Considering the short notice and lateness of the season the local growers responded well and put up a fair show of flowers, fruits and vegetables, which indicated the latent productive talent of the Hyderabad State.

The competition in fruits was very keen and entries in groups varied between 2 to 12. More than half the number of exhibits came from the Districts of Aurangabad, Parbhani and Atrafibalda (Vikarabad), where fruit gardens had been surveyed. The collection was varied and consisted of the usually and unusually grown fruits of the State. Good quality of orange, pumelo, papaya and grape was exhibited. Seedless sour lime a novelty, grown by Mr. Ardeshir B. Mehta, Parsoda, Aurangabad District won Major Amir Sultan's Silver Medal. 'Washington Navel' Oranges from the Jaghirdars' College, Begumpet, were very good, also the grapes and figs from Daulatabad grown by Ali Khan and Luxman Patel. Among rare fruits, Soursop (*Anona muricata*) Cherimoyer (*Anona cherimolia*) and grape fruit shown by Raja Pratapgirji Narsingirji Bahadur deserve special mention. Kotwal Saheb Raja Bahadur Venkatrama Reddy's Silver Cup was won by Mr. Syed Amir Ali for collection of fruits. Major Amir Sultan's Silver Medal was won by Ali Khan, Daulatabad for grapes. Mr. Collins's Silver Medal went to Mrs. Ahmed Ali, Shamshabad for collection of fruits.

(Appendix gives the copies of speeches delivered at the Opening Ceremony).

12. HORTICULTURAL SHOW, 1932.

For the second time a Horticultural Show was held at the Public Gardens and was open to the public from the 11th to 13th February 1932, (9th—11th Farwardi 1341 F.). The Patron H. E. Maharaja Sir Kishen Pershad Bahadur, G. C. I. E., K. C. I. E., President of H. E. H. the Nizam's Executive Council performed the opening ceremony at 4-30 p. m. on the 11th February 1932 (9th Farwardi 1341 F.). The Horticultural Survey Officer acted again as Assistant Secretary.

The Show was a great success, the number of entries were double of what they were at the first Show of last year and the number of visitors was also greater.

The competition in fruits was keen and the entries in certain groups went up to 15. Pumeloos, citron and grapes were above the average. Grapes grown at Hyderabad City and Daulatabad topped the list of prize winners in that group. The following Cups and Medals were awarded for special excellence.

1. Mr. Dharwarkar's Silver Medal for grape fruits, exhibited by Raja Pratappgirji Narsingirji Bahadur.
2. Silver Medal for grapes exhibited by Moulvi Nasrulla Khan, Office of Director, General of Police, Hyderabad - Deccan.
3. Mr. Bhide's Silver Medal for Pumeloos exhibited by Mr. Prakashrao, M. A. L. T.
4. Silver Medal for Fruit Products to the Mumtaz Jam Factory, Hyderabad.
5. Mr. Bhide's Silver Medal for Melons, Jack Fruit etc., to Mr. B. C. Reddy, Jagirdar, Manpad, Alam-pur taluka, Raichur District.

Oranges, guava, fig, papaya and cocoanut were good.

13. FENCING AND WINDBELTS

Dead:—

1. Walls.
2. Barbed wire fencing.
3. Babul thorns.

Living:—

1. Agave americana.
2. Parkinsonia aculeata.
3. Caesalpinia sepiaria.
4. Acacia concinna (Soapnut).
5. Cereus species.
6. Euphorbia Tirucalli.

7. **Bhere** (*Zizyphus jujuba*).
8. **Ramphal** (*Anona reticulata*) **Bullock's Heart**.
9. **Bamboo**.
10. **Dodonaea Viscosa**.
11. **Inga dulcis** (*Korkapille*),
12. **Pedilanthus tithymaloides**.
13. **Lantana camara**.
14. **Tectona grandis** (**Teak**).
15. **Furcraea gigantea**.
16. **Custard Apple** (*Anona squamosa*) (**Sitaphal**)
17. **Agati grandiflora**.
18. **Erythrina Indica**.
19. **Opuntia sp** (**Cactus**)
20. **Neem** (*Melia azaderachla*)
21. **Tamarind** (*Tamarindus Indica*)
22. **Babul** (*Acacia arabica*)
23. **Jatropha Curcas**
24. **Mehndi** (*Lawsonialba*)
25. **Duranta Ellisia**
26. **Pongamia glabra**
27. **Karunda** (*Carissa carandas*)
28. **Artabotrys odoratissimus**
29. **Aloe indica**.
30. **Adhatodavasica**.
31. **Bakan** (*Melia Azaderach.*)

Barbed wire is being largely used in the Mahratwada for fencing gardens and even fields a few gardens at Vikarabad are fenced similarly.

14. BOOKS ON FRUIT CULTURE AND ALLIED SUBJECTS.

The existence of several fruit gardens now neglected and allowed to run down is conclusive proof of the great interest formerly evinced in gardening, but unfortunately little literature could be discovered on gardening in Hyderabad particularly by local persons having the experience of local conditions.

So far the following have been traced.

1. Dr. Riddel's Book on Gardening (Manual of Gardening for Western and Southern India.) in Hyderabad, attached to his book on Cookery (in English) 1872.
 2. Grape Culture by Nawab Azeez Jung Bahadur. (*Kashth Angur*) in Urdu. (Out of print).
 3. Vegetable Culture (*Kashth Tarkari*) by Nawab Azeez Jung Bahadur in Urdu. (Out of print).
 4. Date Culture by Nawab Azeez Jung Bahadur. (*Falahe Nakal*) in Urdu (Out of print.)
 5. Forest Flora of H. H. the Nizam's Dominions by E. A. Partridge, 1916. (Describing among trees Wild fruits).
 6. Garden Calendar for Hyderabad (in English) by M. R. Siddaramaiya, F. R. H. S. (Lond.), Consulting Horticultural Expert, Pioneer Horticultural Institute, Hyderabad, 1925. Out of print. New Edition under revision.
 7. The Papaya in English by M. R. Siddaramaiya, F. R. H. S. (Lond.), Consulting Horticultural Expert, Pioneer Horticultural Institute, Hyderabad, 1928. Price annas 6. A Telugu version was published in the Golconda Patrika Annual, 1928.
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15. LOCAL FUND GARDENS IN THE HYDERABAD STATE.

S. No.	Name of place	Approx. area. acres.	Plan available or not	Remarks	Soil	Water supply
1	Bhir	24½	Plan available	Inspected by Horticultural Survey Officer and Mr. H. P. Paranjpye, Horticultural Adviser.	Good	Good
2	Gulbarga	72	do	do do	Good	Fair
3	Raichur	22	do	Inspected by Horticultural Survey Officer.	Not good	Poor
4	Raichur.	14	do	do	Good	Good
5	Lingsugur	7½	do	do	Good	Good
6	Osmanabad	19	Plan not available	Inspected by Horticultural Survey Officer and Mr. H. P. Paranjpye, Horticultural Adviser.	Good	Fair, water not sufficient
7	Bidar	9¾	do	do	Good	Poor, not sufficient
8	Nizamabad	5½	Plan available	Inspected by Horticultural Survey Officer.	Good	from wells, water supplied from tank stopped
9	Mahbubnagar				Good	Fairly good
10	Nalgonda	A. gts. 23-14	do	Inspected by Horticultural Survey Officer and Mr. H. P. Paranjpye, Horticultural Adviser.	Good	Fair
11	Warangal	Gts. 15-00	do	do	Good	
	Asifabad,	10-00	do	do	Good	
	Adilabad					

General Opinion of Horticultural Survey Officer.—

The gardens are on the whole suitable for Horticultural work. These can be made centres of Demonstration of Fruit and vegetable culture, Arboriculture etc., also Ornamental gardening. No. 3. Raichur garden is unfit for Vegetable or Fruit culture. It would be advisable to maintain it as an ornamental garden for public recreation growing hardy trees and shrubs. For real scientific work in Fruit culture, Gulbarga can provide about 20-25 acres of suitable land.

Mr. Paranjpye's notes on inspection of Local Fund gardens at Bhir (No. 1) Gulbarga (No. 2) Bidar (No. 6), Nalgonda (No. 9) and Warangal (No. 10) are attached as Appendix No. 8 to his Report on Improvement of Fruit Industry.

16. JAIL GARDENS

A few jails were visited, those at Aurangabad, Warangal, Mahbubnagar, Nalgonda and Bidar. It is noticed that special attention is being paid in all of them to the cultivation of sour limes, papayas and pomegranates, etc. Though clean work generally is being pursued and fairly good fruit is obtained, the gardens are not without some serious defects as for example, some of the sour lime trees are old and are attacked by borers and require to be attended to carefully and in many cases require to be replaced by young trees. Many other varieties of fruit of easy culture could also be introduced. More attention is being paid to cultivation of vegetables. Work at Aurangabad is of a high order and deserves special mention.

If in the jail gardens prisoners are properly instructed in fruit culture, the Jail Gardens will not only be improved but the knowledge and practice acquired by the prisoner will give them a trade or profession to serve them in good stead in their subsequent career.

17. SCHOOL GARDENS.

These do not seem to have made much progress though a few have been established in Government Institutions. The Mission Schools at Medak, Sangareddy, Dichpalli, Kamareddy, etc are taking keen interest in this line and doing very useful work, which will instil in the younger generation the desirability and benefit of Fruit Culture. With the large number of Government Schools in the Dominions there is a vast scope for increasing planting of fruit trees and stimulating an interest in that direction.

18. ARBORICULTURE.

A striking and noticeable feature when passing through the country and town is the absence of avenues rendering them inhospitable to the traveller. Some sporadic effort is made in the Districts, with little success, apparently, due to planting unsuitable trees at untimely seasons, on unsuitable soils.

Amongst the fruit trees actually noticed growing in various localities may be mentioned the following.—

1. Mango (Seedling) (*Mangifera Indica*)
2. Jamoon (*Eugenia Jambalanum*)
3. Jack (*Artocarpus integrifolia*)
4. Bhere (*Zizyphus jujuba*)
5. Cashewnut (*Anacardium occidentale*)
6. Kirnie (*Mimusops hexandra*)
7. Tamarind (*Tamarindus indica*)
8. Wood Apple (*Feronia elephantum*)
9. Marking Nut (*Semecarpus anacardium*)
10. Awla (*Phyllanthus emblica*)
1. Ambada - Hogplum (*Spondias mangifera*)
12. Bakul (Moalsari) (*Mimusops elengi*)

The vast extension schemes now proceeding rapidly under the guidance of the City Improvement Board particularly in the case of the spacious and pucca roads doubtless include the planting of avenue trees along these roads and in open spaces. It is to be hoped that the selection will not be limited to timber and flowering trees alone but by choice embrace a judicious selection for planting on road sides, *waste lands* etc. of hardy tropical and sub-tropical fruit and other economic trees which would serve a double purpose of not only affording shade to the weary traveller but providing an additional source of wholesome fruits besides enhancing the scenic effect of the surroundings.

Here, then, is an unlimited scope for increasing fruit production.

19. TOOLS USED IN FRUIT GARDENS.

Generally these are not different from the ordinary tools used in agricultural operations. Occasionally a grafting or a budding knife and secateurs are noticed. But in some private and Government gardens at Hyderabad, Aurangabad, Gulbarga, Warangal etc. improved tools are being introduced and used.

HYDERABAD FRUIT SURVEY.

20. *Questionnaire I.—Summary of replies.*

Question No. 1.—General.

Question :—It is understood that in certain Districts, at least, fruit culture had considerably developed in former days. But it is said that at present people are giving it up. Is it a fact and if so, what are the reasons ?

Answer :—Of the 106 replies received the following is a summary of the condition of fruit cultivation. In the Osmanabad District (Bhoom jagir) the set back in the efforts in former days in fruit culture, except as regards plantains and guavas, is attributed to decreasing rainfall. Where the irrigation facilities happened to exist the present owner of the land is either ignorant of the method of growing fruit trees or he is poor. The deficiency of rainfall is also the cause of restriction in the Parinda taluka of the District. In the Raichur and other districts no fruit culture was carried on for the same reason, whilst in some parts of these districts, a few mango, guava and bhere trees exist; but the people do not show any interest in fruit culture. Besides the general complaint of deficient rainfall and scarcity of irrigation facilities, cultivators have turned their attention to cotton, jawar etc., cultivation which ensures a quicker return with less expenditure and trouble. Fruit cultivation in the Asifabad District, Adilabad taluka (Kasba Village) progress is limited on account of difficulty in securing plants from outside places, absence of adequate means of transport, great distance from any big city or large village, situation in a desert region. In the Bidar District, Ahmedpur taluka, it is said that the soil and water sources do not afford any

encouragement for fruit growing on a commercial scale. Such fruits as mangoes, guavas, oranges, papaya etc., as are seen on a small scale, are maintained by a wealthy few for their own use, whilst in the Koheer taluka of the same district grape vine is said to have been largely grown but eventually abandoned on account of breaches in Syed Tank, 2 miles off. This tank was a direct source of supply as well as acting as a feeder to the wells below it. In the Aurangabad District fruit was extensively grown, whilst it is of general knowledge that Daulatabad acquired a fame not equalled by any other place in the Dominions for its grapes and other fruits. Forty years back the average rainfall was 30 to 40 inches; since then for ten years it was 18 to 28 inches, but in the last ten years it is said to have increased to 20 to 32 inches and consequently fruit culture which was in a decaying state shows signs, it appears, of revival. In the Nanded District, it is said that garden cultivation is making rapid progress, oranges, guavas and sour limes being extensively grown. In the Bidar District (Koheer Village) it is said that 200 gardens have dwindled down to about 30 or 35 owing to.—

1. Failure of water supply in wells.
2. Ignorance of the present owners in the art of cultivation possessed by their fore-fathers leading to the break-up of family holdings and their migration to other places.
3. Need of technical and financial help.

Finally the Divisional Officer, Asifabad Division, Adilabad District, having served in several Districts, gives his extensive experiences of fruit cultivation in those districts and the following causes for the extinction of the once valuable and flourishing fruit gardens:—

- (a) Death of older persons and ignorance of the art by their children possessed by the elders.
- (b) Deterioration of the soil and ignorance of cultivation in the use of manures.
- (c) Diminished rainfall and drop in water in wells.

- (d) Pressure from Government servants for frequent free supply of fruit; compared with the expenditure, profits are low and not now being in the same circumstances as in the past, people are less disposed to pursue anything of little profit.
- (e) District Atrafibalda, taluka Shahabad, village Ennapalli, Nawab Nizamat Jung Bahadur, K. C. I. E., Rafat Bagh, Vikarabad, states that the reason for the decline of fruit culture is want of a proper system and absence of men possessing the requisite knowledge and experience.
- (f) To sum up, the main reasons are continuous deficiency in the annual rainfall, water level in well dropping, insufficient capital to start and maintain a fruit plantation, inability of securing skilled labour and the apathy of the cultivator to interest himself in fruit growing.

Questionnaire II:—Summary of Replies.

AREA.

*Question No. 1:—*What is the approximate total area under fruit culture? Under each kind of fruits?

*Answer:—*Under this heading figures indicating the total approximate acreage under fruit culture are given for a particular taluka together with the area under each fruit grown in the locality. This information has not been incorporated in the Survey Report since more authentic figures under this heading have been received from the Revenue officers which are comprehensively dealt with in a tabular statement and published in this Report as Appendix No. 5 and would be considered more reliable.

Incidentally it may be mentioned that as per statement of the Divisional Officer, Asifabad, Adilabad District, persons possessing 10 to 12 fields in the Mahratwara tract generally set aside 2 to 2½ acres for vegetable and fruit cultivation.

Question No. 2:—For what particular reasons such as soil, climate, water-facility, marketing etc., is a particular fruit grown on a large scale in a locality or district?

Answer:—Of the few replies received to Question II (2), it appears that on account of the soil, climate and water generally mangoes and guavas are grown in Vikarabad, Aurangabad (Vaijapur) and Bidar (Koheer) and according to Gopal Sing, Daroga in charge "Mehdi Manzil" Vikarabad, besides mango and guavas, sapota, lichees, pomegranates, grapes and figs are largely grown in and around Vikarabad for the reasons given.

Nawab Sir Nizamut Jung Bahadur considers that Vikarabad is about the best place for fruit and vegetable culture within fifty miles of Hyderabad on account of both climate and soil.

Whilst Mr. Ardeshir B. Mehta, Retired Customs Inspector, Station Parsoda, N. S. Ry., states that Parsoda has good gardens to its credit and can easily top the list in fruit (orange, mosambi and santra) on account of the black fertile soil, good supply of water in wells and good market in Bombay, Mr. Mahomed Bin Avad Chaoos of Koheer, Bidar, adds that seedling mangoes are grown extensively and fruit produced in plenty.

In Jalna taluka of the Aurangabad District the suitability of the soil and climate are said to be the reasons for the extensive cultivation of santra, mosambi and guava, particularly santra which is grown on a large scale, and further owing to the proximity of the Railway station.

In the Bidar taluka, Bidar District, the soil is red and of good texture which has been found to be suitable for mango and guava.

In the Parbhani taluka, Parbhani District, the soil is considered to be good for santra, guava, bhare and lemon.

Question (3):—Do plantations suffer on account of extremes of temperature, like frosts in cold weather or excessive heat in hot weather?

Answer:—Osmanabad (Bhoom Jagir), Osmanabad (Parinda), Parbhani (Manvath), Nanded (Hadgaon), Asifabad (Adilabad Kasba), Vikarabad (Valandi-Paiga), Aurangabad (Vaijapur-station, Parsoda N.S. Ry), Nanded, Bidar (Koheer), agree that plantations suffer from extremes of temperature, whilst Raichur (Deodurg), Aurangabad, Mr. Bandulal Samaldas Seth, Vaijapur, Aurangabad (Jalna), state that plantations do not suffer from extremes of temperature. Aurangabad (Daulatabad) states that except grape vines which sometimes suffer from mildew plantations are not affected much by extremes of temperature. Bidar (Ahmadpur), and Vikarabad (Gopal Singh, Daroga-in-charge, Mehdi Mansil) states that plantations suffer only owing to insufficiency of water in wells. Vaijapur (Parsoda), Mr. Kishen Rao, Patol, reports that mosquitoes do considerable harm to plantations in the cold season and that in hot season fruits get scorched on one side; mango flower suffers from frost as reported from Bidar (Koheer) and Mr. Mahamad Ibrahim and Mr. Mahamad Bin Avad Chaos of the same place state that mango fruits dry and drop in the cold season and if the weather is cloudy when the trees are in blossom the flowers wither and that loss of both can be prevented by irrigation. Finally the Divisional Officer, Asifabad Division, records that high winds generally ruin mango flowers and fruits.

Nawab Sir Nizam Jung Bahadur, K. C. I. E., (Atrafbalda District, Taluka Shahabad, Ennapalli) states that heat does affect the fruit trees to some extent in the hot season, but not very seriously on the whole.

Question (4):—Are there any other difficulties on account of which the cultivator cannot reap as much profit now by fruit growing as formerly? And therefore fruit culture is being given up?

Answer:—Besides the main difficulty already mentioned, *viz.*, insufficiency of water in wells and want of irrigation facilities, the Bhoom Jagir (Osmanabad) mentions ignorance of the methods of fruit cultivation, whilst Mr. Ardeshir B. Mehta, Retired Customs Inspector (Aurangabad, Vaijapur, Parsoda Station, N. S. Ry,) points out that fruit growers are unable to secure the services of skilled workmen for their gardens and lack of technical knowledge among employers and

employees tends to make fruit-growing a very unprofitable business. Others point out increased wages, high cost of cultivation and diminished returns as drawbacks. Mr. Bezonji Faridoonji, (Aurangabad-Jalna), states that the difficulties in transshipment by road, non-existence of fruit markets in towns and lack of rapid Railway transshipment are drawbacks.

And Adilabad (Kasba) states that its situation in an almost desert region with little transportation facilities is the biggest difficulty in the advancement of fruit growing whilst Mr. Abdul Matin Khan (Nanded) points out that parrots and flying foxes cause considerable damage. Control of these pests is impossible without Government aid. He also suggests that the land revenue assessment should be decreased.

In the Aurangabad, Khuldabad, Ambad talukas of the Aurangabad District, Shahabad (Ennapalli) Atrasbalda District, difficulties are experienced on account of high wages of servants, inexperience, deficient rainfall and scarcity of water. Jalna taluka states imports of santras through Ballarshah Railway line act seriously on the local production. Foreign fruits sell cheaper than the local ones. In the Gangapur taluka cultivators cannot reap much profit on account of fall in the prices of fruits. In Kannad taluka on account of the Railway Station being at a very long distance, in Kandahar taluka, Nanded District, on account of scarcity of water, in Nizamabad taluka on account of lack of technical knowledge, in Bidar taluka, Bidar District, on account of financial difficulties, people get less profit than before. In Nilanga taluka of the same District no profit is derived on account of fruit culture being limited. In the Bhir taluka, Bhir District, due to financial difficulties and costly labour, cultivators are neglecting fruit culture. In the Georai taluka, Bhir District, people do not know the benefits of fruit culture and therefore have no interest in it. In the Manjlegaon taluka of the same District cultivators cannot reap much profit on account of lack of water supply. In the Pathri taluka of Parbhani District ever since the Railways have come into existence fruits enter the Dominions after a day's journey and the price is comparatively less than those that are imported by means other than Railways on which account expenses run very high.

QUESTIONNAIRE III (1)

- Question III (1)** Average annual rainfall in the District (in the different Tahsils in the District). Has the present rainfall gone down considerably from what it used to be before?
- Question III (2)** Has the water level in wells and Tanks gone down now-a-days as compared with former years? Is it due to silting or reduced rainfall?

Answers to Question III (1)		Answers to Question III (2)	
Serial No.	District	Taluka	Average rainfall
1	Aurangabad	Vaijapur Parsoda Khuldabad Kannad Ambar Bhokardan Sillode Daulatabad Jalna	20-00 inches 25-00 " " 23-45 " " 50-28 " " 29-50 " " 32 " " 25 " " 30-32 " "
			Less by 10 inches than formerly
			Rainfall decreasing do
			No reduction Average gone down Rainfall has gone down considerably in recent 12 years.
			Mr. Bezoni Faridoonji states that 40 years back the average was 30 to 40 inches, since then for 10 years it averaged between 18 to 28 inches. In the last 10 years it has been to 30 to 32 inches. He deplores the tendency of cultivation on the borders of tanks within the catchment area. Loose-land by tillage the earth is washed into the tank which in consequence gets silted. The result is that tanks that never dried in summer hold water in the rainy and cold seasons only. He suggests the total stoppage of cultivation and the raising of tank bunds.

2	Medak.	Kalubgar	40-50	inches	
		Siddipet	16-20	"last year	Average gone down
			40-50	"	
		Indole	15-20	"	do
		Seram	29	"	do
		Gulbarga	14-18	"	Average for six years
		Yadgir	26-20	"	Last year 24.4 Inches
		Chincholi	26-20	"	Average gone down
		Indole	26-27	"	Average gone down
		Kodangal	16-20	"	30-40 in. in the past
		Husanabad	30	"	Average gone down
		Shahabad	36	"	Decreasing
			28	"	24" last year
		Karimnagar	34	"	Gone down
		Sultanabad	27.2	"	Gone down
		Huzurabad			
		Mahadevpur	80	inches	
		Jaktial	32	"	
		Pakhal	33.4	"	
		Sirsilla	33	"	
		Mahabubnagar	32-25	"	Gone down
		Amrabad	30-32	"	do
		Mukthal		"	do
		Pargi	30-36	"	do
		Nagarkurnool	20-27	"	
		Kalwakurthi	19-32	"	
		Miryalguda	33	"	do
		Jangaon	22-20	"	Average gone down
		Huzurnagar	29.81	"	do
				"	do
3	Gulbarga				
4	Shahabad (Luttid-dowla Bahadur's Paiga)				
5	Karimnagar				
6	Mahabubnagar				
7	Nalgonda				

QUESTIONNAIRE III (1)--Continued

Answers to Questions III (2)

Answers to Questions III (1)

Serial No.	District	Taluka	Average rainfall	Average gone down
7	Nalgonda	Nalgonda	25 or 26 inches	Average gone down
8	Osmanabad	Bhoom Jagir	23-80	Average gone down Difference of 7 inches in the average annual rainfall.
		Parinda	"	
		Kallam	29"	
		Tuljapur	"	
		Latur	30	
9	Nanded	Osmanabad	26-30	Decrease at times
		Hadgaon	27	Compared with previous years less by 10"
		Mudhol	19-52	Increasing annually
		Nanded	32	
		Kandahar	24	
10	Nizamabad	Nizamabad	32-63	Decrease
		Bhodan	25-30	
11	Asifabad	Adilabad	36	
		Utanoor	32	
		Kinnote	25	
		Adilabad	30-32	Last year 39-70" this year 33-40"
12	Adilabad	Lakshetipet	28-20	
		Chinnur	38	
		Bhot	30-32	

13	Bidar	Ahmadpur Kohser	30 22	inches " (1839)	In 1838 F. 19 inches. Formerly it used to be 40". Present rainfall gone down considerably. Drop in water level is attributed to silting as well.
		Bidar Nilanga	22 20-15	inches "	Gone down In 1839 F. 21-27 inches
14	Raichur	Raichur Gungawati Lingsugur Sindhnoor Khustagi Alampur	19-85" 25 " 24-75 " 20 " 25 "	in 1340 " " " "	Formerly 25"; last year 19-25" At present 16-17", 23" to 24" average Gone down
15	Bhir	Bhir Mominabad Georai Patwada Manjegaon	30 20 28 27-17, 28-6 "	" " " " "	do do do do
16	Parbhani	Manwath Parbhani Basmathnagar Hingoli Kalsmnoori Pathri	22-27 29-50 30-35 36-86 29 or 30 20-58	" " " " inches "	Formerly 40" to 50" Gone down do do do

QUESTIONNAIRE III (1) contd.

Answers to Question III (1).		Answers to Question III (2)	
Serial No.	District	Taluka	Average rainfall
17	Warangal	Khammam	31.16 inches
18	Dongal (Nawab Salar Jung Bahadur's Estate)		
19	Vikarabad Paiga	Raigir	28.96 "
20	Paiga Estate	Hatnoor	21.77 "
21	Paiga	Kotgir	25.17 "
22	Vikarabad	Valandi	26.89 "
		Atrafabalda	15 "

No considerable decrease

Water level in wells formerly about 8,4" below the surface. It is now 60 ft. below in Atrafabalda Narayankheda. In recent years rainfall varied from 17 to 25 inches. In good years it is 35 inches. It is much less now than in former years.

Note.—Summarising the answers to Question III (2) it is clear that the water levels in wells and tanks in the majority of Talukas of all Districts has gone down now-a-days as compared with former years, and that the shrinkage is due to deficient or reduced rainfall besides silt for the removal of which no attempt is made.

Question 4. IV PLANT PROPAGATION

Question 4 (1)—How the demand of growers for plants is met? Are there any nurseries kept either by private or Government agencies to meet such demands? If the supply is inadequate whence the grafted and budded plants are imported in the Dominions?

Answer.—From the majority of the answers it appears that fruit plants for private gardens are usually got out from Poona, Nagpur, Bombay, Madras, Bangalore and Hyderabad. Daulatabad (Aurangabad) grows mainly grapes and figs and these plants are raised by the local gardeners themselves. It is said that there is a garden in Daulatabad controlled by Government which is in a position to supply plants. But the people, it appears, are not in a position or have not the means to purchase. In some cases *e. g.* at Vikarabad (Vikarul-Umra Paiga) it seems that owners of private gardens exchange grafted plants. Mr. Abdul Matin Khan, Nanded, states that Aurangabad supplies sour limes, mosambi, pumelo, karna (lemon), narangi, grape and orange plants; Hingoli, bhere and Hyderabad mango. In Bidar (Koheer) for mango local seed is sown, whilst plants are obtained from Hyderabad; of late from Bangalore and other places. A local Arab Mohammed Avad sells seedlings of mango said to be sweet varieties, one year old at Rs. 10 per 100, two years old at Rs. 15 per 100, three years old at Rs. 25 per 100 and guava seedlings at Rs. 10 per 100 plants. In Parbhani (Manwath), Bidar (Koheer) and Balda (Hyderabad) grafted and budded and other plants are prepared locally.

In the Hingoli taluka, Parbhani District, there is said to be a technical expert by name Zahooruddin Saheb, in whose garden, bhere, santra, guava, lemon, pomegranate and stargooseberry grafts are prepared and sold to would-be purchasers.

There are neither Government nor private nurseries in the real sense of the word to meet the demand of growers for plants.

Question 4 (2)—Do outside nurserymen supply reliable stock?

Answer:—In the majority of the answers it is apparent that outside nurserymen do not supply reliable stock. Gopal Singh, Daroga-in-charge, Mehdi Manzil, Vikarabad, states that plants coming from outside are either very unreliable or quite useless. Plants (Grafted Mangoes) from Madras imported into Hyderabad (Balda) are said to produce sour fruits, whilst those raised or prepared in Hyderabad or the Districts are said to be thoroughly reliable and good. They do not produce sour fruits. Mr. Kishen Rao, Patel, Parsoda, Vaijapur (Aurangabad) states that nurserymen do not supply reliable stock. A third of the plants brought out by him from Poona died. Mr. Ardeshir B. Mehta of the same place, Parsoda station, N. S. Ry., (Vaijapur-Aurangabad) makes the same statement and adds that it is on account of the unreliable stock supplied to him that he is suffering up to the present time; whilst the above represents the concensus of the answers, Parbhani (Manwath) alone has it, to state that the supply is often satisfactory.

It appears that the stock supplied by nurserymen is not reliable or there is neither demand nor supply. Nawab Sir Nizam-ut Jung (Ennapally, Atrabalda District, Shaha-abad Taluka) considers the supply generally reliable; Tul-japur Taluka (Osmanabad District), Pathri Taluka (Parbhani District) Manjlegaon Taluka and Mominabad Taluka, Bhir District, Rajura Taluka, Adilabad District, also state that the supply is reliable. In Osmanabad Taluka, Osmanabad District, the owners themselves get their supplies from Nagpur and Poona or got their servants to get them; Nanded Taluka, Nanded District, states "outside nurserymen bring santra plants only once a year" while Basmatnagar Taluka, Parbhani District, states that supply is got from Nagpur but they are not satisfactorily grown. Khammam Taluka, Warangal District, considers the question too difficult to answer!

Question 4 (3):—Is there any scope for establishing main fruit-growing localities? Can private agencies take up this work if encouragement is given by Government?

Answer:—It is generally agreed that if Government help is given there is every scope for the establishment of nurseries and that private agencies would willingly take up the work.

In the Aurangabad taluka of the Aurangabad District there is great scope provided technical advice and supervision by responsible instructors are assured and water sources, *e. g.* tanks, channels, streams etc., can be relied upon for a regular and constant supply of water.

Mr. Khader Murtuza Hussain, Troop Bazaar, Hyderabad-Deccan (Vikarul-Umra Paiga) is of opinion that the establishment of nurseries by Government will involve large expenditure of money. If instead Malies are appointed for the work (Nursery) in the private gardens of Zamindars, etc., and the village Patwaries made to take interest thousands of plants can be sold and at less expense.

The Tahsildar of Ahmadpur (Bidar) is hopeful of progress in this direction if—

1. Government establish Model Fruit Farms.
2. Sources of irrigation are improved and extended.
3. Water is not taxed for 3 years at least.
4. Government gives concessions to sink wells at their own cost.

The Naib Tahsildar of Valandi (Vikarabad) is of opinion that there is little hope of private persons taking up this sort of work even with Government help as there are no proper sources of water supply "and the people are not much interested in fruit growing". Mr. Bandulal Samaldas Seth of Vaijapur (Aurangabad) agrees that there is scope for establishing nurseries "provided cost of plants is less than outside". Mr. Ardeshir B. Mehta of Parsoda Station, N. S. Ry. Vaijapur, Aurangabad, also agrees that a nursery can be "established in his garden and suggests that technical and financial encouragement should be advanced by Government". Mr. Bezonji Faridoonji whilst agreeing with the proposal is prepared to give his lands and spend money if Government will send a capable man to handle the work.

Mr. Mahomed Ibrahim, Koheer (Bidar), states that the soil is eminently suited for fruit growing and the supply of plants by a Government nursery will be a great encouragement.

In Kalabgur and Siddipet talukas (Medak District), Gulbarga, Chincholi, Indola of the Gulbarga District, Shahabad and Narsapur talukas of the Shahabad District, Karimnagar, Sultanabad, Mahadeopur, Jaktial and Pakhal talukas of Karimnagar District, Mahabubnagar and Nagarkurnool of the Mahabubnagar District, Jangaon, Nalgonda and Suriayapet talukas of Nalgonda District, Nizamabad and Bodhan of Nizamabad District, Rajura and Both of Adilabad District and Chinnur of Asifabad District, there is said to be no scope for reasons unexplained; while in Bhir Mominabad, Georai, Patwada talukas of Bhir District; Parbhani, Uasmathnagar, Hongoli, Jintur and Kalamnoori talukas of Parbhani and Khammam taluka of Warangal District there is every scope. Nilanga taluka of Bidar District suffers from insufficiency of water and therefore there is no hope of starting nurseries and none would agree to take up the work. In Alampur taluka, Raichur District, the people, it appears, are preparing grafts for mangoes and, therefore, there is no need of establishing nurseries and no encouragement is wanted! Bhodan taluka of Nizamabad District forsee every scope on account of the introduction of the Nizamsagar canals. In Tuljapur taluka of Osmanabad District it is said there is a little hope of success while in Kallam taluka of the same district, Tahsildar finding that "Fruit Culture is not developing and people have no interest in it", went personally on tour in this taluka to describe the benefits to the cultivators. It seems they do not want fruit culture to be developed owing to:—

1. want of experience, 2. want of encouragement,
3. Railway distance!

V. CULTURAL TREATMENT.

Question No. V (1). What are the existing methods of cultivation? Do cultivators adjust their crops according to the soil, water and climatic conditions? And in what way? Do fruit crops pay them by following their own methods? If not what are the defects?

Answer.—Whilst no very clear idea is given the generality of answers show that the expressions "Old system", "or the old methods" or the "Ordinary Methods", the "Present Methods", of cultivation of fruits are not different from "the ordinary", or "the existing methods of fruit cultivation are of the old type" are answers to this question. Mr. Bezonji Faridconji of Jalna is perhaps more explicit when he explains that "the existing methods of fruit cultivation are of the old type viz, merely applying water to keep the trees alive. No manure is given and, if any, it is stable manure and that at intervals of 3 to 4 years".

Mr. Ardeshir B. Mehta, retired Inspector of Customs, at Parsoda (a station on the N. S. Ry.) Vaijapur taluka, Aurangabad District, states "we employ proper methods to adjust the crops with the technical advice from the Poona Agricultural College and other Poona nurserymen also to the soil, climate, water and climatic conditions."

In the Aurangabad taluka of the Aurangabad District the tendency, it appears, is confined to "Ordinary methods as people generally do. No loss is found in fruit culture because of the fact that the rich and those who have taken interest in it are getting experienced malies from Nagpur and Poona. The Malies of this taluka have no experience and knowledge of the methods of fruit cultivation."

In Jalna taluka after making pits of 2 feet square the trees are planted and water is given every fourth day. This is done till 4 or 5 years. No manure is used during this period. Only red soil is used at the time of planting. Some cultivators use manure after that period and some do not. The cultivators cannot get profit owing to the heavy cost of cultivation and high prices. If not they would have got much by following their own methods.

In Vaijapur taluka, Aurangabad District, the people do as it is done ordinarily! In the Gangapur taluka of the Aurangabad District, Kallam, Tuljapur, Latur and Osmanabad talukas of the Osmanabad District, Nanded, Kandahar talukas in Nanded District, Rajura taluka in Adilabad District, Bidar and Nilanga talukas of Bidar District, Alampur in Raichur District, Mominabad and Manjlegaon

talukas of Bhir District, Parbhani, Basmathnagar, Jintur and Kalamnoori talukas of the Parbhani District, cultivators adjust their crops according to climatic conditions. Fruit crops pay them by following their own methods.

In Khuldabad taluka of Aurangabad District cultivators adjust their crops according to climatic conditions. Their profit is not much owing to scarcity of water, lack of varieties and sufficiency of manures and special knowledge regarding the same. In the Kannad taluka of Aurangabad District cultivators adjust their crops according to climatic conditions. It is profitable to them by following their own methods. In the Ambad, Bokhardan and Sillode talukas it is the same as also in the Pargi and Nagarkarnool talukas of the Mahabubnagar District.

Nawab Sir Nizamat Jung Bahadur (Ennapalli, Shahabad taluka, Atrasbalda District) states that the present methods are unmethodical for want of proper knowledge and trained men. In Gulbarga and Udgir talukas, Gulbarga District, it is the same. In the Jaktial taluka, Karimnagar District, no costly fruits are grown except mango, guava and lemon. Pits $1\frac{1}{2}$ yards are made in which hay is burnt. After two or three days manure is put into them and the trees are planted. The kind and quantity of manure to be used is unknown. For this reason they are unable to get much profit. In the Hingoli taluka of the Parbhani District pits $2\frac{1}{2}$ ft. in depth 1 foot in breadth are made and filled with manure before planting. Papayas are planted at one yard distance but of other fruit trees 15 to 18 feet distance. The adoption of their own methods is profitable.

Question V (2).—In the successful growing of certain crops the proper methods of pruning, root exposure and the like have to be practised. Do the growers of those particular crops know such methods? Do their plantations suffer in yield due to lack of such special knowledge?

Answer:—Generally pruning, root exposure etc. are not understood, nor practised and plantations are said to suffer owing to lack of such knowledge and consequently loss is suffered. Whilst cultivators are said to know the

methods, the yield, it appears is little. At Parsoda (Vaijapur-Aurangabad) citrus pruning, root exposure and manuring are practised but not with other kinds, such as apples, figs, peaches etc., owing to lack of technical workers. And Bidar (Koheer) reports that want of technical knowledge, particularly plant diseases, made many to abandon their gardens. In the same taluka, grape vine, it is said to have been pruned and protected from insect attacks and people know how to do these.

Whilst the methods of pruning, root exposure etc., are said to be known in certain talukas and neither known nor heard of in others, it is clear that nothing of the kind is actually practised. This statement is confirmed by Nawab Sir Nizam Jung Bahadur in the following words.—

“Hardly anything of the kind is done, and the plantations do suffer for lack of proper methods of treatment.”

Question V (3).—Are the orchard crops properly spaced to allow sufficient space to work implements by bullock power?

Answer:—In certain places, for instance, in Manwath taluka, (Parbhani District), Hadgaon (Nanded), Sirsilla (Karimnagar), Deodurg (Raichur), Adilabad (Asifabad), Seram (Gulbarga), Lakshitepet (Adilabad), Valandi (Vikarabad), Parsoda (Station N. S. Ry), Vaijapur. Aurangabad, Jalna (Aurangabad), Koheer (Bidar) etc, the distance is said to be properly spaced to allow of implements worked by bullocks operating freely, whilst planting distance, it is said, is neither understood nor practised in other places e. g., Bhoom Jagir, (Osmanabad District), Mudhol (Nanded), etc. In some other places like Lakshatipet (Adilabad), Sirsilla (Karimnagar), Koheer (Bidar), etc, sufficient spacing is observed in the case of mango plantations and in the case of plantations in Deodurg (Raichur District).

None wishes to admit ignorance of the correct distance between plants but rather to blame nature, e. g.

the answer from the Aurangabad Taluka, Aurangabad District is "Yes", "but it is not possible after the trees reached to the age of 15 to 20 years".

Jalna Taluka (Aurangabad District) states "trees are planted 15 and 16 feet distant from one another at first. When they grow larger the space left is covered by their branches." Therefore no possibility of working implements by bullock power! Bidar taluka, Bidar District, states "it is possible in the Guava garden," Karimnagar Taluka, Karimnagar District, states "It is possible only in the Mango Gardens!" Of course it is not so every where, but here and there they are properly spaced.

Question V (4)—What is the manure used at present and what is its source?

Is the existing supply adequate?

Are the orchards timely and properly manured?

Do fruit trees suffer for want of manure?

Answer:—Generally farm yard manure, sweepings of houses, cattle dung such as cow, sheep and goat dung, and these, it is said, are available in sufficient quantity locally. Farm yard manure, it appears, is used by the Ryots in Uttanur (Asifabad) for their dry crops, whilst in Lakshatipet (Adilabad) the manure is used only for Agricultural crops. At Parsoda (Vaijapur Taluk, Aurangabad District) sheep manure is said to be used once a year and the supply though adequate, is brought from a distance. In Koheer (Bidar) only when mango seeds are planted, cattle manure, prickly pear and sand are used. Manures are not used for mango, grape, and plantains nor the other fruit trees. Mango seedlings are said to yield fruit in Koheer earlier than others. People here, it seems, manure only their plantain crops with farm yard manure. Other fruit crops are not manured at all and their fruit, it is said, are produced from what natural plant food there is in the soil.

In the Aurangabad Taluka, Aurangabad District, the following are the manures used.—Cattle dung, Human excreta, red soil, dilution of asafoetida and salt, carcasses of

animals, bones, blood from slaughter houses etc. In Jalna Taluka "Dung Manure" is used and the supply is adequate. "No fruit trees suffer for want of manure." "This year manure taken from the Agricultural Department is used in Mr. Mohamed Khan Saheb's Garden, but in vain because the yield is not such as desired". In the Gangapur and Khuldabad Talukas, Aurangabad District, dung and sheep manure are used. That too is not adequate. Fruit trees suffer for want of it. In Kannad Taluka manure giving is not in practice, only oilcakes etc. are used. In Ambad taluka Dung and ash are used. The supply is not adequate. Therefore fruit trees suffer for want of it. In the Bokardan Taluka of the same District animal manure is used; though the supply is adequate the yield is not such as it ought to." They do not know in what capacity the dung manure is used !

In the Sillode Taluka of Aurangabad District cattle dung is used. Fruit trees do not suffer for want of manure.

In almost all the Talukas of all the Districts cattle dung (mixed with red earth) obtained from the cattle of the cultivators which is generally insufficient is used. Fruit trees suffer on this account in some of the talukas whilst in others fruit trees do not suffer for want of manure. The position may be summed up in the words of Nawab Sir Nizamat Jung Bahadur: -

"Cow dung & ordinary rubbish supply hardly adequate.

Manuring very irregular—Trees do suffer."

Question V (5) Do the growers use Organic manures and oil cakes to supplement Farm Yard Manure?

Answer:—No artificial or organic manures are made use of to supplement farm yard manure in any place except in Adilabad (Asifabad Kasba) and in Nanded (Nanded District) in which places according to the brief answers recorded it appears that "they are used."

Bone meal is not available and crushed bones are hardly ever used, oil cakes are sometimes used but very rarely by those who know its use. This is about all that can be gathered from the answers of the several talukas of the various Districts.

Question V (6).—What are the assured and controlled water supplies, lift or canal? In the former what are the principal sources? Wells or rivers or tanks?

Answer.—Evidently this question has not been understood. The first part of the question is whether water supplies are assured and controlled by lift or canal. The general answer vouchsafed is merely “Wells”, or “Wells and Nalas”, or “Wells, Nalas, Tanks”, exist, which in reality would be the answer for the second part of the query as the principal sources of the water supplies which are controlled by lifts.

In short, what is meant is, lift by means of ordinary *whote* from wells, which is as much as can be understood from the answers from all talukas in all the Districts.

Question V (7).—Do any fruit plantations exist on defective and unassured water supply? Can such fruit crops be adjusted as will give harvest within the period of availability of water?

Answer.—There is no place in Daulatabad which with adequate supply of water cannot procure and harvest its crop in time. In Hadgaon (Nanded), Deodurg (Raichur), Seram (Gulbarga), Mudhol (Nanded), Valandi (Vikarabad), Khammam (Warangal Dist.), Pathri (Parbhani Dist.), Mominabad and Patwada Talukas (Bhir Dist) Nelinga (Bidar Dist.) Nizamabad, the answer is more or less a mere “No”. In Bhoom Jagir (Osmanabad) it is said that there is enough water obtainable till the crops are ready. The Naib Tahsildar of Valandi (Vikarabad) states that many fruit plantations exist on unassured water supply lands but that the result is hardly worth counting. There are some gardens in Parsoda (Station N. S. Ry.) in Vaijapur Taluk, Aurangabad district with insufficient supply of water, and Mr. Ardeshir B. Mehta, suggests that if the Government can help them to bore down the wells so much the better for fruit industry. In Jalna, it is said, in any drought years when the well is dried up the garden trees are totally destroyed.

In Vaijapur Taluka, Aurangabad District, trees are planted according to the capacity of water in the wells. If

there happens to be a shortage owing to deficient rainfall, only the costly and good trees are given water to save the trees.

In the Kannad Taluka, it is said, "Jambagh only is supplied water by the river. That too is in a bad condition now."

Aurangabad District I.—In the Bokerdon Taluka, fruit trees are planted where there are assured water supplies. Fruit crops can be adjusted as well give harvest within the period of availability of water in some places.

Medak District:—In Indole taluka the fruit trees are given water from wells and some from tanks.

Gulbarga District:—In Yadgir no trees are planted where there is no adequate supply of water.

Nanded District:—In Nanded Taluka fruit gardens are situated near wells in which water is stocked in full quantity always even in the summer season.

Bidar District:—Mango and guava trees are generally planted near wells. If water in the wells is reduced the growers can do nothing.

Bir District:—In the Manjlegaon taluka fruit plantations do not exist where there is no supply of water. The places where the fruit cultivation is carried on supply water till harvest time.

Parbhani District:—In the Parbhani Taluka water is supplied from wells. Fruit crops can be adjusted as will give harvest within the period of availability of water.

In the Basmathnagar Taluka fruit plantations exist on defective water supply and fruit crops cannot be adjusted up to harvest time.

In the Hingoli Taluka the crops are lost if the wells fail before harvest.—To sum up, nearly all suffer on account of defective and unassured water supply while adjusting is hardly possible.

*Question V (8).--*What are the systems of applying water? Can any improved method be introduced by which economy in water could be made without affecting the crop?

*Answer :—*Mr. Syed Kamaluddin, Khaji O. Khabib, Bhoom, Osmanabad, states that he has invented a machine which can be worked by a boy or woman and give two *whotes* of water without any animal power and without any recurring and extra expenditure. The cost of this machine will never go beyond Rs 200/- and it will serve for 50 years. He has no capital to start a factory with a view to help the cultivators. The suggestion made from Daulatabad (Aurangabad) is that if the tanks are thoroughly restored and arrangements made for irrigation by pipes etc., there is every possibility of success. Ahmedpur (Bidar) suggests that Government should help the ryots to sink wells and construct suitable dams in the Nalas for the water to be utilized for cultivation. Mr. Kbaja Ismail, Bar-at-Law, Vicar Manzil, Vikarabad, states that the old bullock *mhote* system is the general method and is of opinion that Artesian wells are required all over the country to give a continuous supply of water. At Parsoda Mr. Ardeshir B. Mehta, Retired Customs Inspector has two oil engines and pumps each drawing 15,000 gallons of water per hour. This system, it is said, is very economical and efficient. Others suggest the erection of oil engines and pumps by which irrigation will become easy and profitable.

*Aurangabad District:—*Drains are made to run water from wells which absorb much of the water intended for trees. It is suggested that small pipe systems or assured and controlled drains to carry the water to the ground where it is required should be provided as some such means would reduce wastage of water, labour and time.

1. Vaijapur Taluka.
2. Gangapur Taluka.
3. Ambar.

Gulbarga District:—"*Mhote*" is the only system. Hand pumps, it is said, should be introduced.

1. Yadgir Taluka.
2. Kodangal Taluka.
3. Sultanabad, Karim-nagar District.

} Think that there is "no need of any improved method for these talukas as there is no fruit culture."

Nalgonda District:—States except the installation of water lifts, nothing would be improved.
Huzurnagar Taluka.

Nanded District:—The people here it appears, “know no other methods except the old method of *Mhole*.”
Nanded Taluka.

Parbhani District:—States “The system by which water is supplied is ‘Lift’. Economy could be made if any other improved method be introduced.”
Hingoli Taluka.

QUESTIONNAIRE

(1) What are the kinds of fruits grown? How

(2) What are the wild varieties of fruits grown

The answers are

District	Taluka	Source	Names of									
			Mango	Orange	Santra	Mosambi	Kaula	Sour Lime	Plantain	Guava	Fig	
1	2	3	4	5	6	7	8	9	10	11	12	
Aurangabad ...	Daulatabad ...	...	...	O	...	...	...	...	...	...	F
	Vaijapur (Pathri)...	...	...	O	...	M	...	...	...	...	...
	Vaijapur ...	...	...	...	S	M	...	...	...	...	...
	Vaijapur (Parseda) ...	Mr. Ardeshir B. Mehta	...	O	...	M	...	...	...	...	...
	Jalna ...	Mr. Bezonji Faridoonji	...	...	...	...	...	...	P	G	F
	Aurangabad ...	Tahsildar	M	...	S	M	...	...	P	G	F
	Jalna ...	do	..	...	S	M	...	...	P	G	...
	Vaijapur ...	do	...	...	S	M	...	...	...	...	...
	Gangapur ...	do	M	...	S	M	...	...	P	G	F
	Amber ...	do	M	...	S	M	K	...	P	G	...	
	Bhokardan ...	do	M	O	S	...	...	...	P	G	...
	Sillode ...	do	M	...	S	...	...	...	P	G	...
Medak ...	Indole ...	do	M	O	...	...	...	...	G	...	

District	Tahsil	Source	Names of								
			Mango	Orange	Sautra	Mosembi	Kaula	Sour Lime	Plantain	Guava	Fig
1	2	3	4	5	6	7	8	9	10	11	12
Adilabad ...	Rajura ...	Tahsildar	...	O	S	...	...	...	P	G	F
	Lakshatipet ..	do	M	...	...	...	...	...	...	...	...
Bidar ...	Koheer ...	do	M	...	...	...	...	...	P	G	...
	Kcheer ...	Md Awd Chats	M	...	...	...	...	...	...	G	...
	Bidar ...	Tahsildar	M	...	...	...	...	...	...	G	...
	Nelinga ...	do	M	...	...	...	...	...	P	G	...
Adilabad ...	Adilabad ...	do	M	...	S	...	...	SL	P	G	...
	Asifabad ...	do	M	...	S	...	...	...	...	G	F
Raichur ...	Alampur ...	do	M	...	...	...	...	...	...	...	...
	Deodurg ...	do	...	...	...	...	...	...	P	G	...
Bhir ...	Bhir ...	do	...	...	S	...	...	SL	P	G	...
	Mominabad ...	do	M	O	...	...	...	...	P	G	...
	Patwada ..	do	M	...	...	...	...	...	...	...	...
	Manjlegaon ...	do	...	...	S	...	...	...	...	G	...
Parbhani ...	Basmathnagar...	do	M	...	S	...	...	...	P	...	...
	Hingoli ...	do	M	...	S	...	...	...	...	G	...
	Jintur ...	do	M	...	S	...	...	...	P	G	...
	Manwath ...	do	M	...	S	...	...	...	P	G	...
	Kalamnoori ...	do	M	...	S	...	...	...	...	G	...
	Pathri ...	do	M	...	S	...	...	SL	P	G	...

District	Taluka	Source	Names of								
			Mango	Orange	Santra	Mosambi	Kaula	Sour Lime	Plantain	Guava	Fig
1	2	3	4	5	6	7	8	9	10	11	12
Warangal	Khammam	do	M	O	...	...	...	...	P	G	...
Atrafibalda (Paiga)	Vikarabad	do	M	O	...	..	...	...	P	G	...
do	do	do	M	O	...	...	K	...	P	G	F
do	BaldaHyderatad	do	M	O	...	...	...	S L	P	G	F
Vikarabad	Valandi Paiga	do	M	...	...	...	...	...	P	G	...
Atrafibalda (Paiga)	Narsyankhed	do	M	...	...	...	..	...	P	...	...

DISTRICT	TALUKA	Bhere	Cashew Nut	Wood Apple	Custard Apple	Ramphal	Jamun
		1	2	3	4	5	6
Aurangabad	... Daulatabad	... B	... W A	...	...	...	...
do	Vaijapur. ... Pathri	... B	...	...	...	...	...
do	do ... Parsoda	... B	...	...	...	...	...
Aurangabad	... Jalna	... B	...	CA	R	J	
do	... Aurangabad	... B	... W A	CA	...	J	
do	... Patan	... B	...	CA	...	J	
do	... Vaijapur	... B	...	...	...	...	...
do	... Gangapur	... B	... W A	...	...	...	...
do	... Khuldabad	... B	...	CA	...	J	
do	... Kannad	... B	...	CA	...	J	
do	... Ambar	... B	... W A	CA	...	J	
do	... Bhokerdan	... B	...	CA	...	...	...
do	... Sillode	... B	...	...	...	J	
Atrafibalda	... Shahabad	...	...	CA	...	...	...
do (Paiga)	... Vikarabad	...	...	CA	...	...	...
do do	do	... B	...	CA	...	J	
do do	... Hyderabad Balda	B	...	CA	...	...	...
do do	... Narayankhed	... B	...	CA	...	J	
Vikarabad	... Valandi	... B	...	CA	...	J	

DISTRICT	TALUKA	Bhere		Castewnut	Wood Apple	Custard Apple	Rampal	Jamun
		1	2					
		3	4	5	6			
Medak	... Kalubgur	... B	...	W A	CA	...	J	
do	... Siddipet	...	...	...	CA	...	...
do	... Indole	...	...	...	CA	...	...
Gulbarga	... Gulbarga	...	...	...	CA	...	...
do	... Yadgir	...	...	...	CA	...	...
do	... Chincholi	...	...	...	CA	...	...
do	... Kodangal	...	...	...	CA	...	...
Shahabad (Paiga)	... Hasanabad	... B	...	...	...	...	J
do	... Shahabad	... B	...	...	CA	...	...
do	... Narsapur	... B	...	...	CA	...	...
Karimnagar	... Karimnagar	...	...	...	CA	...	...
do	... Sultanabad	...	...	...	CA	...	...
do	... Huzurabad	...	...	...	CA	...	...
do	... Jagtial	...	...	...	CA	...	...
do	... Parkal	...	...	...	CA	...	J
Mahbubnagar	... Mahbubnagar	... B	...	...	CA	...	...
do	... Pargi	... B	...	W A	CA	B	...	
do	... Nagarkurnul	... B	...	W A	CA	...	J	

DISTRICT	TALUKA	Here	Cashewnut	Wood Apple	Custard Apple	Kamphal	Jamun
		1	2	3	4	5	6
Mahbubnagar	... Kalwakurti	...	...	...	C A	...	...
Nalgonda	... Miryalguda	...	...	...	C A	...	...
do	... Jangaon	...	...	...	C A	...	...
do	... Nalgonda	...	...	...	C A	...	...
do	... Suryapet	...	...	...	C A	...	...
Osmanabad	... Bhoom jagir	... B	...	...	C A	...	...
do	... Tuljapur	... B	...	...	C A	...	...
do	... Latur	... B	...	...	C A	...	J
do	... Osmanabad	... B	...	...	C A	...	J
Nanded	... Nanded	... B	...	WA	C A	...	J
do	... Mudhol	... B	...	...	C A	...	...
Nizamabad	... Kamareddy	...	...	...	C A	...	...
do	... Bhodan	...	CN	...	C A	...	...
Raichur.	... Deodrug	...	...	WA	C A	...	...
do	... Lingsugur	... B	...	...	C A	...	...
do	... Alampur	...	...	...	C A	...	...
Adilabad	... Adilabad	...	...	...	C A	...	...
do	... Lakshit pet	... B	...	WA	C A	...	J
do	... Asifabad	... B	...	WA	C A	...	J

7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Suwa Jamun	Chare Bore	Pandu	Wild F (Gallair)	Charoli	Chironji	Tamarind	Karonda	Gooseberry Awla	Karna	Marking Nut (Bhilawa)	Tendu	Pulichetuphal	Tada	Sorji	Wild Date	Tendwal	Bael Fruit	Kirni	Purgi	Marlipandu	Chitmitapandu
..
..	W F	..	..	..	K	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..
..
..	CB	P	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..
..
..	W F	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..
..	M N	..	..	..	..	..	..	..	..	..	..	..
..
..	Ch	..	..	..	..	M N	..	..	..	..	..	..	T	B F	..	..	..
..	C	..	..	..	..	..	..	T	..	..	..	..	..	..	..	..	..	..
..	W F	..	..	..	..	..	..	M N T	..	..	..	..	..	..	..	..	..	..	..
..	K	..	..	..

DISTRICT	TALUKA	Ehere	Cashewnut	Wood Apple	Custard Apple	Ramphal	Jamun
		1	2	3	4	5	6
		Adilabad	... Rajura
do	... Bhot	... ..	... ..	... ..	C A	... ..	... ..
Bidar	... Ahmedpur	... B	... ..	... ..	... ..	... ..	... ..
do	... Koheer	... B	CN	... ..	C A	... ..	... ..
do	... Bidar	... ..	... ..	... ..	C A	... ..	... ..
Bhir	... Bhir	... B	... ..	... ..	C A	... ..	J
do	... Mominabad	... ..	... ..	... ..	C A	... ..	... ..
do	... Georai	... B	... ..	... ..	C A	... ..	J
do	... Patwada	... B	... ..	... ..	C A	... ..	... ..
do	... Manjlegaon	... B	... ..	... ..	C A	... ..	J
Parbhani	... Parbhani	... B	... ..	... ..	... ..	... ..	... ..
do	... Jintur	... B	... ..	... ..	C A	... ..	... ..
do	... Pathri	... B	... ..	... ..	... ..	... ..	J
Warangal	... Khammam	... B	... ..	... ..	... ..	... ..	... ..
Dongal (Nawab Salar Jung's Estate.)	... Raigir	... ..	... ..	... ..	CA	... ..	... ..

VII—INSECT PESTS AND DISEASES.

Question VII (1)—Are any of the Fruit Crops liable to insect pests and diseases? If so, what is the extent of damage done?

Answer

District	Taluka	Fruit	Are fruit crops liable and what is the nature of disease or pest and extent of damage?
Aurangabad	Daulatabad	Fig	Attacked by borers.
do	Pathri, Vaijapur.	Grape Vine	Attacked by Caterpillars.
do	Vaijapur	Orange, Mosambi, <i>Amba bahar</i> & <i>Hatta bahar</i> fruit	Attacked by birds and flying foxes. Damage to the extent of 10 per cent.
do	Jalna	Fruit in general	Attacked by pests and diseases.
do	do	do	Loss is four annas in the rupee.
do	do	do	"Yes"
do	Aurangabad	do	"No"
do	Patan	do	"Yes"
do	Gangapur	do	"Yes" 4 or 8 annas in the rupee.
do	Khuldabad	do	

Aurangabad	...	Kannad	...	"Yes"
do	...	Ambar	...	"Yes" 4 or 6 annas in the rupec.
do	...	Bhokardan	...	"No"
Atrafalda	...	Sillode	...	"No"
	...	Shahbad	...	"Yes" "A good deal of damage
	...	(Ennapalli)	...	is done and many bearing trees
Medak	...	Kalubgur	...	are destroyed."
	...	Siddipet	...	"Yes"
Gulbarga	...	Gulbarga	...	"Nil"
do	...	Yadgir	...	"Nil"
do	...	Shahpur	...	"Yes" at 8 per cent.
do	...	Chincholi	...	"Yes"
dc	...	Dodangal	...	"No"
Shahabad	...	Husanabad	...	"No"
do	...	Narsapur	...	"Yes" about 2 to 4 annas in the
Karimnagar	...	Karimnagar	...	rupee.
do	...	Sultanabad	...	"Nil"
do	...	Mahadevpur	...	"No"
do	...	Jaktial	...	"No"
Mahbubnagar	...	Mahbubnagar	...	"No"
do	...	Pargi	...	"Yes" damage is done to some
	...	Jangaon	...	extent.
Nalgonda	...	Huzurnagar	...	"Nil"
do	...	Kallam	...	"Nil"
Osmanabad	...		...	"Technical experts are expected
	...		...	to observe these. People do not
	...		...	know them."

...

Mango

ANSWER TO QUESTION VII (1)—contd.

District	Taluka	Fruit	Are fruit crops liable and what is the nature of disease or pest and extent of damage ?
Osmanabad	Tuljapur	...	"No"
do	Latur	...	"If any diseases come upon the crops the cultivators try to remove them as far as their knowledge in it goes. Of course damage is done some times, but the extent cannot be given."
do	Osmanabad	...	"Rarely; not much damage is done."
Nanded	Nanded	Guava	"Attacked by Maggots."
do	Kandahar	Fruit crops	"Attacked by insect pests, but the growers do not know the controlling methods."
do	Hadgaon	Common fruits	"No" "Very little affected by insects and diseases."

Named	...	Hadgaon	...	Common fruits	...
Nizamabad	...	Nizamabad	...	Common fruits	...
do	...	Bodhan	...	Common fruits	...
Atilabad	...	Asifabad (Kasba).	...	Common fruits	...
		Rajura	...	Common fruits	...
		Chinnur	...	Common fruits	...
		Bhot	...	Common fruits	...
Bidar	...	Koheer	...	Guava Mangoes	...
		Bidar	...	Mango	...
		Nelinga	...	Mango	...

"Insects do considerable damage"
Mr. Abdul Matin Khan adds that
this year a fourth of the Guava
crop was lost owing to worms in
the fruit."

"Squirrels, monkeys and parrots
do considerable damage. No
insect pests."

"Neither any fruit gardens nor
any such diseases."

"Existing fruit plantations have
never been damaged by insects."

"No diseases, but damage is done
by insect pests."

"No"

"No"

Attacked by maggots.
By insects and termites and borers
in stems of trees. A number of
nurseries destroyed by ravages
of insect pests.

"Insects."

"No"

ANSWER TO QUESTION VII (1) - contd.

District	Taluka	Fruit	Are fruit crops liable and what is the nature of disease or pest and extent of damage?
Raichur	Alampur	...	Fruits are undoubtedly damaged to the extent of about 2 annas in the rupee.
Bhir	Deodurg	Bhere	"Affected by maggots."
Bhir	Bhir	...	"Yes" about one to two annas in the rupee.
Parbhani	Georai	...	"No"
Parbhani	Patwada	...	"Yes"
Parbhani	Manwath	...	The damage and subsequent loss are very great. Plantations generally suffer from insect-pests and other diseases which affect the produce to a certain extent.

Parbhani ...	Parbhani ...	Damage is done often but the cultivators do not observe.
	Basmathnagar ...	No, but slight damage is done accidentally.
	Kalamnoori ...	A little damage would be done if the crops are attacked by insect pests.
	Pathri ...	Yes, the damage done sometimes to the extent of half the yield and sometimes less.
Warangal ...	Khammam ...	"No"

Question VII (2):— Do the growers try to control them by their own methods? If so, what remedies do they use for the particular trouble?

Answer:—“If any insect or disease occur the growers are quite helpless; people do not know how to deal with attacks of insect pests.” “Bagwans control insect pests by their own methods.” “There are no means to protect trees from insects and it appears to be almost an impossible task.” “The growers try to control the diseases in haphazard manner.” “Nothing like the manner in practice in other fruit growing countries.” “Some growers do try to control them by their own ancient methods, but generally speaking people are quite ignorant.” “People do not get at the cause of the trouble; when a tree dies they do not know why it has died.” “Spraying has not been appreciably beneficial.” “The growers burn some fuel or hay and try to avoid the pests by the fumes; but this method is not successful so far.” “Mr. Bezonji Faridoonji states that growers try no remedy because they are ignorant and leave the fruit to the mercy of insects and God!” “Tar is used for the control of termites and for other insects; holes are drilled and mercury put in; mangoes are damaged by cloudy weather and people do not know how to deal with them.”

Aurangabad Taluka, Aurangabad District:—“Salt water and Jaggery water are said to be remedies.” For what fruit or trees and in what circumstances these are used is not explained.

Jalna:—“Kerosine oil and phenyle is poured into the holes.”

Vaijapur:—“Ordinary remedies are used.”

Gangapur:—“Camphor, sweet oil and asofoetida are mixed and sprinkled on the trees and some phenyle.”

Ambad:—“No remedies are known.”

Bhokardan:—“No.”

Sillode:—“No.”

<i>Kalubgur Taluka</i>	}	"No knowledge."
<i>Medak District</i>		
<i>Shahapur</i>	}	"No knowledge."
<i>Gulbarga Dist.</i>		
<i>Chincholi.—</i>		"No"
<i>Kodangal.—</i>		"No"

Shahabad District:—

<i>Hasanabad Taluka</i>	}	Nil.
<i>Shahabad</i>		
<i>Narsapur</i>		

Karimnagar District:—

<i>Karimnagar.</i>	}	Nil
<i>Sultanabad.</i>		
<i>Huzurabad.</i>		
<i>Mahadevpur</i>		
<i>Jaktial.</i>		
<i>Parkal.</i>		

Mahabubnagar District:—

<i>Mahbubnagar.</i>	}	Nil
<i>Amrabad.</i>		
<i>Mukthal.</i>		
<i>Kalwakurti.</i>		

Nagarkurnool. Except mercury nothing is used.

Pargi:—"Having in vain been trying to control them the growers leave the crops to God's care."

Nalgonda District:—

Huzurnagar. Mercury is used when mangoes are attacked by insect-pests and diseases.

<i>Miryalguda.</i>	}	Either "don't know, or can't say"!
<i>Jangaon.</i>		
<i>Devarkonda.</i>		
<i>Nalgonda.</i>		
<i>Suriyapet.</i>		

Nizamabad District:—

Bhokardan.—“There is no such fruit cultivation to answer this question”!

Adilabad District:—

Rajura.—“Salt is used by which the crops are saved.”
Bhot.— “No”

Asifabad }
Chinnur. } Nil

Bidar District:—

Nilanga.—“No necessity.”
Bidar.—No remedies are used. People here do not know what to do to control them.

Raichur District:—

Khustagi.—Nil.
Alampur.—“Growers try to stop them but cannot. Something like drums are used in the nights to make them fly.”

Note:—According to answer to Question VI (1) mango and kharbooza only are grown.

Bhir District:—

Mominabad.—“No remedies are tried.”
Patwada.—“Do not know.”
Manjlegaon.—“Growers try their best to control them.”

Osmanabad District:—

Kallam.— “No.”
Tuljapur.—“No remedies are needed !”

- Latur:—(1) To the roots of mango, jaggery or salt is given.
(2) Bones of dead animals are given to orange, lemon, sour lime and fig.
(3) The blood of sheep is used for pomegranate.

- (4) Regarding citron, grape and guava the soil is removed from the roots and fresh soil is put.
- (5) The method of root exposure is observed for plantain.
- (6) Salt is given every five years to sour lime.

Osmanabad.—“No knowledge.”

Nanded District:—

Nanded.—“Do not know.”

Kandahar.—“No”

Nizamabad District:—

Nizamabad.—“Do not know.”

Kamareddy.—“No such gardens as to observe them.”

Parbhani District:—

Parbhani.—“No technical experts. But villagers use salt and camphor.”

Basmathnagar.—“Salt, mercury and other things are used. But the cultivators do not know the particular things by which they can get rid of the disease.

Hingoli.—Mercury and some other medicines are used, after antiseptic oil is used.

Jintur.—No technical experts to control but cultivators.

Kalamnoori.—Several remedies are used.

Pathri.—Yes. But no particular methods and the results also are not ~~satisfactory~~.

Warangal District:—

Khammam.—Neither the trees are attacked with any disease nor the people know the remedy!

Nalgonda District:—

Raigir.—(Nawab Salar Jung Bahadur's Jagir). Nil.

The above is a summary of the answers *ad literatim*, to Questionnaire VII (2). It seems that beyond some primitive customs practised in certain localities to combat insect pests no effective measures exist for protecting existing fruit trees from their ravages.

Mr. Ardeshir B. Mehta, Retired Inspector of the Customs Department of Parsoda (Station N.S. Ry.), Vaijapur Taluka, Aurangabad District, hopes that some means will be devised by Government. In this connection it may be noted that growers in the Balda (Hyderabad), it appears, have now begun to seek the help of the Agricultural Department.

Question viii. Harvest and yield.

*Question (1).—*Are the fruits picked in the quite ripe stage or a little earlier? If so, what are the indications of ripeness?

*Answer.—*As to (1) the replies of the majority show that fruits are generally picked when quite ripe, in some cases when they show signs of ripening, that is, when they begin to turn yellow or when they begin to drop from the trees. In one or two places (e. g. Vikarabad) fruits are nearly always picked in a semi-ripe state to allow complete ripening in transit from one place to another, whilst yet in another place Jalna (Aurangabad), the crop is sold wholesale on trees to fruit merchants and the merchants remove the fruits according to demand.

*Question (2).—*What are the curing methods in practice? What improvements can be brought in them?

*Answer.—*Of the 1025 Questionnaire papers sent out 106 only have been received and of the 106 only 21 papers have something to say under the Head viii (2). The majority of replies show that "fruit is not produced in such quantities as to necessitate drying." The replies of others state that "there is no fruit worthy of such attention," "there is no scope for improvement," others again that "curing is done, by the ordinary method," that "Fruits dry naturally," that fruits are ripened in grass, that "there are

no fruits that can be cured or dried," that "people have very little idea in the method of curing," that "fruit is not dried ordinarily, fruits after being picked "are kept in cool well-ventilated places for some time," " mangoes are kept in bags for ripening," and "dried in cloth and packed in leaves and paper," and finally that fruits are sent to Bombay, Hyderabad, Surat, Baroda, Ahmedabad, etc, "there is no need for any improvement." Plantains are artificially ripened in air tight chambers (Bhattes) whilst "santras, mosambi and sour limes," "are packed in baskets lined with paper and closed after putting a layer of leaves on the top."

*Question (3).—*What is the cost of cultivation and what is the return obtained? Is any particular fruit growing a profitable concern? If not, Why? How could fruit farming be made economic?

Answer.—There is no business that has no profit in it. Gardens begin paying, according to the opinions of some after the 5th to 7th year and according to the opinion of others after the 7th or 8th year, whilst one (Koheer) states after the 3rd year. A plantation of 6-7 hundred trees (mangoes and guavas) cost about Rs. 45 a month and yields a net profit of Rs. 50 to 60 the 3rd year. After this the profit increases year by year. In the beginning it is all expenditure and no return whatever. It is said that the cost of maintaining a garden of 200 fruit trees is nothing less than Rs. 25 a month (excluding the initial cost of planting), but the return is always less, owing to there being no demand. In another instance, Vaijapur and Pathri record that unless at least 4 to 5 hundred trees are grown there is no profit. Cultivation costs Rs. 2 to Rs. 2-8 per tree and each tree gives a return of Rs. 3 to Rs. 5 now. Formerly it was Rs. 5 to Rs. 7. Another reason given for poor returns is high cost of cultivation, transportation difficulties, Railway freight, damage during transit, thefts, broker's commission. Vaijapur and Parsoda state that besides fodder charges, the annual cost of cultivation is from Re. 1 to Rs. 1-4-0 per tree. Cause of fall in returns is said to be due to dishonesty of brokers. Another point mentioned is that market prices are generally low and cost of cultivation high, whilst the high land assessment is also said to be another disturbing factor in the development of fruit culture.

Parsoda and Jalna make the suggestion that unless and until Government appoint a capable technical adviser in each district or at least in Aurangabad District to give technical advice, thrice a year, fruit farming cannot be expected to be developed, since the present growers or those who have gardens generally do not understand the use of manures or how to combat insect pests.

A detailed summary of the answers according to Talukas and Districts is appended.

AURANGABAD DISTRICT.

Aurangabad :—The cost of cultivation for one acre is Rs. 500 per year. No return is obtained for 10 years continuously. After that period the income will be Rs. 1000 per acre. The net return will be Rs. 500. Better returns will be obtained if more care is taken.

Gangapur :—It is understood that the cost of cultivation for 500 trees is Rs. 5,000.

Ambar :—The cost of cultivation for santra and guava is Re. 1 per tree, and for other fruits not much. The return from santra is Rs. 5 per 100, mosambi Rs. 4, kaula Rs. 3, sweet lime As. 8, mango Rs. 5, papaya Rs. 12, more return is obtained from plantain.

Sillode :—The cost of cultivation will be B. G. Rs. 250 for 100 fruit trees.

MEDAK DISTRICT.

Katubgur Taluka :—The cost of mango cultivation for one acre is about Rs. 500 for 5 years and the yearly yield is Rs. 100.

GULBARGA DISTRICT.

Yadgir :—The cost of cultivation for one acre is Rs. 100. The cultivators get Rs. 15 as profit yearly per acre after meeting expenses. Plantains and guavas are considered to be more profitable.

KARIMNAGAR DISTRICT.

Sultanabad :—The cost of cultivation for fruits is Rs. 50. There is much profit particularly in the mango and guava cultivation. The profit on mango is Rs. 50 per acre and on guava Rs. 25.

Huzurabad :—During the mango season two men are appointed on Rs. 4 or 5 for the protection of the fruits for three months.

Jaktial :—The cost of cultivation for one acre of fruits is Rs. 150 and the profit Rs. 15. Superior varieties being not procurable more profit cannot be made.

NALGONDA DISTRICT.

Suriapet :—The cost of cultivation per tree is Rs. 4 or Rs. 5. The tree begins to yield after 7 or 8 years. Therefore it is impossible to say how much profit to get in it.

OSMANABAD DISTRICT.

Kallam :—The cost of cultivation for plantain, guava and sugarcane, per acre is Rs. 400, gross income is Rs. 1000; profit is Rs. 600. The gross income for mango is Rs. 254 and the profit is Rs. 238 yearly.

Tuljapur :—(A). The cost of mango cultivation for one acre is Rs. 150 and the return Rs. 250. No profit is got from plantain and guava cultivation because the yield is very little.

(B) The cost of plantain and guava cultivation is Rs. 150. The return is Rs. 200. No profit from other fruits because of the heavy cost of cultivation.

Osmanabad :—The profit is three times the cost of cultivation.

NANDED DISTRICT.

Nanded :—“The cultivators of santra, guava and plantain will have to bear expenses for the first three years continuously.”

NIZAMABAD DISTRICT.

Nizamabad :—“No one in this Tahsil knows how to make it a profitable business concern. The cost of cultivation of fruit bearing plants is more than its return.”

ADILABAD DISTRICT.

Rajura :—“The cost of santra, guava cultivation is Rs. 90 per year; after two or three years the return is about Rs. 500.”

BIDAR DISTRICT.

Bidar :—“The cultivation of mango trees will have to bear expenses of all kinds without any return until five years. After that period the trees begin to bear fruits gradually. As years pass fruits would increase and the cultivators thereby get more profit.”

“Regarding guava trees the case is the same as mango trees but the time for coming into bearing is only 3 years.” “Water is to be supplied in the summer season. When in fruit the trees are given water daily.” “The more the expenditure the greater the profit, but the cultivators do not know the economic methods of fruit culture.”

RAICHUR DISTRICT.

Alampur :—“The expenses for 100 karbooza trees are ten rupees.” “The income is Rs. 15.” “It is impossible to tell expenditure and income of mango, orange and other trees.” “They do not bear fruits yearly.”

BHIR DISTRICT.

Bhir :—“The cultivators get a profit of Rs. 25 at the most per 100.”

Mominabad :—“The cost of cultivation per tree is annas 12 and the return Re. 1.”

Patwada :—“The profit depends upon the transportation of the fruit.”

Manjlegaon :—“The cost of cultivation would be Rs. 500 to Rs. 1000.” “In the end Rs. 150 remain as profit after meeting all expenses.”

PARBHANI DISTRICT.

Parbhani :—“The cost of santra cultivation is more than the others as well as the income”.

Hingoli :—“If Rs. 100 is the cost of cultivation the return obtained is Rs. 150.”

Jintur :—No accounts are kept. But it is generally noted that the income is always more than the expenditure.

Kalamnuri.—Profits depend on the cultivation.

Pathri :—Fruit culture does not pay at all in its initial stage and requires much expenditure. Even plantains begin to pay after two years. To make the cultivation economic and profitable the following suggestions are made :—

- (1) Advice of technical experts,
- (2) Good supply of water.
- (3) Improved means of transportation.
- (4) Metalled roads.

WARANGAL DISTRICT.

Khammam :—“100 mango trees are planted on three acres for which Rs. 100 are obtained annually till six years.” “After this a profit of Rs. 3 per tree is derived.” “To make fruit farming economic technical men are required for advice.”

Question IX :—Suitable containers for the market:—

Question IX (1) :—What are the existing methods of packing fruits to nearer markets and to distant ones?

Answer :—“A very poor specimen of basket is usually employed for packing fruit”. “In some cases gunny bags are used—a very clumsy method.”

Fruit is generally sent out packed in grass in baskets, or boxes, or in gunny bags, or bags made of rope netting and carried on the head, or in carts or on pack animals.

Question IX (2) :—What are the containers in vogue for different crops, bamboo basket or crates or any other wooden containers or gunny bags ?

Answer :—Baskets made of split bamboo, or of reeds and fibre from roots of certain trees (creepers particularly), of Tuar stocks, wooden boxes or crates, gunny bags, or *shendi* baskets woven from the leaves of date trees or in grass bundles called *guttas*.

Question IX (3) :—Do growers suffer loss on account of defective methods of packing in defective containers ?

Answer :—“They are bound to, but they do not seem to realise it.”

In the majority of answers some say “Yes” and some “No.” In Hyderabad (Balda) it is stated that considerable loss to growers occurs due to defective methods of packing, while in Vaijapur (Aurangabad), defective packing is said to be profitable to the broker who under this plea pays less to the growers. Mr. Bandu Samaldas of Vaijapur (Aurangabad) states that there is no loss by defective packing but asks how thefts on the railway are to be combated. And Mr. Bezonji Faridoonji of Jalna states that the bamboo baskets in which fruit is packed are badly handled in railway transshipment and the railway staff generally pilfer fruits from the baskets, a general complaint for years together which remains unremedied. In Bidar (Koheer) also it is said that there is more loss by railway than by carts and carriers, and when consignments of fruit are exposed to rain.

TRANSPORT & MARKETING.

Questionnaire X.

Question X (1):—What are the difficulties in regard to transport of fruit? How the transportation is carried in a tract where there are no good roads?

Summary of replies.

AURANGABAD DISTRICT.

Daulatabad :—No transportation difficulties.

Patan :—As there is no bridge over the Ganga, fruits reach the Railway station late.

Jalna :—Fruit is carried in a cart where there is no road and the delay in transporting causes the fruit to deteriorate.

Vaijapur :—Roads are not kept in good condition. In the rains conditions get worse. At times four bullocks have to be yoked.

Vaijapur-Parsoda :—It appears there are no roads.

Vaijapur—Station } With bad road some difficulty is
Parsoda, N. S. By. } experienced. Fruit is carried in bullock carts.

Gangapur :—No difficulties.

Khuldabad :—In carts.

Kannad :—Fruits are transported with much difficulty where there are no good roads.

Ambad :—In carts, on horses and on asses where there are no good roads.

Bhokardan :—In carts only.

Sillode :—No difficulties whatsoever.

Medak District :—

Kalubgur :—Transported in bandies,

SHAHABAD DISTRICT.

Husanabad:—No good roads but the paths are not such as to cause difficulties when people pass over.

KARIMNAGAR DISTRICT.

Jaktial:—In bandies.

Sirsilla:—Carts are generally employed.

NALGONDA DISTRICT.

Huzurnagar:—In bandies and on bullocks.

Suriyapet:—In carts.

OSMANABAD DISTRICT.

Bhoom jagir:—Where there are no good roads, fruits are transported on pack animals, carts or on the heads of coolies.

Parinda:—Plantains, guavas, melon are transported in carts.

Kallam:—Fruits are transported by motor, bandies and by people according to their convenience.

Tuljapur:—In carts where there are no good roads.

NANDED DISTRICT.

Hadgaon:—As very little fruit is sent to bazar and no superior varieties are grown the question of improvement in transportation does not arise.

Mudhol:—Carts and men are employed.

Nanded:—It is said by Mr. Abdul Matin Khan that if station masters are not tipped, they do not send the parcels in time, and *hums* cause needless damage by rough handling. Transportation is by carts and bullocks.

NIZAMABAD DISTRICT.

Nizamabad:—In bandies whether the roads are good or not.

ADILABAD DISTRICT.

Asifabad:—It is said that there are no pucca roads, nor any raliway station near by. Transportation is difficult and hence there is no interest in fruit growing.

Chinnur:—No difficulties.

ADILABAD DISTRICT.

Lakshetipet:—Roads are bad. But there is no transportation of fruit.

Asifabad:—The Divisional officer, Asifabad Division, states, "as in the case of other materials and grains, fruit is transported in carts, packed in baskets, whether roads exist or not.

BIDAR DISTRICT.

Ahmadpur:—By pack animals.

Koheer:—Owing to the absence of good roads and bridges over Nalas transport between Koheer and Kopallā becomes very difficult and some times impassable during rainy season.

Sending fruit by rail means always loss to growers as there are no proper arrangements for taking care of the fruit.

Bidar:—Transportation is by carts and bullocks. Four miles have to be traversed from Koheer before the pucca road to Hyderabad is reached.

Nilanga:—By bullocks, carts and camels.

RAICHUR DISTRICT.

Deodurg:—In baskets on the heads of carriers. (Paid labourers.)

Alampur:—In carts and by labourers if it is not the rainy season.

BHIR DISTRICT.

Bhir:—On bullocks where there are no good roads.

Georai:—No difficulties.

Patwada:—It is a hilly place. No good roads.

Manjlegaon:—In carts.

PARBHANI DISTRICT.

Manwath:—No roads in existence, nor is the transportation by train safe. Railway porters are hopelessly careless which results in great loss. Transportation is by cart.

Parbhani:—By cart or by people where there are no good roads.

Basmathnagar:—No difficulties.

Hingoli:—In bandies and on bullocks, motor service is lacking for want of good roads.

Jintur:—In bandies and on bullocks. The difficulties could be overcome if there were good roads and any other new methods introduced.

Kalamnuri:—Transportation is carried by the people.

Pathri:—No good roads. By carts on which account expenses are many and loss great.

VIKARABAD DISTRICT,

Valandi:—Fruit is not produced in this taluka in any large quantities to be sent to distant markets.

ATRAFIBALDA DISTRICT.

VIKARABAD (VIKABUL-UMRA PAIGA.)

Transportation much hampered on account of bad roads and therefore much loss is caused to the fruit growers in outlying districts.

There is a Railway station, but roads are not good; fruit from the neighbourhood are usually brought in carts or on pack animals.

QUESTIONNAIRE.—X (2)

Summary of replies:—Transport and Marketing.

*Question 2:—*What are the marketing difficulties? What is the system of marketing? How much is lost due to the middleman's profit? How can it be remedied? Can co-operative and regulated marketing be introduced?

*Answer:—*There are practically no fruit markets anywhere in the sense of the word. Fruit in season generally is sold in the weekly market in big villages. In this connection Mr. Khaja Ismail, Bar-at-Law, Vikar Munzil, states that markets are badly needed where fruit can be properly stored. Gopal Singh, Daroga-in-charge "Mehdi Munzil" states that the absence of any market in the neighbourhood of Vikarabad forces growers to take their fruit to Hyderabad.

Even in Hyderabad the growers are said to be at the mercy of the fruit merchants or brokers of the City or have of necessity to dispose of their produce and suffer loss.

Mr. Kulkarni of Parsoda, Vaijapur, Aurangabad, states that the brokers get always the lion's share of the business at the expense of the growers who have to send their fruit out and are at the mercy of the brokers whilst Mr. Kishen Rao, Patel of the same place avers that, when oranges are sent to Hyderabad and Bombay markets of unscrupulous middlemen, owing to their sharp practices, gardeners are put to a great loss. Sometimes parcels fail to fetch the expenses of transport and this is also the experience of Mr. Bezouji Faridoonji of Jalna where growers sell the fruit on trees to *Bagwans* who sell them to the local dealers at reduced rates because when they are sent to Bombay, the baskets are sold in lots by auction and sometimes the buyers "make pool in Bombay" with the result that in the end the *Bagwan* does not recover even the railway freight spent by him. Mr. A. B. Mehta suggests that there should be a State Price Bureau which would be a boon to producers of fruit. In this connection it is generally agreed that this state of affairs can be remedied by cooperative marketing being introduced by Government.

QUESTIONNAIRE X (3)

Question. X (3) How far is the Railway from fruit growing localities ?

Answer.

- | | | |
|--|---|--|
| <i>Aurangabad District.</i>
Daulatabad Taluka. | } | About 2 miles from village. |
| <i>Aurangabad.</i>
Aurangabad. | } | Almost all are near to the Railway Station, but some are 10 to 20 miles distant. |
| <i>Aurangabad.</i>
Vaijapur. | } | Nearly six miles. But fruit growing head-quarters are near to the Railway Station. |
| Parsoda-Vaijapur. | } | About a mile from Parsoda Railway station. |
| Vaijapur-Parsoda
Mr. Kishanrao, Patel. | } | About a mile and a half. |
| Vaijapur-Parsoda
Mr. Ardeshir B. Mehta.
Retired Customs Inspector, | } | The station is about 25 yards from garden. |
| <i>Aurangabad.</i>
Patan. | } | 25 miles. |
| <i>Aurangabad.</i>
Jalna.
Mr. Bezonji Faridoonji | } | As there are no good roads the fruit gardens are generally close to the stations. Not more than 5 to 10 miles away. |
| <i>Aurangabad.</i>
Jalna. | } | One mile to 2 miles from the fruit-growing localities which are in Jalna head-quarters and 4 to 5 miles from some villages of this taluka. |
| <i>Aurangabad.</i>
Gangapur | } | 8, 16, 18, and 20 miles. |
| <i>Aurangabad.</i>
Khuldabad. | } | Not more than 4 to 20 miles. |

- Aurangabad District.*
Kannad Taluka. } 20 miles from this taluka to the
G. I. P. Railway Station.
24 miles from this taluka to the
Aurangabad Railway Station.
- Aurangabad District.*
Ambad Taluka. } 10, 15, 20 and 25 miles.
- Aurangabad District.*
Bhokerdan Taluka. } 32 miles from this taluka to the
Jalna Railway Station and 50
to 58 miles to the Aurangabad
Railway Station.
- Aurangabad District.*
Sillode Taluka. } 30 to 40 miles.
- Medak District.*
Kalubgur Taluka. } "No fruit growing localities."
Note.—This statement appears
to be in conflict with the
replies to questionnaires VI,
VII, VIII, IX, & X (1) & (2).
- Medak District.*
Andole Taluka. } "No railway station is nearer to
any village of this taluka"
- Gulbarga District.*
Gulbarga Taluka. } 3 to 4 miles.
- Gulbarga District.*
Shorapur. } 30 to 40 miles.
- Gulbarga District.*
Yadgir Taluka. } "From 2 to 10 miles."
- Gulbarga District.*
Shahpur Taluka. } "No fruit growing localities.
But the Yadgir Railway
Station is 21 miles from this
taluka."
- Gulbarga District.*
Seram Taluka. } "There is a Railway Station at
the headquarters of the
taluka."
- Shahabad District.*
Hasanabad Taluka } "5 miles from the headquarters of
this Tahsil to the Railway
Station."
- Shahabad*
Shahabad Taluka } "The Railway Station is very
near the headquarters of this
taluka."

- Shahabad District.*
Narsapur Taluka. } "Found no need of giving the distance as there are no fruit gardens"!
- Karimnagar District.*
Sirsilla Taluka } "About 32 miles from this taluka."
- Karimnagar District.*
Karimnagar Taluka } "24 miles from this taluka."
- Karimnagar District.*
Sultanabad Taluka. } Some villages 2 to 4 miles.
do do 12 to 16 miles.
do do 20 to 22 miles.
But there is no transportation to the Railway as fruits are grown on a very small scale.
- Karimnagar District.*
Huzurabad Taluka. } "No fruit growing localities."
- Karimnagar District.*
Mahadeopur Taluka } "No fruit growing localities."
- Karimnagar District.*
Jaktial Taluka. } "Nearly 40 miles"
- Karimnagar District.*
Parkal Taluka. } In this taluka there are neither gardens nor Railway Stations. But there are Railway Stations in other talukas and in the Warangal District the distance is about 14 to 24 miles from the Railway Station.
- Mahbubnagar District.*
Mahbubnagar Taluka. } The following are the places where there are Railway Stations.—
Devarkadra, Mahbubnagar, Gollapalli.
- Mahbubnagar District.*
Amrabad Taluka. } "The distance from the fruit growing localities is not known, but the distance from this taluka is 64 miles."
- Mahbubnagar District.*
Mukhtal Taluka. } "No gardens."

- Mahbubnagar District.*
Pargi Taluka. } "From 6 to 12 miles."
- Mahbubnagar District.*
Nagarkurnool Taluka. } "25 to 30 miles."
- Mahbubnagar District.*
Kalwakurti Taluka. } "No gardens at all."
- Nalgonda District.*
Miryalguda Taluka. } "72 miles to Bhongir Railway Station."
- Nalgonda District.*
Jangaon taluka. } "No fruit growing localities."
- Nalgonda District.*
Huzurnagar Taluka } "No fruit gardens."
- Nalgonda District.*
Suriyapet Taluka. } "37 miles from this taluka to the Khammam Railway Station"
- Osmanabad District.*
Kallam Taluka. } "15 miles to Tadola station" }
32 miles to Barsi town, 42 miles }
to Parli, but there is no road }
from Tadola to Kallam. There- }
fore no fruits are transported. }
- Osmanabad District.*
Tuljapur Taluka. } "15 to 30 miles."
- Osmanabad District.*
Latur Taluka. } "From 5 to 7 miles."
- Osmanabad District.*
Osmanabad Taluka. } "12 miles to Barsi Light Railway }
and 46½ miles to Sholapur }
station." }
- do - }
Bhoom Jagir. } 14 miles.

<i>Nanded District.</i> Nanded Taluka.	} "1 to 10 miles."
<i>Nanded District.</i> Khandahar Taluka.	} 30 miles.
<i>Nanded District.</i> Mudhol Taluka.	} "About 15 to 16 miles from the taluka."
<i>Nizamabad District.</i> Nizamabad Taluka.	} "Not more than 12 miles."
<i>Nizamabad District.</i> Bodhan Taluka. (Rudrur Village.)	} "Since there is no such cul- tivation, this question cannot be answered."
<i>Adilabad District.</i> Sirpur Taluka.	} Nil.
<i>Adilabad District.</i> Chinnur Taluka.	} Nil.
<i>Adilabad District.</i> Bhot Taluka.	} "No fruit growing localities."
<i>Adilabad District.</i> Kasba	} "65 miles on one side and 95 on the other."
<i>Adilabad District.</i> Uttanoor Taluka.	} "Asifabad and Dichpalli are 30 miles from here."
<i>Bidar District.</i> Ahmedpur Taluka	} "About 40 miles."
<i>Bidar District.</i> Koheer Taluka. (Mr. Md. Ibrahim)	} "About 1 mile."
<i>Bidar District.</i> Koheer Taluka. (Mr. Md. Bin Chaus)	} "Railway station is very near to the fruit growing localities."
<i>Bidar District.</i> Bidar Taluka.	} "There is a Railway Station to this District." "20 miles from this taluka."

<i>Raichur District.</i> Gangawati Taluka.	} "22 miles from the taluka headquarters."
<i>Raichur District.</i> Khustagi Taluka.	} "32 miles distant."
<i>Raichur District.</i> Alampur Taluka.	} "The distance from the Railway Station to Alampur Road is 7 miles."
<i>Bhir District.</i> Bhir Taluka.	} "60 miles from the headquarters of Bhir. But 40 to 45 miles from some other places."
<i>Bhir District.</i> Mominabad Taluka	} "36 miles."
<i>Bhir District.</i> Georai Taluka.	} "44 miles from this taluka to the Jalna Railway station"
<i>Bhir District.</i> Potoda Taluka.	} "Not less than 60 or 70 miles."
<i>Bhir District.</i> Manjlegaon Taluka.	} "About 30 miles."
<i>Parbhani District.</i> Manwath Taluka.	} "7 miles distance."
<i>Parbhani District.</i> Parbhani Taluka.	} "Different gardens at different places."
<i>Parbhani District.</i> Basmatnagar Taluka.	} The distance from the fruit growing localities is not more than 8 miles.
<i>Parbhani District</i> Hingoli Taluka	} "Fruits are brought either in bandies or on bullocks from villages of this taluka. But the taluka has got a Railway Station."
<i>Parbhani District.</i> Jintur Taluka	} "The distance from the fruit growing localities to the Railway Station is 6 to 30 miles."
<i>Parbhani District.</i> Kalamnuri Taluka.	} "The distance is 6 miles."

<i>Parbhani District.</i> Pathri Taluka	} " 1 to 12 miles."
<i>Warangal District</i> Khammam Taluka	} " 16 miles distant."
<i>Atrafi-balda District</i> Valandi Paiga	} " 24 miles."
<i>Atrafi-balda District.</i> Vikarabad Paiga (Mr. Khaja Ismail, Bar-at-Law)	} " Railway communication is not in close proximity to fruit growing localities."
Virkarabad, Paigah, Gopal Singh, Daroga, Mehdi Munzil	} "The Railway station is just about a mile from the fruit growing tract."
<i>Atrafi-balda District.</i> Balda, (Mr. M. Khader Murtuza Hussain, Troop Bazaar, Hyderabad.)	} "The people do not get land easily, it appears, in the vicinity of Railway Stations. The existing gardens are, therefore, usually situated a little in the interior, 12-15 miles away from the station."
<i>Atrafi-balda District.</i> Narayankhed Taluka (Paiga)	} " Station is about 20 miles."
<i>Atrafi-balda District.</i> Kotgir Taluka	} " 22 miles from the taluka headquarters."
<i>Atrafi-balda District.</i> Shahabad. Ennapalli. Nawab Nizam Jung Bahadur.	} In most cases within $\frac{1}{2}$ a mile or so.

DEFECTS.

1. Area under fruit is very limited and insufficient.

2. Knowledge of various kinds of fruits is wanting; in case of known kinds the selection of good varieties is neglected. Only inferior and deteriorated old varieties are propagated because they are cheap.

3. The methods of cultivation in most of the gardens inspected were found primitive and defective.

a. Land meant to be converted into a fruit garden is not properly prepared. No deep ploughing or trenching is done in the cold season and summer and grass and weeds eradicated. No green manure crop is taken beforehand.

b. Close and irregular planting distance in the case of kinds and varieties of fruit trees without due consideration to the kind of soil.

c. Pits for fruit trees are invariably below the size or the requisite dimensions really necessary to encourage or ensure good growth.

d. Wherever a good supply of water is available more water than necessary is given.

e. Local manure available (cow dung, sheep dung, town rubbish etc.) is not properly conserved and applied in sufficient proportions or quantities. Night soil is sometimes used, prejudice against its use has not yet been got over, also use of bone.

f. Pruning and thinning of fruit trees are not practised (except in case of orange and other citrus trees, after fruiting dry twigs are removed).

g. The advantages of soil aeration are not understood,

h. Superstitious notions prevent cultivators from growing fruit, as it is considered inauspicious, also grower of one kind of fruit to take to another, superstition against budding and grafting exists in some gardens, some malies who know the art will not do it in their own gardens.

4. Irrigation facilities in many places very deficient.
5. Really large plantations do not exist except a few, mango, orange, guava, plantain and papaya gardens.
6. Marketing imperfect.
7. Fruit preserving practically unknown.

In short, want of correct practical knowledge and method of the art of fruit culture and the nonexistence of skilled and reliable labour such as trained malies with an aptitude for gardening are the chief causes which deter enterprising and enthusiastic people of means from establishing fruit gardens in suitable places and localities where water and other facilities do exist. This view also accounts in a great measure, for the decay of many once a flourishing fruit garden in and about towns and in the country, due to neglect chiefly for want of men with the requisite knowledge and ability to keep up such gardens.

22. CONCLUSION.

It is not without considerable diffidence that I am submitting this report. No one can be more thoroughly aware than myself of many deficiencies with which it must unavoidably be chargeable. But working single handed, gathering often under great difficulty, my facts for the report and with the labours of no predecessor to be of any material assistance to me, I can only hope for indulgence if in some instances the information recorded be not so full as might be desired, and if in some few, perhaps, I prove wrong or mistaken.

2. When submitting an Interim Report in July 1931 I noted that pending the completion of my tour in all the Districts of the Dominions I considered it premature to give any definite conclusion. The Director General instructed me to state facts as they are at present in the Fruit Industry.

3. I have, since submission of the Ad-Interim Report, toured in 8 more Districts of the 11 remaining at the time. I have not been able to go to the 3 Districts for want of time within the period of my special duty. However, the three Districts viz. Adilabad, Karimnagar and Osmanabad have not much in fruit culture and would not in all probability give any further information than what has been ascertained of the conditions in the neighbouring districts that have been surveyed.

4. From the data collected and defects noted it is apparent that there is a vast scope for the improvement, development and expansion of Fruit Industry in the Dominions as (a) Subsidiary occupation for the ryot, (b) Main occupation for landlords and capitalists. The Horticultural Shows held at Hyderabad in 1931 and 1932 more than justify this impression. Project areas with transport facilities, particularly improved roads, have great possibilities for fruit plantations on a commercial scale.

5. In conclusion, my impressions lead me to say that for the development of Horticulture the ryot stands in immediate need of technical advice. In fact there is need for educating the public regarding the essentials of successful fruit growing, e. g.

- a. The conditions which give rise to diseases and pests of plants.
- b. How to meet such conditions ?
- c. How and when to treat particular crops when attacked.

6. For this purpose adequate competent research and propaganda staff should be available to help the growers and institutions such as Model Fruit Farms and Nurseries, for the incultation of such knowledge of fruit crops suitable for the tract as well as for vegetables, flowers and supply of reliable seed and plant material at concession and reasonable rates. In many cases Local Furd Gardens if properly organised would serve as suitable centres of propaganda.

7. Finally and in my humble opinion the most essential consideration for the advancement of Horticulture is the training under modern conditions of the right stamp of men for the job.

There is an increasing demand for trained gardeners and garden supervisors, (literate by preference) scientifically trained men who can make gardens look well and pay handsomely. The Mali proper appears now-a-days to be an unskilled labourer who has picked up some smattering knowledge of gardening but who has not the energy nor the ability to do much alone. The comparatively high wages obtainable by unskilled labour in industrial concerns have attracted many who, at other times, would have turned to garden work. The result is that the wages of malies have risen but the standard of their attainments has not improved.

If anything is to be done with a large garden, expert direction is needed, and men who have the necessary training can find employment there. The demand for trained supervisors has led to a demand for the necessary training.

23. ACKNOWLEDGMENT.

I would be failing in my duty if I omitted to record my deep gratitude to the high officers and other gentlemen inside and outside the Hyderabad State, from whom I have received valuable advice and suggestions in the course of my investigations particularly from Mr. B. Aaby Collins, C. I. E., I. C. S., Director General & Secretary to Govt., Industries and Commerce Departments, Nawab Sir Nizam Jung Bahadur, K. C. I. E., Mr. Nizamuddin Hyder, Director of Agriculture, Mr. R. K. Bhide, Economic Botanist, and the gentlemen (list attached as appendix No. 6), to all of whom I am under very considerable obligation for the liberal and unreserved way in which I was always helped.

I need scarcely add how deeply sensible I am of the kind aid and encouragement I have invariably received from one and all of them, to whom I tender my best thanks.

My thanks are also due to the authors of the various works consulted by me (vide list Appendix No. 7)

M. R. SIDDARAMAIIYA,
Horticultural Survey Officer.

Appendix No. 1

24 COMMUNIQUE.

With a view to encourage fruit culture and help people with sound advice about the cultivation and marketing of fruit, the Industrial Fund Trustees have sanctioned a Scheme for conducting survey of the existing conditions of fruit culture in Hyderabad State. Mr. M. R. Siddaramaiya, F. R. H. S., (London), has been appointed as Horticultural Survey Officer under the general supervision of Mr. R. K. Bhide, Economic Botanist to H. E. H. the Nizam's Government, Hyderabad-Deccan. A questionnaire is being issued and all persons who are interested in fruit industry are invited to send their names and addresses to Mr. R. K. Bhide and to give him any information and assistance in their power.

29-2-40 F. }
 3-12-31 . }

(Sd). NIZAMUDDIN HYDER,
 Offg. Director of Agriculture.

Appendix No. 2

District

Taluk

Village

Hyderabad Fruit Survey.

QUESTIONNAIRE.

سرریشتم زراعت سرکار عالی

سوال بند

متعلق بہ

مطالعہ حالات پیداوار میوہ جات

Information is desired regarding the following points connected with Fruit Survey of His Exalted Highness the Nizam's Dominions and it is requested that all those who have information would kindly send it to Mr. R. K. Bhide, Economic Botanist, Agricultural Department, Hyderabad-Deccan.

ممالک معروضہ سرکار عالی میں مطالعہ حالات پیداوار میوہ جات کے ضمن حسب ذیل استفسارات کے جوابات مستر آر۔ کے بھیدے (کنامی بائنسٹ محکمہ زراعت متعینہ بلدہ حیدرآباد کے پاس براہ کرم ارسال فرمائے جائیں۔

I. General.

It is understood that in certain districts at least, fruit culture had considerably developed in former days. But it is said that at present people are giving it up. Is it a fact and if so, what are the reasons?

I. — معلومات عام

سنا جاتا ہے کہ ممالک معروضہ سرکار عالی کے بعض اضلاع میں زمانہ سابق میں کاشت میوہ جات بہت ترقی پر تھی لیکن لوگ اب اسکو ترک کر رہے ہیں۔ اگر یہ صحیح ہے تو اس کے اسباب کیا ہیں۔

II. Area.

(1) What is the approximate total area under fruit culture? under each kind of fruit?

۲۔ رقبہ

(1) مجموعی رقبہ زیر کاشت میوہ جات تضمیناً کس قدر ہے میوہ کی ہر قسم کے تحت علیحدہ علیحدہ رقبہ کس قدر ہے؟

(2) For what particular reasons such as soil, climate, water facility, marketing, etc., is a particular fruit grown on a large scale in a locality or district?

(۲) کسی خاص مقام پر کسی خاص ضلع میں اگر کسی مخصوص قسم میوہ کی کاشت زیادہ ہوتی ہے تو اس کے اسباب کیا ہیں؟ مثلاً وہاں کی زمین اس کے واسطے خاص کر سوزوں ہے یا آب و ہوا یا ذریعہ آب پاشی یا نکاسی کی آسانیاں وغیرہ؟

(3) Do plantations suffer on account of extremes of temperature like frosts in cold weather or excessive heat in hot weather?

(۳) کیا باغات کو موسمی شدتوں سے مثلاً سردیوں میں پالے سے یا گرمیوں میں گرمی کی زیادتی سے نقصان پہنچتا ہے؟

(4) Are there any other difficulties on account of which the cultivators cannot reap as much profit now by fruit growing as formerly, and therefore fruit culture is being given up?

(۴) کیا اور بھی کوئی دشواریاں ہیں جنکی وجہ سے مالکان باغات کو اب اتنا منافع نہیں ہوتا ہے جتنا کہ سابق میں ہوتا تھا؟

III. Rainfall.

(1) Average annual rainfall in the District (in the different Tahsils in the district) and has the present rainfall gone down considerably from what it used to be before?

۳- بارش

(۱) کل ضلع میں اور ضلع کی مختلف تحصیلات میں سالانہ بارش کی اوسط مقدار کیا ہے۔ اگلے زمانہ کا لحاظ کرتے ہوئے فی زمانہ بارش میں کوئی کمی تو نہیں پائی جاتی ہے۔

(2) Has the water level in the wells and tanks gone down now -a- days as compared with former years? Is it due to silting or reduced rainfall?

(۲) کیا باؤ لیاات و تالابوں میں گذشتہ زمانہ کے مقابلہ میں موجودہ وقت پانی کم تو نہیں پایا جاتا ہے؟ اگر کم ہے تو کیا اس کمی کا سبب کیچڑ کی زیادتی ہے یا بارش کی قلت ہے؟

IV. Plant propagation.

(1) How the demand of growers for plants is met.? Are there any nurseries kept either by private or Government agencies to meet such demands.? If the supply is inadequate whence the grafted and budded plants are imported in the Dominions?

۴- افزائش پودا ہاے میوہ جات

(۱) میوہ جات کے پودوں کی سربراہی کس طرح ہوتی ہے۔ کیا ان کے مطالبات کو پورا کرنے کے لئے خانگی یا سرکاری طور پر باغچہ جات قائم ہیں؟ اگر ان مطالبات کی تکمیل نہیں ہوتی ہے تو قلم اور چشمہ سے تیار کئے ہوئے پودے ممالک محروسہ میں کہاں سے منگائے جاتے ہیں؟

(2) Do outside nurserymen supply reliable stock?

(۲) کیا ممالک غیز کے باغبان قابل اطمینان پودے ہم پہنچا دیتے ہیں؟

(3) Is there any scope for establishing nurseries in main fruit-growing localities? Can private agencies take up this work if encouragement is given by Government?

(۳) کیا جن مقامات میں کم میوہ جات کی کاشت زیادہ ہوتی ہے اگر قلموں وغیرہ کی تیاری کے باغیچے بطور ذخیرہ کے قائم کئے جائیں تو ان کے کامیاب ہونے کی توقع ہے؟ اگر سرکار کی طرف سے امداد دی جائے تو کیا لوگ اس قسم کے باغیچے قائم کرنا پسند کریں گے؟

V. Cultural treatment.

(1) What are the existing methods of cultivation. Do cultivators adjust their crops according to the soil, water and climatic conditions?, and in what way? Do fruit crops pay them by following their own methods? If not, what are the defects?

۵۔ طریقہ تربیت کاشت

(۱) میوہ جات کی کاشت کا موجودہ طریقہ کیا ہے؟ اور کیا کاشتکار زمین پانی اور موسمی حالات کی مناسبت کے لحاظ سے میوہ کی کاشت کرتے ہیں؟ کیا ان کو اپنے طریقہ پر کاشت کرنے سے کچھ فائدہ بھی حاصل ہوتا ہے؟ اگر نہیں ہوتا ہے تو ان کے طریقہ میں کیا نقائص ہیں؟

(2) In the successful growing of certain fruit crops the proper methods of pruning, root exposure and the like have to be practised. Do the growers of those particular crops know such methods? Do their plantations suffer in yield due to lack of such special knowledge?

(۲) بعض اقسام میوہ جات کی کامیاب کاشت کے لئے ان کے درختوں کی شاخوں کا تراشنا یا ان کی جڑوں کو ہوا دینے کے لئے کھول دینا وغیرہ ضروری ہیں۔ کیا ایسے مخصوص میوہ جات کی کاشت کرنے والے اشخاص اصول مدنکور سے واقف ہیں؟ یا ان مخصوص اصول کی لاعلمی کے باعث ان کے باغات میں پیداوار کم ہوتی ہے؟

(3) Are the orchard crops properly spaced to allow sufficient space to work implements by bullock power?

(۳) کیا باغات میں درختوں کا باہمی فاصلہ (تفا) وسیع ہوتا ہے کہ بیلوں سے ناگر وغیرہ چلایا جاسکے؟

(4) What is the manure used at present and what is its source? Is the existing supply adequate? Are the orchards timely and properly manured? Do fruit trees suffer for want of manure?

(۴) فی الحال کس قسم کا کھاد استعمال کیا جاتا ہے اور اس کو کہاں سے حاصل کرتے ہیں۔ کیا یہ کافی مقدار میں دستیاب ہوتا ہے؟ کیا باغات میں بروقت اور برابر مقدار میں کھاد ڈالا جاتا ہے۔ کیا قلت کھاد کی وجہ سے درختوں کو کچھ نقصان تو نہیں پہنچتا ہے؟

(5) Do the growers use organic manures like the bone and oil-cakes to supplement Farm Yard Manures?

(۵) کیا کاشتکار اپنے خود بنائے ہوئے کاشت کے ساتھ اجزائی کھاد مثلاً کھاد ہڈی و کھلی بھی استعمال کرتے ہیں؟

(6) What are the assured and controlled water supplies? Lift or Canal? In the former what are the principal sources, wells or rivers or tanks?

(۶) مستقل ذرائع آب پاشی کیا ہیں - باڑے لیاں ہیں یا نہر یا تالاب؟

(7) Do any fruit plantations exist on defective or unassured water supply? Can such fruit crops be adjusted, as will give harvest within the period of availability of water?

(۷) کیا کوئی میوہ کے باغات ایسی جگہ واقع ہیں جہاں آب پاشی کا ذریعہ ناقص و ناقابل اعتبار ہے۔ کیا ایسے مقامات میں کاشت میوہ جات کو اس طرح پر مرتب کیا جاسکتا ہے کہ پانی کے دستیاب رہنے کے وقت تک فصل تیار ہو جائے؟

(8) What are the systems of applying water? Can any other improved method be introduced by which economy in water could be made without affecting the crop?

(۸) کیا کوئی آسان نیا طریقہ ایسا رائج کیا جاسکتا ہے جس سے پانی کے خرچ میں کفایت بھی ہو اور فصل کو کوئی نقصان بھی نہ پہنچے؟

VI. Kinds and Varieties.

(1) What are the kinds of fruits grown? How many varieties of each kind of fruit are grown? Are they hardy and locally popular? Do not people care to have better varieties.

۶- اقسام و ذیلی اقسام میوہ

(۱) کن کن اقسام کے میوہ جات کی کاشت ہوتی ہے؟ ہر قسم کے ذیلی اقسام کس قدر ہیں۔ کیا ان اقسام کو بہت پسند کیا جاتا ہے اور کیا ہر آب و ہوا میں کاشت ہو جاتے ہیں؟ کیا لوگوں کو ان سے بہتر اقسام کے کاشت کرنے کی خواہش ہے؟

(2) What are the wild varieties of fruits grown naturally?

(۲) خود رو جنگلی میوے کون کون سے پھولے ہوئے ہیں؟

VII. *Insect pests and diseases.*

(1) Are any of the fruit crops liable to insect pests and diseases? If so, what is the extent of damage done?

۷- کیڑوں کا حملہ اور درختوں کی بیماریاں

(۱) کیا میوہ کی کوئی فصل کیڑوں کے حملہ اور بیماریوں کا شکار تو نہیں ہوتی ہیں؟ اگر ہوتی ہیں تو اس سے ان کو کس حد تک نقصان پہنچتا ہے؟

(2) Do the growers try to control them by their own methods? If so, what remedies do they use for the particular trouble?

(۲) کیا باغبان ایسے حملے اور بیماریوں کو اپنے کسی طریقہ سے دفع کرنے کی کوشش کرتے ہیں اگر کرتے ہیں تو یہ طریقہ کیا ہے؟

VIII. *Harvest and yields.*

(1) Are the fruits picked in the quite ripe stage or a little earlier? If so, what are the indications of ripeness?

۸- درو فصل اور پھل دوار

(۱) کیا پھل بالکل پختہ ہو جانے کے بعد توڑے جاتے ہیں یا پختگی سے کچھ پہلے توڑ لئے جاتے ہیں؟ اگر پختہ ہو جانے کے بعد توڑے جاتے ہیں تو ان کے پختہ ہونے کی کیا پہچان ہے؟

(2) What are the curing methods in practice? What improvements can be brought in them?

(۲) پھل توڑنے کے بعد کس طرح سے خشک اور محفوظ کئے جاتے ہیں۔ کیا ان کے محفوظ کرنے اور خشک کرنے کے طریقہ میں کچھ اصلاح کی گنجائش ہے؟

(3) What is the cost of cultivation and what is the return obtained? Is any particular fruit growing a profitable concern? If not why? How could fruit farming be made economic ?

(۳) میوہ دار درختوں کی کاشت میں کیا اخراجات ہوتے ہیں اور آمدنی کس قدر ہوتی ہے؟ کیا کسی خاص میوہ کی کاشت میں سناٹا ہوتا ہے؟ اگر نفع نہیں ہوتا ہے تو کیوں نہیں ہوتا؟ نفع خیز کرنے کے کیا تدابیر ہو سکتے ہیں؟

IX. Suitable containers for the market.

(1) What are the existing methods of packing fruits to nearer markets and to distant ones?

چھانے اور ٹوکری وغیرہ

(۱) نزدیک کے بازارات اور دور کے بازارات کو میوہ کس طرح باندھ کر بھیجا جا رہا ہے؟

(2) What are the containers in vogue for different crops, bamboo basket, or crates or any other wooden containers or gunny bags?

(۲) مختلف قسم کے میوہ جات کو روانہ کرنے میں کس قسم کے برتن استعمال کئے جاتے ہیں؟ بانس کی ٹوکریاں استعمال کی جاتی ہیں یا لکڑی کے صندوق یا تھیلے؟

(3) Do growers suffer loss on account of defective methods of packing in defective containers?

(۳) کیا میوہ والوں کو میوہ باندھنے کے ناقص طریقہ اور ناقص برتنوں کی وجہ سے نقصان تو نہیں پہنچتا ہے؟

X. *Transport and marketing.*

(1) What are the difficulties in regard to transport of fruit? How the transportation is carried in a tract where there are no good roads?

۱۰۔ نقل و حمل و بازارات

(۱) میوے کے روانہ کرنے میں کیا دشواریاں ہیں؟ جن مقامات پر عمدہ سڑکیں نہ ہوں وہاں نقل و حمل کا کیا انتظام ہوا کرتا ہے؟

(2) What are the marketing difficulties? What is the system of marketing? How much is lost due to the middleman's profit? How can it be minimised? Can co-operative and regulated marketing be introduced?

(۲) میوے کے بیوپار میں بازارات (مارکٹ) میں کیا دشواریاں پیدا ہوتی ہیں۔ اور بیوپار کا کیا طریقہ ہے اور دلالوں کی وجہ کس قدر نقصان ہوتا ہے ایسے نقصان کو کس طرح سے رفع یا کم کیا جا سکتا ہے؟ کیا دلالوں کو صلحہ کر کے آپس میں اتحاد باہمی کا طریقہ قائم کر کے میوے کے بیوپار کا کم چلا یا جا سکتا ہے۔

(3) How far is the Railway from the fruit growing localities?

(۳) باغات سے ریلوے اسٹیشن کتنی دور ہے؟

Date

SIGNATURE

Address

Appendix No. 3.

Statement of Preliminary information regarding
FRUIT CULTIVATION IN HYDERABAD STATE.

Name of Tahsil.	Name of District.
1. Regular Fruit gardens, number & acreage	1. Mango 2. Orange. 3. Lemon.
2. Principal kinds grown (strike off kinds not grown)	4. Pomelo (Shaddock) 5. Citron 6. Sweet Lime (Mosambi) 7. Fig. 8. Pomegranate. 9. Papaya. 10. Bhere (Zizyphus Jujuba) 11. Guava 12. Sapota (Sapodilla) 13. Phalsa (Grewia Asiatica) 14. Kamrac, Sweet & Sour. 15. Bullock's Heart (Ramphal) 16. Date. 17. Litchi 18. Custard apple (Sitaphal) 19. Plantains (Bananas) 20. Sour Lime. 21. Miscellaneous, other than those mentioned below are melon etc.
3. Fruits sold locally or exported. If exported to what places generally ?	
4. Number of owners.	
5. Are there private people who take interest in fruits and have grown a few trees in their gardens. If any their names and addresses may please be given.	

APPENDIX NO 4. HYDERABAD FRUIT SURVEY.

حیدرآباد فرUIT سروي

District. ضلع
Taluka. تالوڪو
Village. ڳوٺ

VILLAGE RECORD OF FRUIT GROWING.

سوءان قصبو با با ٻوٽو پيداوار و ميوو ڳاٽ

Population آبادي

Number of gardens. تعداد ڳاٽ

NUMBER OF TREES تعداد درختا

Serial No. سلسلو نشان	Name of fruit grower نام ڳاٽو، ميوو ڳاٽ	Main occupation of the fruit grower اصلي ٻيڻشو ڳاٽو، ميوو ڳاٽ	Area of garden رتو باغ	NUMBER OF TREES تعداد درختا	Remarks ڪو به ٻيو
1	Mango			آم	
2	Orange			نارنگو	
3	Lemon			ليٽو	
4	Pomelo			چانورو	
5	Citron				
6	Sweet Lime			مٺيا ليمو	
7	Fig			انڱير	
8	Pomegranate			آٺار	
9	Papaya			پاپايا	
10	Bhere			بهر	
11	Guava			گواوا	
12	Sapota			سپوٽا	
13	Phalsa			فالس	
14	Kamrac			ڪمرڪ	
15	Bullocks heart			رام ٻيل	
16	Date			گهجوڙ	
17	Litchi			ليچي	
18	Custard apple			ڪسٽارڊ	
19	Plantains			موز	
20	Sour Lime			ليٽو ترش	
21	Miscellaneous			مختلف ميوو ڳاٽ	
	Remarks				

Dated 134 F. 793

Horticultural Survey Officer.

هاڻيڪار سروي آفيسر

Appendix No. 5

HORTICULTURAL SHOW 1931.

Speech by Mr. B. A. Collins, C. I. E., I. C. S., Director
General and Secretary to Government, Industries
and Commerce Department, President of the
Show Committee.

To

H. E. Maharaja Sir Kishen Pershad Bahadur, G.O.I.E., K.C.I.E.
Yaminus Sultanat,

President, H. E. H. the Nizam's Executive Council and
Patron of the Show.

Your Excellency.

I have much pleasure in asking you to open the Hyderabad Horticultural and Poultry Show. I am afraid that the show is not a very large one this year, but it is the first to be held in Hyderabad and I hope that next year we shall do better. Recently the Industrial Fund Trustees have been carrying out surveys of the Fruit Industry and the Poultry Industry in H. E. H. the Nizam's Dominions. The object of this Show is to get into touch with those persons who take interest in Horticulture and Poultry, so that we may obtain more information regarding these industries and at the same time be in a position to give them such assistance as we are able. One of the great difficulties with which persons interested in gardening have to contend in Hyderabad is that there are a very few trained Malies. Steps are now being taken to train Malies and I hope that this difficulty will gradually be overcome. My experience is that there are very few kinds of flowers, plants or fruits which cannot be grown in the Dominions which are not being grown most successfully by atleast one or two persons, but the knowledge how to produce the various kinds of flowers, fruits and vegetables is not very common. If this Show proves to owners of gardens in Hyderabad that it is possible for them to improve their gardens, and if they will take time and trouble then it will

not have been held in vain. I hope also that this Show may lead to the formation of a Poultry Association similar to those which have proved so successful in other parts of India. We have been fortunate in getting Mrs. Ansell, the Secretary of the All India Poultry Association, to visit Hyderabad for the Show and her knowledge and experience will be of the greatest use to us in framing our future policy. I am most grateful to her for having taken the trouble to come to Hyderabad. I will now ask you again kindly to declare the Show open.

The Patron H. E. Maharaja Sir Kishen Pershad Bahadur G. C. I. E. K. C. I. E., the President of H. E. H. the Nizam's Executive Council, replied, as follows:—

1. "In response to the invitation of Mr. Collins and other members of the Show Committee we have come here to perform the opening ceremony of the Exhibition. I am very glad to note that the aims and objects of this Exhibition of Fruits, Vegetables and Poultry are first of their kind so far as Hyderabad City is concerned.

2. I am pleased also to take interest in this activity because this Exhibition is pregnant with other profitable and practical ways and instructions and it is the first step taken towards extensive propaganda having in view the benefit of all people living in different parts of H. E. H. the Nizam's Dominions.

3. Agriculture and Horticulture, rearing of Poultry and the method of conducting such enterprises are not confined to the inhabitants of large cities alone but from an economic point of view they afford ample sources of income to an agricultural country like ours.

4. Australia not only excels in its cereal products but is also an unsurpassable example in itself towards the commercial cultivation of fruits and their marketing. There are many civilised agricultural countries whose resources are immensely augmented by the Poultry Industry. Apart from the point of view of an amateur gardener and poultry keeper who pursue the business as a pastime or a mere hobby, I appreciate this Exhibition as an economic uplift for the agricultural class as a whole.

5 I am not inclined to believe that gardening is a difficult task in our country, if at all it is so, it is due to the fact that persons who possess a knowledge of this art are losing interest due to the indifference of the wealthy and capable persons whom I charge responsible. It was only thirty years ago that innumerable fine gardens owned and maintained by nobles and well-to-do persons extending over several miles outside the City walls met our eyes, and those were the sources of inexhaustible supply of fruits and vegetables, but alas ! they are all no more.

Nature's exquisite tastes and choicest gifts are invested in fruits and to ensure a profitable return from the fruit culture should prove of immense benefit to the interested public. Every fruit, however common it might be, (such as bhare, plantain, custard apple and mangoes) if cultivated with proper knowledge of the art would thrive to an amazing extent. This besides being found palatable can contribute enormous wealth to the public. Advancement in the successful cultivation of fruits will only be considered as a boon when the poor villagers get a chance of tasting them to the extent of their resources and thus derive the benefits of their nourishing qualities, which are at present are only enjoyed by the well-to-do residents of the City.

In making the aims and objects of this Exhibition a success we must not forget that there are thousands of such people in the country who, besides being ignorant of the tastes of many fruits, are utterly unfamiliar even with their appearance, partly because of their poverty and partly because of their ignorance and love of antiquity. I hope, therefore, that the Agricultural Department will, in future, pay special attention in its endeavours to induce the cultivators to grow suitable fruits and rear poultry on a part of their lands and train them in these subsidiary occupations in order that the period of "Slack Season" of the ryot might be better utilised and thus save them from the evils of idleness.

The Government of H. E. H. the Nizam (May He reign long over us) will much be pleased to further its help in all possible ways for the advancement of Poultry and Fruit Industry in the State. In widening the scope of these

subsidiary industries, I am sure, the Agricultural Department will fully cater to the needs of the interested public and further, I must believe, that as a sequel to this Exhibition, the responsible officers of the Public Gardens acting in union with the Agricultural Department and Industries Department will lay the foundation for the establishment of a permanent branch, and this Exhibition will recur every year not only in Hyderabad but will be possible in the Taluka headquarters also, for which the Local Fund Boards can do much work permanently in the respective Talukas.

Mr. Collins deserves our praise and thanks for the successful arrangements of the Exhibition. It was due to him and his colleagues that it has resulted in such a marvellous success.

The presence of Mrs. Ansell, Secretary, All India Poultry Association, whose vast experience and services with regard to the Poultry Keeping in India in general and United Provinces in particular, is highly encouraging to the conveners of the Exhibition and all of us are much indebted to her for her ready response to our invitation and for the trouble taken to come over here.

I don't see the necessity of saying more on this occasion and I now declare the Exhibition open.

Appendix No. 6.

LIST OF GENTLEMEN THAT HELPED
IN HYDERABAD FRUIT SURVEY.

1. Mazhar Hussain Esq., M. A., B. Sc. (Edin.)
Director of Statistics, Hyderabad-Deccan.
2. Nawab Raza Nawaz Jung Bahadur, Subedar,
Aurangabad.
3. Nawab Rustom Jung Bahadur, Customs Commis-
sioner, Hyderabad-Deccan.
4. Abdul Basith Khan Esq., First Talukdar,
Warangal.
5. Gulam Mohammad Baig Esq., First Talukdar,
Nalgonda.
6. Revenue Officers of H. E. H. the Nizam's
Dominions.
7. T. P. Bhaskara Sastri Esq., M. A., F. B. A. S.,
Director, Nizamiah Observatory, Hyderabad,
Deccan.
8. The Inspector General of Forests, Hyderabad-Dn.
9. Syed Jamaluddin Esq., F. L. S. etc., Director,
Public Gardens, Hyderabad-Deccan.
10. The Chief Commercial Manager, N. S. Ry.,
Secunderabad.
11. C. Gopalan Esq., Special Superintending Engineer,
Capital Works Circle, Hyderabad-Dn.
12. Raja Pratapgirji Narsingirji Bahadur, Residency
Road, Hyderabad-Deccan.
13. Dr. Habib Hussain, Chief Chemist, Government
Industrial Laboratory, Hyderabad-Deccan.

14. W. O'Brien Esq., Pleader, Hyderabad-Deccan.
15. G. H. Krumbiegel Esq., F. R. H. S., Director of Horticulture in Mysore, Bangalore.
16. M. K. Seetharam Chetty Esq., L. Ag., Asstt. Superintendent, Government Gardens, Bangalore.
17. Dr. G. S. Cheema, Government Horticulturist, Agricultural College, Poona.
18. H. P. Paranjpye Esq., B. A., District Horticultural Officer, Agricultural College, Poona. (Lately Horticultural Adviser to H. E. H. the Nizam's Government.
19. D. G. Dani Esq., B. Sc. B. Ag., Superintendent, Ganeshkhind Botanical Gardens, Kirkee.
20. Captain Flanders, Superintendent of Markets, Bombay.
21. A. M. D'Cruz Esq., F. R. H. S., Horticulturist, Bombay, 28 Chowpatty Road.
22. S. Samuel Esq., Garden Superintendent to Sir D. J. Tata, Gladhurst, Poona.
23. Abdul Allam Esq., Office Superintendent, Director of Agriculture's office, Hyderabad-Deccan.
24. R. Shanker Pillay Esq., B. A. B. Ag. Horticultural Assistant, Himayatsagar-Deccan.
25. G. V. Hardiker Esq. B. Ag., Agricultural Inspector, Parbhani.
26. Joseph Stracey, Esq, Retired Office Superintendent of the office of the Director of Agricultural, Hyderabad-Deccan.

APPENDIX. No. 7.
LIST OF WOKS CONSULTED.

S. No.	Name.	Author.
1.	Mysore Fruit Survey Report, 1915.	G. H. Krumbiegel.
2.	Poona Agricultural College Magazine.	
3.	Fruit Culture in Aurangabad District, 1930.	R. Shanker Pillai, B. A., B. Ag.
4.	Imperial Gazetteer of India.	Sir William Hunter.
5.	Report on Visit to Daulatabad on the Development of Fruit Gardens.	R. K. Bhide.
6.	Report on Fruit Culture at Daulatabad and neighbourhood 1339 F.	Dr. H. H. Mann.
7.	Reports of H. E. H. the Nizam's Customs Department.	
8.	Reports of H. E. H. the Nizam's Statistical Department.	
9.	Forest Flora of H. E. H. the Nizam's Dominions.	E. A. Partridge.
10.	Reports on Soils of Hyderabad State.	Dr. P. G. Krishna.
11.	Census Reports of Hyderabad State. 1922-23.	M. Rahimatullah.
12.	Castes and Tribes of H. E. H. the Nizam's Dominions 1920.	Dr. Siraj-ul-Hasan.

13. Revenue Administration Report
of Hyderabad State 1334 F. G. E. C. Wakefield.
14. Publications of Bombay Depart-
ment of Agriculture.
15. The Hyderabad Farmer. H. E. H. the Nizam's
Dept. of Agriculture.
16. Firminger's Manual of Garden-
ing for India. Cameron and Burns.
17. Tropical Gardening. Woodrow.
18. Tropical Gardening and Plant-
ing. H. F. Macmillan.



