ROYAL COMMISSION

ON

AGRICULTURE IN INDIA

INTRODUCTION
TO
VOLUME III

EVIDENCE
TAKEN IN THE
MADRAS PRESIDENCY

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MADRAS

I. GENERAL FEATURES AND NATURAL DIVISIONS.

The Madras Presidency, together with the five Indian States which fall within its bounds, the State of Mysore, the small British province of Coorg, and the small French possessions (Pondicherry, Karikal, Yanam and Mahe) occupies the whole of the southern portion of the Indian peninsula. The west coast is washed by the Arabian Sea and the east by the Bay of Bengal. The northern boundary has been formed by the accidents of history and consists, from east to west, of Orissa, the Central Provinces, the State of Hyderabad and the southernmost districts of the Presidency of Bombay. The area of the presidency proper is 141,705 square miles, or 20,000 square miles more than the area of Great Britain and Ireland. Of its 90·5 million acres, 57·5 millions are classed as 'culturable,' 13 millions are under forest, and 20 millions are 'barren and unculturable.' The culturable area, which is about 62 per cent of the total, includes a net cropped area of 33·26 million acres, the remainder consisting of cultivable waste and current fallows. Irrigation, from government and private sources, is available for slightly over 9 million acres and, if the new schemes sanctioned or under consideration are all executed, water will be provided for an additional 800,000 acres in the near future.

The presidency contains two well-defined hill systems. The Western Ghats run, steep and rugged and at an average elevation of 4,000 feet, in an all but unbroken chain along the whole length of the western coast, at a distance from the sea varying from 50 to 150 miles. Along the eastern coast, but further inland, runs the much less prominent and more broken range of the Eastern Ghats. These two systems converge, towards the south, to form the plateau of the Nilgiri Hills. To the north of this plateau lies an elevated table-land, from 1,000 to 3,000 feet above sea level, which includes the area bordering on the State of Mysore. Outliers from the two main chains are found in the Nallamalais of Kurnool district and in the Anaimalais of Coimbatore and Travancore. Besides these there are several isolated blocks of hills, the Shevaroys in Salem, the Panchamalais and Kollamalais in the same district and in Trichinopoly, and the Javadi Hills in North and South Arcot.

The key to the river system of the presidency is the conformation of its hills. The Western Ghats form an impregnable barrier to the passage of rivers in a westerly direction and there is, therefore, no drainage into the Arabian Sea, except that which is shed from their western slopes. With this exception, the whole trend of the drainage is from west to east into the Bay of Bengal. There are four great rivers, the Godavari, the Kistna, the Cauvery and the Pennar. The first two rise in the Bombay Presidency within fifty miles of the Arabian Sea, the third in the Western Ghats in Coorg and the fourth in the Mysore plateau. In the early part of their courses, these rivers flow rapidly in deep beds but the pace slows down as they approach the coast, and it has, therefore, been possible to harness them all for irrigation purposes. The deltas are covered with wide expanses of irrigated crops which rarely fail, even in the severest droughts.

The presidency possesses 1,700 miles of coast line. The full advantage which such an extensive sea-board might be expected to confer is not secured for the reason that, in all its length, there is not a single natural harbour capable of accommodating ocean-going vessels. The various ports, except the Port of Madras which possesses an artificial harbour, are merely open roadsteads where ships can lie at anchor and discharge their cargo into small surf boats. The building of artificial harbours at Vizagapatam and Tuticorin on the east coast and at Cochin on the west coast is now under contemplation and these projects if carried out, will go far to provide all that is required in this connection.

The presidency falls into six natural divisions. The Agency division in the extreme north, which is a sparsely populated area, consists almost entirely of fever-stricken jungles and low hills covered with inferior forest growth and patches of bamboos. The higher portions are inhabited by aboriginal tribes such as Khonds, Savaras and Jathapas who depend upon sporadic or *podu* cultivation, while a few Oriyas and Telugus—the civilised races of the plains—occupy scattered areas in the lower portions in which they carry on fruit gardening and terrace cultivation, growing rice, gram, vegetables and other garden crops. Between the Agency and the coast, and extending to the south as far as the Nellore district lies the East Coast North division which includes the prosperous deltas of the Godavari and Kistna rivers. This tract is favoured with a fertile soil, adequate rainfall and extensive irrigation facilities. In the middle of the peninsula, which gets the full benefit of neither monsoon, is the Deccan division. Here Nature compels the peasants to work hard for a living. Their prosperity is almost immediately affected by even a small shortage of rain and the Deccan districts are seldom free, if not from the reality, at least from the apprehension of famine. Passing south from the Deccan, from the Telugu to the Tamil country, we come to the East Coast Central division, where the rainfall is more abundant, the soil more fertile and the peasants more industrious. The general air of prosperity which characterises this tract becomes still more evident in the East Coast South division which contains the densely populated deltas of the Cauvery and Tambraparni, and the cotton fields of the Madura and Tinnevelly districts. Finally, there is the West Coast division where the abundant rainfall enables a teeming population to extract a living from a soil not naturally over-fertile, with but little exertion.

It is not always realised how vastly conditions change in passing from one side of the presidency to the other, or from one end of it to the other. If we travel from east to west, as we pass through the famous gap near Coimbatore and reach the west coast, we come immediately into a different world, as different as, say, England is from Italy. We find a different race of people, referring to the Tamils we have left behind as "foreigners," a race with an entirely different language, with a different religion, different customs, and different dress. Not only has the contour of the country changed from vast plains to rolling hills intersected by rivers and backwaters, but the climate has changed from a dry one to one of moist heat and frequent rains. The very type of village houses has changed and the temples are of a different design. On all sides, we find coconuts, pepper vines and areca palms, while the valleys are so fertile and well watered that, in some places, they yield three paddy crops in the year. Equally great and marked are the changes experienced as we pass from south to north and get into the Telugu country and find a different language and a different race of people.

The chief rain bearing current is the south-west monsoon which blows from the Indian Ocean from the end of May to the end of September. Much of the moisture conveyed by this current fails to cross the Western Ghats, with the result that the main precipitation (which may be anything from 100 to 180 inches) occurs between the top of the Ghats and the west coast. The districts on the other side of the range, except in a tract corresponding roughly to the Agencies in the north, generally speaking, receive less than 25 inches, and in many parts only 5 inches or less during the south-west monsoon period. The south-west current dies away in September and is replaced, normally in October, by the north-east monsoon current. The date of arrival of the latter is somewhat uncertain and it is often cyclonic in nature, sometimes coming with terrific force and causing considerable damage. The fall due to this is heaviest along the strip of coast lying between the Pulicat lake to the north of Madras city and Point Calimere in the Tanjore district. In this tract, the average rainfall is over 25 inches. The current gradually weakens as it passes inland towards the Eastern Ghats and in areas to the west of that range, such as the Deccan, the fall is less than 10 inches. Rain continues to fall at irregular intervals from January to May, the average precipitation during this period being about 6 inches. For the year as a whole, the heaviest fall in the presidency occurs on the west coast in the inland parts of South Kanara, where it is about 180 inches. The central and southern table-land comprising ten of the largest districts, gets, with exceptions, only a moderate rainfall, varying locally from 38 inches in North Arcot to 23 inches in Bellary. Moreover, it is in these areas where the rainfall is least abundant that it is most capricious both in amount and distribution and they are, therefore, the areas which are most susceptible to famine.

The climate throughout the plains of Madras is warm throughout the whole year, with a very varied humidity depending on the influence of the two monsoons. There is a general rise in temperature during February and March; April and May are the hottest months; from June till October, the climate is warm and humid in the regions of heavy precipitation from the south-west monsoon, but just outside this rain zone the humidity is lower and the temperature is modified by the wind. The eastern and south-eastern districts remain dry and hot during this period but, with the onset of the north-east monsoon at the end of October, the situation improves. Generally, conditions are comparatively cool from November till the end of January. The climate of the Nilgiris and other high elevations is uniformly good. Cuddapah, where the mean temperature rises as high as 106° in May, is considerably the hottest station in the presidency.

The most general type of soil existing in Madras is derived from the gneisses and schists of the Archaean system and varies greatly in consistency, depth and fertility. In general, the upland soils are poor, thin, gravelly and light-coloured, and from these intermediate variations are found up to the rich, deep, dark-coloured loams of the lowlands. As a rule, the soils of this type are deficient in nitrogen, phosphates and humus, but potash and lime are sufficient. They respond readily to suitable manurial treatment, and irrigation can be employed with great advantage.

Black cotton soil covers extensive areas in the drier tracts of the presidency, in the Bellary, Cuddapah, Kurnool, Tinnevelly and Coimbatore districts and, to a less extent, elsewhere. This is a dark-coloured, often black, soil, probably derived from the ferruginous schists by weathering under arid conditions. It is exceedingly sticky when wet and difficult to work, but is very retentive of moisture and can yield excellent crops even where the rainfall is scanty. It is particularly suited to the cultivation of cotton and millets and possesses many of the cultural characters of the Deccan trap regions, though it never attains the depth of soil associated with the trap area. Phosphoric acid, nitrogen and organic matter are generally deficient but potash and lime are not. The larger rivers, the Godavari, Kistna and Cauvery, have formed extensive deltas consisting of deep, rich, alluvial loams, which produce heavy crops of rice under irrigation. They vary in character according to the nature of the upland soils from which they are derived, but all respond to manurial treatment, particularly in regard to nitrogen and phosphates. The soils of the areas of high rainfall are of lateritic origin and in this class can be included the ferruginous clay soils of the Nilgiris and other planting districts. These soils are the product of excessive weathering and are usually very deficient in potash, phosphates and lime and therefore respond readily to manuring. The almost complete absence of lime gives them an acid reaction.

The total area sown in 1926-27, including double cropped land, was 37·36 million acres. Of this, 29·35 million acres were under food crops and 8·01 millions under non-food crops. The most important cereal food crops were:

Rice	10·8 million acres.
Cholam (*Andropogon sorghum*) ..	4·2 " "
Cumbu (*Pennisetum typhoideum*) ..	3·1 " "
Ragi (*Eleusine coracana*)	2·3 " "

Of food crops other than cereals the most important were:

Pulses	2·7 million acres.
Fruits and vegetables	313,000 acres.
Sugarcane	114,000 "

The chief non-food crops were cotton (2·2 millions) and groundnut (2·7 millions). Smaller in extent, but yielding crops of high intrinsic value, was the area under "drugs and narcotics":

Tobacco	.. ..	232,000 acres.
Arecanut (*Areca catechu*) ..	..	97,000 ,,
Coffee	.. ..	51,000 ,,
Tea	.. ..	55,000 ,,
Betel-vine (*Piper betel*)	.. ..	27,000 ,,
Rubber	.. ..	12,000 ,,

A quinquennial census of livestock is taken. The last four of these do not show any very definite increase in the number of cattle, especially if some allowance is made for understatement in the earlier reports. The figures were:—

1910	.. .. ..	20·1 millions.
1915	.. .. ..	21·8 ,,
1920	.. .. ..	22·3 ,,
1925	.. .. ..	22·1 ,,

At the last census the classification was:

Bullocks (including bulls)	..	7·3 millions.
Cows	.. .. ..	5·5 ,,
Male buffaloes	.. ..	1·4 ,,
She buffaloes ..	.. ..	2·6 ,,
Young stock ..	.. ..	5·3 ,,

In general, the cattle are poor in size and quality, though notable exceptions are to be found. There is, for example, the Ongole (Nellore) breed which provides the best milkers in the presidency and the males of which make good heavy-draught animals of a quality which will stand comparison with any in the world; there is the Allambady which is considered to be closely related to the famous Amrit Mahal of Mysore, and there is also the compact Kangayam which can trot up to seven miles an hour. The only other numerically important classes of stock are sheep (11·2 millions) and goats (8 millions). Horses, mules and donkeys are of little account and their numbers are on the decline.

2. PROVINCIAL INCOME

GOVERNMENT

(Figures are in

Revenue and Expenditure

Receipt heads	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27
Revenue Receipts						
Principal Heads of Revenue—						
Land Revenue .. .. (a)	726	730	(d) 714	740	(e) 771	751
Excise	458	490	519	490	491	510
Stamps	190	220	231	241	245	252
Forests	49	53	51	50	52	56
Other heads .. .	(c) 36	36	18	39	43	45
Irrigation	(b) −27	−20	−25	−30	−35	−41
Debt—Interest	6	10	11	13	16	21
Civil Administration—						
Administration of Justice	11	16	16	14	12	13
Jails and Convict Settlements ..	9	8	6	8	9	8
Police	7	13	9	9	10	10
Education	7	7	7	6	6	7
Medical	3	3	4	4	4	5
Public Health	1	3	1	..	1	1
Agriculture (including Co-operation and Veterinary)	4	3	4	3	3	3
Industries	10	14	12	14	11	10
Other departments	3	3	5	4	4	4
Civil Works	7	8	7	6	10	8
Miscellaneous	11	12	13	15	18	17
Miscellaneous adjustments between Central and Provincial Governments	2	3	9	1	1	..
Extraordinary receipts	..	..	..	..	18	..
Total, Revenue Receipts ..	1543	1606	1648	1627	1693	1688

(a) Includes and (b) excludes land revenue due to irrigation.
(c) Excludes contra-adjustments under revenue and expenditure on account of income tax which were
(d) The low actuals were due to adverse seasonal conditions.
(e) Includes a special credit of 13 lakhs for *eitheut* inclusion fees in the Kistna and West Godavari
(f) Excludes and (g) includes interest on irrigation works.
(h) Includes repayment of debt which was met from borrowed funds in the years 1921-22 to 1923-24.

AND EXPENDITURE

OF MADRAS

lakhs of rupees)

charged to Revenue

Expenditure heads	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27
Expenditure charged to Revenue						
Direct Demands on the Revenue—						
Land Revenue	129	133	41	38	39	33
Forests	52	48	47	43	18	50
Other heads	61	58	59	50	78	75
Irrigation—Revenue Account ..	(f) 19	35	30	40	47	50
Irrigation—Capital Account charged to Revenue	..	..	..	1	1	..
Debt Services	(g) (h) 44	(h) 65	(h) 63	68	81	80
Civil Administration—						
General Administration	135	182	217	222	227	230
Administration of Justice	95	66	91	96	96	95
Jails and Convict Settlements ..	30	30	31	29	30	28
Police	200	201	201	196	188	188
Education	143	155	161	171	197	199
Medical	58	50	57	58	60	60
Public Health	27	11	12	32	33	31
Agriculture (including Co-operation and Veterinary)	26	27	27	27	30	32
Industries	21	18	16	18	17	18
Other departments	11	12	15	16	19	20
Civil Works	122	107	104	81	100	115
Miscellaneous	80	80	95	90	92	91
Provincial contribution	(o) 348	348	348	348	222	195
Miscellaneous adjustments between Central and Provincial Governments ..	21	..	..	1	..	..
Extraordinary charges	..	..	..	23	..	..
Total, Expenditure charged to Revenue ..	1662	1623	1629	1657	1596	1582

abolished with effect from 1922-23 by modification of Devolution Rule 15.

districts.

In the subsequent years the expenditure is met from ordinary revenues.

GOVERNMENT

(Figures are in

Capital Receipts

Receipt heads	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27
Capital and Debt Head Receipts						
Revenue Surplus	..	..	10	..	98	101
Famine Insurance Fund	..	6	7	5	7	8
Loans and Advances by Provincial Governments	16	37	22	22	38	34
Loans between Central and Provincial Governments	115	66	61	..	..	..
Advances from Provincial Loans Fund ..	..	..	..	130	80	202
Appropriation for Reduction or Avoidance of Debt	(a) 10	(a) 11	(a) 17	21	30	34
Suspense	..	..	..	..	2	7
Depreciation Funds	..	..	..	..	..	2
Total, Receipts ..	141	123	120	178	204	388
Opening Balance ..	59	..	9	13	31	114
Total ..	200	123	135	191	205	502

(a) Includes repayment of debt which was met from borrowed funds in the years 1921-22 to 1923-24.

OF MADRAS

lakhs of rupees)

and Expenditure

Expenditure heads	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27
Capital and Debt Head Expenditure						
Revenue Deficit	100	17	..	30	..	..
Capital outlay on Forests	..	..	..	8	1	1
Construction of Irrigation Works ..	7	6	10	16	28	77
Civil works not charged to Revenue ..	11	..	4	6	9	7
Other Capital outlay not charged to Revenue	..	6	2	—6	2	14
Famine Insurance Fund	..	..	..	3	..	..
Loans and Advances by Provincial Governments	63	71	60	88	79	81
Loans between Central and Provincial Governments	10	14	46	21	30	34
Suspense	..	..	..	..	2	8
Depreciation Funds	..	..	..	..	..	..
Total, Disbursements ..	200	114	122	160	151	222
Closing Balance ..	..	9	13	31	144	310
Total ..	200	123	135	191	295	532

In the subsequent years the expenditure is met from ordinary revenues.

In 1921-22, as the result of famine, the non-co-operation movement and the Malabar Rebellion, there was a large decrease in revenue, while the same causes also led to increased expenditure, with the result that there was a deficit in that year of Rs. 109 lakhs. In 1922-23, the Government made every effort to balance the budget. Additional taxation was imposed under stamps and court-fees, registration fees were enhanced, and severe retrenchment in expenditure was undertaken. In the result, in the year 1922-23, the deficit was only Rs. 17 lakhs, which was turned in 1923-24 into a small surplus of Rs. 19 lakhs. The heavy floods and cyclone of 1924 again disturbed the financial position in 1924-25, but a remission of Rs. 126 lakhs in the provincial contribution saved the situation in 1925-26. A further sum of Rs. 57 lakhs was remitted in 1926-27. These remissions have enabled the Government to undertake a progressive policy of expanding elementary education by the opening of new schools, to incur additional expenditure on other development services and to build up a balance as a reserve against unforeseen contingencies.

3. REVENUE ADMINISTRATION AND LAND RECORDS.

The land revenue systems of British India have been broadly classified into two main divisions: *ryotwari* and *zamindari*. Both systems are in force in Madras, the former over about four-fifths of the presidency, and the latter in the permanently settled estates. Most of these estates are in the northern districts but large tracts are held under the *zamindari* tenure in some of the central and southern districts.

The *ryotwari* settlement is based on a cadastral survey, field by field, of the area to be settled. A separate map is prepared for each village, in which are shown the separate fields which make up the holding. In addition to the village map, each field is separately mapped and the subdivisions, if any, are shown. All these are bound up together to form an atlas known as the "Field Measurement Book". Upon the basis of the cadastral map is prepared a ledger of holdings, the primary object of which is to show from whom the assessment of each holding or field or subdivision is to be realised, and the amount due in each case. The record is corrected every year at the annual settlement of accounts known as the *jamabandi*, when any changes in the holdings and any remissions under the rules are ascertained and recorded. The registered occupants of each field deals directly with Government and is entitled to hold the land so long as he pays the assessment. Subject to that provision he cannot be ejected by Government though he himself may increase or diminish his holding or entirely abandon it. There are no restrictions imposed by the legislature on inheritance, transfer, mortgage, sale and lease. A settlement ordinarily runs for a period of thirty years, after which a resettlement is effected.

The *zamindari* system differs from the *ryotwari* in two important respects: in the first place, the settlement is a permanent one; in the second, the revenue is imposed, not on each individual landholder, but on an individual (zamindar) owning an estate and occupying a position identical with, or analogous to, that of a landlord. The permanent settlement was carried out without any detailed survey and record, and even now such a survey is only undertaken at the express wish of the zamindar. Government have bestowed upon the zamindar the right to collect the revenue on the condition that he hands over a certain portion of that revenue to the State. The amount payable to the State has been declared to be fixed and unchangeable for all time.

As regards the method by which the *ryotwari* settlement is carried out, the soils are divided into series, the most important of which are black (*regur*) and red ferruginous, and these again are divided into classes according to their chief constituents, clay, loam or sand. A further subdivision occurs according to quality and according to whether the land is 'wet', that is irrigated, or 'dry', land irrigated from purely private sources being classed and assessed as 'dry'. The outturns are then valued at a commutation rate which is below the average of the prices of the previous twenty non-famine years, and from this valuation deductions are made for differences between market and village prices, for vicissitudes of season, for unprofitable areas, and for cultivation expenses which are estimated according to soil. The balance represents the value of the net produce, of which one-half forms the nominal assessment. The rates thus obtained are then applied to the respective soils. Further allowances are made according to the position of groups of villages in relation to communications, markets, etc., and according to the nature of the sources which supply irrigation. In general, the existing classification of soils is not altered at a resettlement unless for very strong reasons.

In the period anterior to British rule, it was a favourite device, whilst leaving the land revenue nominally at a fixed proportion of the produce, to add to it very considerably by the addition of *abwabs* or cesses. The only cess that is now levied is the local rate, the proceeds of which are devoted to local objects such as roads, schools, dispensaries and sanitation and are administered by local boards. The amount of the cess is fixed at six-and-a-quarter per cent on the land revenue assessment *plus* water rate, if any, in the case of lands held direct from Government on *ryotwari* tenure, and on the annual rent payable to the landholder, in the case of lands held on any other tenure. In the case of *inam* lands or lands held wholly or partially free from assessment, the cess is levied on the full assessment *plus* water rate, if any, which such lands would bear, if they were not *inam*. In addition, district boards can levy an extra tax not exceeding three pies in the rupee, and the taluk boards can levy up to a similar amount. On the other hand, deductions from the full settlement rate are frequently allowed. There are, first of all, deductions which are of a permanent nature as in the case of *inam* and *muafi* lands. These are a legacy from the ancient custom of granting land either revenue-free or at a reduced revenue for religious or charitable purposes, or as a reward for service to the State, or as part of the emoluments of village officers and servants, and grants so made in the past were in general respected and continued. Again, all improvements, whether effected by the cultivator entirely from his own resources or with the help of a loan from Government, are exempted in perpetuity from assessment. Care is taken that a proposed enhancement at a resettlement shall not press too heavily. The enhancement which may be imposed immediately is limited to twenty-five per cent, the balance being imposed by annual instalments not exceeding twelve-and-a-half on the original assessment and, if the enhancement is proposed on the basis of a rise in prices only, it must not exceed eighteen-and-three-quarters per cent. Finally, deductions are made by granting remissions of revenue in seasons of crop failure.

The assessment on wet land is wholly remitted if the land is left waste or the crop is totally lost owing to failure of water in the irrigation source, but suspension and remission of assessment on dry land are only granted in very exceptional circumstances, such as the occurrence of widespread calamities, such as famine, or of local calamities, such as floods or hail storms. Whether the assessment is suspended or remitted depends on the crop history of the tract in the years immediately preceding that in which the calamity occurs. Where remission is granted for loss of crop on dry lands, it is given at a uniform rate calculated with reference to the average loss for the whole of the affected tract. If the yield is one-sixth or less of the average, the remission is seventy-five to one hundred per cent; if it is between one-third and one-sixth, the remission is from fifty to seventy-five per cent; and if it is between one-half and one-third, the remission is from twenty-five to fifty per cent.

Remissions are not granted in the permanently settled tracts as their revenue is light.

Until twenty years ago, the relations between landlord and tenant, both in the permanently and temporarily settled tracts, were regulated by the provisions of an Act of 1865. Since 1908, the permanently settled parts of the province have come under the operation of the Madras Estates Land Act, based on the tenancy legislation of other provinces, more especially that of Bengal. Occupancy rights were conferred on ryots who, at the time, were in possession of land other than the private land of the proprietor. A non-occupancy ryot can obtain occupancy rights by the payment to the landlord of a premium equal to two-and-a-half times the annual rental. Rents can be increased by mutual agreement or by order of a revenue court, but the enhancement cannot exceed more than two annas in the rupee and the rent cannot again be enhanced for a period of twenty years. An occupancy tenant cannot be ejected for arrears of rent but his property (including movable property, with certain exceptions), can be attached and sold, in the proprietor's interest, by a properly empowered officer. In the *ryotwari* areas where the land is cultivated to a much larger extent by the landholders themselves and where, consequently, rents are far less prevalent, tenancy legislation has not so far been found necessary. The only provisions of the Estates Land Act which apply to these areas are those in regard to the recovery of rent. These give landholders in such areas the same powers in this respect as are possessed by landlords in the permanently settled areas.

We come now to a description of the agency by which the land revenue is collected and by which the records on which its collection is based are maintained. The unit of administration is the village. Each village has an official headman. His primary duty is the collection of the revenue and to that are added the duties of petty magistrate and registrar of births and deaths. The other official of the village is the accountant or *karnam* whose office, like that of the headman, is hereditary in certain districts of the presidency. His duties are to keep the village account of revenue payments, to look after the village maps and registers and keep them up-to-date, to make inspections from which to fill up the statistical returns for which he is responsible, to maintain a record of all changes of ownership, and to report any unusual occurrences such as epidemics of human or animal disease. Both the village headman and the *karnam* are paid a fixed salary.

From the village we pass to the *firka*, the circle of the revenue inspector whose duty it is to supervise a number of *karnams*. Six or seven revenue inspectors' circles go to form a taluk, the officer in charge of which is known as the tahsildar. Under him there is an establishment for the purpose of receiving the local land revenue and sending it on to the district treasury, but revenue work by no means exhausts the list of his duties. Above the taluk comes the division under a divisional officer who is a member of the Indian Civil Service or the Provincial Civil Service. Above the division comes the district, the fundamental administrative unit, at the head of which is the Collector, and which contains on the average between six and seven thousand square miles and nearly two million inhabitants. The powers and duties of the Collector embrace almost every subject which comes within the functions of modern government. In fact, in the eyes of the cultivator, he is the supreme authority, the *ma bap* (literally, mother and father) who is expected to interest himself in all that affects the well-being of the people under his control. In all provinces except Madras, there is one more territorial unit—the division with the Commissioner at its head—but; in Madras, matters relating to revenue administration pass direct from Collectors to two of the three Members of the Board of Revenue or, in cases of special importance, to the Board as a whole. Finally, there is the Governor, his Executive Council and his Ministers.

4. THE CULTIVATOR.

The peoples of Madras belong almost entirely to the Dravidian race and therefore typify pre-Aryan India. Nevertheless there are great differences between them. The 1921 census distinguished some 120 castes, tribes, etc., of all degrees of civilization and enlightenment, from the Brahmins, the heirs to systems of religion and philosophy which were already old when the Romans invaded Britain, to the Khonds of the Agency tracts, who, within human memory, practised human sacrifice to ensure plentiful harvests. The striking similarity of the word 'rice', which came into the English language through Latin, to the Tamil word *arisi* gives some support to the claim that the original inhabitants of south Madras were the pioneers of rice cultivation. It may be claimed, with less uncertainty, that they were the pioneers of irrigation engineering. The study of the crops and agricultural methods of the people of south India is for these reasons profoundly interesting and it is fitting that, within modern times, Madras, by its important deltaic irrigation schemes, should have shown the way to the utilisation of the vast resources of the Himalayan rivers which has changed the face of many an arid waste in northern India.

The Oriyas of the Ganjam and Vizagapatam districts in the north of the presidency who number 1·57 millions deserve special mention as a race of non-Dravidian origin. Their language resembles many other Indian vernaculars of Aryan descent, and the influence of Sanskrit on it is very marked. They came down as conquerors from the north in the sixth and seventh centuries A.D. and in the year 1434, under Kapileshwar Deva, one of the Ganga kings of the Solar line, spread as far south as the Pennar River. Relics of the sway of their rulers in the form of temples and large tracts of *inam* land are still to be found in the northern districts of the presidency.

The total population of the presidency, at the census of 1921, was 42,794,155 and of this seventy-one per cent were returned as making a living directly from agriculture. Tamils and Telugus between them made up 787 out of every thousand: the remainder consisted of Malayalees, Oriyas, Kanarese and Muhammadans. Of Hindus there were 887, of Muhammadans 67, and of Christians 32 per thousand. 124 in every 1,000 were urban dwellers; the remainder were distributed over 52,708 villages.

The census village, as a rule, is not a residential but rather an administrative unit. These units vary greatly in size from district to district. They are smallest in population in the Agency, where they contain, on the average, 116 souls and largest in population as well as in area on the west coast where the average population is as high as 1,344. They vary in type as greatly as they differ in size. Characteristic of the Agency is the "tiny temporary affair containing only a couple of huts and a cattle byre," which can be shifted elsewhere as occasion arises. Then there is the old fortified type, common in the Deccan, around which the ruins of the old walls and circular towers are still in evidence, and where the square, flat-roofed houses are crowded close together and the streets are narrow and tortuous. The ordinary village of the Tamil country will contain three or four broad streets, flanked by the tile-roofed, solid masonry houses of the well-to-do, behind or interspersed with which will cluster, in a shapeless mass, the mud houses of the poor. The west coast village, again, may cover a wide area in which each house, however humble, stands in its own compound amidst luxuriant vegetation. These are the characteristics which (in the words of the Census Officer) "give the whole of Malabar the appearance of a beautiful garden, where live a race of prosperous lotus eaters, each family nestling under its own pepper vine and jack tree."

In an average village, 810 out of every 1000 people would be engaged directly in agriculture; the remainder would be craftsmen, shopkeepers, village servants, etc. If every thousand of those supported by agriculture were divided by occupation, the result on the average would be as shown below :—

Non-cultivating landowners	..	..	.. 56
Cultivating do.	..	..	.. 398
Non-cultivating tenants	..	..	.. 32
Cultivating do.	..	..	.. 240
Farm servants and casual labourers		..	.. 274

The typical abode of the well-to-do cultivator is fairly commodious and is built of stone or brick and mortar. At the back of the compound are the thatched huts of the labourers and the cattle sheds. A distinguishing mark of the men of means is the large granary. The rich ryot never markets his produce immediately after harvest and never to the village trader, preferring rather to hold it over in the hope that prices will improve. The furnishings of his house are simple and inexpensive, consisting of a few benches and stools and desks, rudely fashioned by the village carpenter from wood grown on the holding. His fare, though simple, is markedly superior to that of his humbler brethren; rice is his staple food; millets rarely, except in the Deccan districts; milk and milk products form an important item; his garden supplies him with vegetables, supplemented by what he purchases at the weekly market. His wealth consists of his land, his livestock, his family jewels and the principal which he has lent out. He is no great believer in bank accounts; moneylending and investment in land, in the order named, appeal to him much more. Socially, he aspires to connection with townspeople and, for that reason, marriage and other social obligations cost him dear. The dignity of manual labour does not appeal to him. His day's work consists of a walk of inspection round his fields after breakfast, and a second round in the evening when he gives instructions for the following day's work. He devotes his leisure mainly to law suits, to pilgrimages and visits to the towns. He holds a high position in the estimation of his fellows and is freely consulted in matters which concern their daily life.

The home of the cultivator who, though not in easy circumstances, lives well above the subsistence margin, is on a much less commodious scale. His granary is small for he has to part with most of his produce at harvest time. He is not encumbered with over-much furniture; his friends, when they visit him, squat on a mat on the *pial* (verandah); his evening meal generally consists of rice, dal and vegetables, with fish or meat occasionally if he is not of a caste to which these are forbidden; in the morning he breakfasts on what was left over from the evening before, or perhaps on *kanji* (millet gruel), vegetables and curd, and at midday he again has *kanji*; milk products enter into his diet but sparingly; his savings, if any, he invests much in the same way as does his wealthier brother; his means do not encourage him to form marriage ties with the cities but nevertheless his expenditure under that head is heavier than he can really afford, and more than he would be inclined to incur if he were unfettered by caste obligations. He does his cultivation with the help of one or more permanent servants. After he has marketed his produce, made his house watertight against the monsoon and given all the attention that he considers necessary to his holding, he has ample leisure before the business of the next cultivating season claims his attention.

The house of the poor cultivator who ekes out a bare subsistence consists of mud walls and a thatched roof and the same roof shelters his family and his cattle; furniture there is none; his cooking utensils are of earthenware instead of brass: he does not require a granary, for his chronic need of money compels him to sell his crops to the village merchant and moneylender even before he is in a position to sow them; he buys his clothing from itinerant vendors who refuse cash down if it is offered to them; millets form his staple food, rice rarely; milk and *ghi* are luxuries which he can seldom afford; his children are taken away from school at about eight years of age, to help on the holding or to tend the cattle of the village; in the slack season he plies his cart for hire if he has one; when conditions get too hard for him he emigrates, but with the firm intention of returning to his village as soon as he has made a little money.

The labourer, if he is a caste man, lives in the village proper, often in the compound of his master; if he is a member of the depressed classes he has to resort to the segregated area allotted to those classes. The casual labourer is generally paid in grain, at the rate of eight to ten annas a day for a man and four to six annas for a woman. The farm servant is paid in a variety of ways; a few rupees in cash *plus* a fixed quantity of grain, and clothing for himself and his family; or a definite share of the produce *plus* clothing. Generally he gets into his master's debt by taking an advance for a special purpose, such as a wedding, and nominally the loan is to be repaid by service. Cases are not unknown where the master takes care that the loan shall not be worked off, the man is attached compulsorily for life and sometimes his sons inherit the debt. Emigration to the rest of India, and to Burma, Ceylon and Malaya however, is steadily making its influence felt. Statistics show that while, in 1901, there were 270 working labourers for every 1,000 persons supported by the other agricultural occupations, the proportion in 1921 had fallen to 212, and that, between 1911 and 1921, the presidency had suffered a net loss of a million-and-a-half labourers by excess of emigration over immigration. This must mean that the labourers who stay at home are in greater demand and, in fact, wages show a continuous tendency to rise. Of late years, too, Government have started an organisation to deal specially with labour problems and, so far as may be possible, to improve the conditions under which the labourer works.

The villager enjoys little in the way of social amenities. His chief relaxation is to gather round the village tree and gossip, or to listen to recitals and religious discussions. Occasionally the monotony is varied by the arrival of a travelling circus or cinema show, or by the exhortations of the officials of one or other of the departments which are concerned with showing him better ways of doing things. He is easily satisfied, for his knowledge of the outer world is but scanty. The children are taught the "three R's" in the village school, or as much of the rudiments as they can pick up in two or three years, which is all the time that is usually devoted to school life by all except the children of the well-to-do. Their parents are illiterate, and in consequence they soon forget what little they have learnt. The position with regard to literacy is dealt with in the section on 'General Education.'

That Madras is a province of small holdings is clearly brought out by a study of the figures supplied by the First Member of the Board of Revenue, at page 304,* which refer to the *ryotwari* areas. Lands in these areas are held under *patta* (a document showing the area of land held under it and the revenue payable). A 'patta' may be in the name of a single individual or jointly in the names of several. A man may hold more than one *patta* and a joint *pattadar* may in addition have a *patta* or *pattas* standing in his name alone. The total number of *pattas* is not, therefore, the same as the total number of holdings but the figures are sufficiently close to enable inferences to be drawn with some certainty from the figures of *pattas* as to the average size of a holding. The Tables show that the total number of single and joint *pattas* in 1925-26 was 5·4 millions. Over a million *pattas* paid, in revenue, Re. 1 or less; nearly three million paid between Re. 1 and Rs. 10; and just under one million paid between Rs. 10 and Rs. 30. Thus, roughly, ninety-three per cent of the holdings pay Rs. 30 in revenue, or less; and seventy-four per cent pay an amount not exceeding Rs. 10. Turning from terms of revenue payment to terms of the amount of land held by each of the three groups already mentioned, the average area of the land held under the *patta* which pays Re. 1 or less is about two-thirds of an acre; that held under the *patta* which pays between Re. 1 and Rs. 10 is just over three acres, and that of the third group is seven-and-two-thirds acres. In the light of these figures, there appears to be ample justification for the view expressed that many holdings have become subdivided to a point at which they no longer provide an adequate standard of living. Unfortunately, too, there appears to be clear evidence that subdivision is still proceeding apace in the fact that whereas, in 1921, the total number of single and joint *pattas* was 4,861,745, by 1926 the number had increased to 5,415,745. The position is rendered still worse by the prevailing system of fragmentation, under which an individual holding consists not of one compact block, but of a number of small plots scattered all over the village area. The experiment of re-arranging holdings by consent has been tried in Trichinopoly district, but without success. No attempt has yet been made to deal with the problem by means of legislation.

Recent censuses point to a steady increase in density of population and that in spite of the many diseases and other factors which at present take a heavy toll of human life. The question, therefore, obtrudes itself: How is Madras to accommodate the natural increase in the population of the future? The progress of medical science and the preaching of the elementary principles of sanitation may be trusted to make the

* *Vide* Evidence Volume III—Madras.

toll taken by disease lighter and lighter as the years go by, so that an acceleration in the present rate of increase may be expected. Will a complete solution of the problem of the surplus population be found in emigration, in the expansion of industry, in bringing under cultivation the large areas which are described under the somewhat vague term 'culturable' but are not under crops, in increasing the productivity of the areas already under cultivation? When all these possibilities have been exhausted, the main solution will probably still have to be found in restriction of the population rather than in expansion of the material resources of the presidency.

Some idea of the extent to which indebtedness prevails is given in the Table on page 309.* As regards the four distinct areas in the Tanjore, Kistna and Godavari districts (for which the figures are more or less complete), it will be seen that, out of 3,740 cultivators examined in 125 villages, 1,697 were free from debt. The total debt in these four areas amounted to Rs. 27·8 lakhs, that is Rs. 1,360 per cultivator indebted, and Rs. 743 per head for the total number of cultivators examined. In two of the areas, debt incurred for "ordinary family expenses" has not been disentangled from debt incurred for purely productive purposes such as purchase and improvement of land and purchase of livestock and implements, but, in the other two areas, it would appear that forty to fifty per cent of the borrowings were for purposes which would not ordinarily be classed as productive. That marriage ceremonies are responsible for a large proportion of the unproductive debt is shown by the figures for nearly all the districts mentioned in the Table.

In a country of the size and diversity of the Madras Presidency, including, as it does, areas of copious rainfall as well as semi-arid tracts, fertile deltas and stony uplands, and cultivation at all altitudes from a few feet above sea level up to 7,000 feet, it is not unnatural that agricultural practices should vary very widely. How wide the range may be within the limits of a single crop can be seen from a glance at the methods by which the chief crop—rice—is grown. For instance, in areas irrigated from the Godavari, enough water is frequently available to mature a second crop, the area of second crop for which water is available being decided each year by the Collectors after consultation with the Irrigation Advisory Board. In the Kistna delta on the other hand, as in almost all the rice-growing areas in the northern part of the province, there is not enough water for a second crop and therefore the ryot grows a single crop of a late-maturing variety, followed by a pulse or a green-manure crop, the seed of which is broadcasted in the standing rice crop just before the latter is harvested. Again in the Cauvery delta, broadcasting is common, whereas, in the Godavari and the Kistna deltas, transplantation is the rule. In the Cauvery delta, where transplantation is practised, a variation from the ordinary method of managing nurseries is found in the 'double transplanting' system—a device rendered necessary by the generally late arrival of the north-east monsoon. The nurseries are sown in early September, but the rains rarely appear before early November, by which time, under the ordinary method, the seedlings

* *Vide* Evidence Volume III—Madras.

would have tended to establish themselves too firmly in the nursery beds. They are, therefore, transferred to a second nursery bed where they remain until it is safe to plant them out. Another method known as *kar* and *ottadam* in the Cauvery delta and as *udu* in the Godavari delta, is the sowing of early and late-maturing varieties together, the seed being sown in the proportion of 2 early to 1 late. Under this system, when the early rice crop is harvested, the late variety is "topped" and the stubble of the early crop is left to rot and form a manure for the second crop. In the Agency division, where population is scanty and land plentiful, the outstanding feature is the prevalence of the practice of *podu* or shifting cultivation. A patch of jungle is set alight and the rice is simply broadcasted among the ashes, without any preparatory tillage or subsequent attention whatsoever. That particular patch is farmed until the land becomes exhausted. At harvest time, the whole of the straw is left standing, only the ears being cut off; a few days before the next season's monsoon sets in, the straw is fired and the seed is broadcasted among the ashes as before. Still another system locally termed *kaipad* is practised in sour lands on the west coast. After ploughing, the soil is heaped up into small mounds. When the rain sets in, the injurious salts are washed out and sprouted seed is broadcasted over the mounds. When the seedlings are old enough to withstand acidity, the mounds are scattered and the seedlings take root and establish themselves uniformly. Shifting cultivation is practised here too, on the low hill ranges of Malabar, and is locally termed *modan* (hill-rice) cultivation. Finally, there is the "semi-dry" system which is practised in the alluvial tract of the Coromandel coast, as a precaution against the over-vigorous onset of the north-east monsoon. The seed is drilled in, as in the case of an ordinary dry crop, and frequent intercultivation is given. Then, from the time that the tanks fill right up to harvest time, it is treated as a wet crop.

A very efficient system of dry farming is practised in the Deccan districts, where the rainfall is scanty at best and uncertain always, and the water table is so low that irrigation from wells is not practicable. All crops are drill-sown and the efficacy of intercultivation in conserving moisture is very well understood. Every fifth year or so, the land is ploughed in February-March, with a heavy iron plough drawn by a team of six or more oxen, the object being to kill off *hariali* (*Cynodon dactylon*) and other deep-rooted weeds by exposure to the hot-weather sun. The ryots in these dry tracts are very good farmers and have little to learn about the handling of dry soils.

Mention may be made, too, of the diversity of the systems practised in the different hill regions. In the Anaimalais, the Shevaroys, the Palnis and the Wyannad, agriculture has become highly specialised and is practically entirely in the hands of the planters. In the Agency, there is general agriculture and no planting, while in the Nilgiris both are practised.

Preparatory tillage begins about the middle of March. In some localities along the Ghats, showers received before the regular onset of the south-west monsoon allow sowings to commence in May, but the bulk of the early monsoon crops are sown in the beginning of June, and of the late monsoon crops in October. Harvesting is over by the middle of January, when the ryot rests from his labours and indulges in the harvest feast or *pongal*.

The cultivator is by no means ignorant of the principles underlying the rotation of crops. He knows that certain crops exhaust the soil and that others have a recuperative effect and, when he can, he arranges his cropping accordingly. He is aware, for instance, that gingelly (*Sesamum indicum*) is a greedy feeder and therefore he follows it by a pulse crop, never by another crop of gingelly. Under wells in the Coimbatore district, a three course rotation of *cholam*, cotton and *ragi* is the rule. In the rice areas, a single crop of rice is followed by a pulse, or sometimes by *sann* hemp (*Crotalarica juncea*) or *dhaincha* (*Sesbania aculeata*) for fodder and green manure, or, when no other alternative is possible, late maturing varieties are followed by early varieties. Sugarcane, where grown, comes into the rotation once in every three or four years, and the same is the case with betel-vine and plantains (*Musá sapientum*). Where conditions are not favourable, and where holdings are small and subsistence farming the rule, regular rotations are replaced by a system of mixed cropping, or even by a combination of mixed cropping and rotation. Thus, a system common in the Deccan districts is to grow sorghum mixed with pulse and safflower (*Carthamus tinctorius*) and to follow those, the next year, by a mixture of *korra** (*Setaria italica*) and cotton. Elesewhere a cereal and a pulse are grown together, as, for instance, "dry" rice and red gram (*Cajanus indicus*), cholam and cowpea (*Vigna catiang*), *ragi* and field bean (*Dolichos lablab*); or shallow-rooted and deep-rooted crops like *korra* and cotton; or exhausting and recuperating crops like gingelly and red gram. The idea underlying the mixed crop system is that a season which is unfavourable to a cereal may be favourable to a pulse, and *vice versa*.

Of recent years, however, there has been a regrettable tendency to violate the old established rotations by a too persistent cropping with commercial crops like chillies (*Capsicum annuum*), tobacco and groundnut. The very intensive system of cultivation under wells in Coimbatore, for instance, has been upset by the introduction of Cambodia cotton (*G. Hirsutum*). This is a phase which may safely be left to work itself out when the diminishing yield and the increased susceptibility to disease, which must inevitably follow too frequent cropping with the same crop, react on the profits.

The above account will serve to indicate what a large number of variables are present in this huge presidency in soil, climate and agricultural practice and how difficult it is for the Agricultural Department adequately to cover such a large and varied area, with its language and caste difficulties and its widely different territorial customs. The Agricultural Department must not only cater for these different conditions but must also study them in detail. Any improvement discovered

* *Korra* is the Telegu name for this crop. The Tamil name is *tenai*.

in one locality under one set of conditions is not likely to prove equally good in another locality where an entirely different set of factors obtain. It is necessary, therefore, to establish experiment stations and plant breeding stations in each typical locality for the intensive study of crops under different conditions and, in an area so vast, it is difficult to lay down and start a sufficient number of such stations to cover the ground with thoroughness. The "range" of each station is limited and with the present facilities the "ranges" of the existing stations neither meet nor cover the whole ground. In these circumstances, the advice given by the Agricultural Department on many points can only be of a general and not of an intensive nature.

5. THE AGRICULTURAL DEPARTMENT.

The need for introducing an improved system of agriculture in Madras was recognised as long ago as 1854, although the Mutiny prevented active steps being taken until 1863. The first beginnings were not very sound in conception. Not unnaturally, it was thought that the quickest road to progress was the wholesale introduction of western ideas and methods. Hence the placing of an order in England for a "steam plough, some harrows and cultivators, seed drills and horse hoes, threshing machines and winnowers, chaff-cutters and water lifts." Hence, too, the opening of a "model" farm at Saidapet on the outskirts of Madras city, at which the use of all these implements and machines, of artificial manures, and of western methods generally was to be taught to the ryots. The fundamental weakness of the scheme lay in the failure to recognise that an essential preliminary to model farming was the careful working out of the model to be followed and that model methods must, of necessity, be the fruit of an intimate knowledge of local conditions coupled with careful research and experiment on the multitude of problems which awaited solution. Nevertheless, the Saidapet farm continued to be the centre of agricultural activity for nearly forty years. For the first few years, it was controlled by a committee of management, with a superintendent in charge. In 1871, it was placed directly under the Board of Revenue and about the same time an assistant superintendent was added to the staff. Associated with its other activities was a class for the training of apprentices, with the object of fitting them to take charge of model farms and to act as demonstrators. Apparently this object was not achieved, for, when Government proposed to expand their activities by opening experimental farms in different parts of the presidency, the proposal fell through, mainly because there was no trained staff available to take charge of them. One result of this was that the problem of agricultural education came so much to the front that it obscured all the other equally important problems not only until an agricultural college was opened at Saidapet in 1876 under the control of the Education Department but for some years after. In 1885, an officer was appointed to the Board of Revenue as Commissioner of Revenue Settlement, Land Records and Agriculture. From that date the policy underwent a radical alteration. The Saidapet farm was abolished except for a small area which remained attached to the college, and, up to the beginning of the present century, the energies of the department were devoted to the collection of statistics bearing on famines and to sporadic enquiries on agricultural or economic subjects in various parts of the presidency. Meanwhile, the "model farm" idea had been steadily retreating into the background in favour of the sound idea of establishing farms for experiment and enquiry, with distinct and definite objects. All that was needed to bring Government to a decision was the threatened extinction of the sugarcane crop in the Godavari district, due to the ravages of "red rot" (*Colletotrichum falcatum*) disease.

The history of Madras agriculture from 1863 up till the end of the century thus falls into three periods. The first witnessed the ascendancy of the idea of a model farm worked on western methods, the second was dominated by a barren discussion on agricultural education and, in the third, agricultural effort was blighted by the insistence on the importance of statistics. None the less, in spite of the difficulties under which they laboured, the work done by Mr. W. H. Robertson during his long tenure of office as Principal of the college and Superintendent of the experimental station at Saidapet and subsequently by Mr. C. A. Benson as Deputy Director of Agriculture left its mark on the development of the department after the reorganisation of 1905. In that development, former students of the Saidapet College played no inconsiderable part.

In 1901, Dr. Barber was allowed to lease, and in 1905 to acquire, land for research with the object of finding varieties of cane resistant to red rot. In the same year, two farms were opened for work on cotton, and similar farms were established for the study of pepper in 1902, and for work on groundnut and exotic irrigated cotton in 1904. Thus, by the time Lord Curzon's forward policy of agricultural development for the whole of India was initiated, the Madras department was already well under way. By 1906, ten farms had been established and a whole-time Director appointed. The expert staff, which up till then had consisted only of the botanist recruited in 1898, was strengthened by the addition of an agricultural chemist, and two deputy directors for district executive work. The college at Saidapet was transferred back to the Agricultural Department under a new principal and, in 1908, the students were moved to the larger and better situated college at Coimbatore. The expert staff was further strengthened, at intervals up till 1914, by the addition of a mycologist, a special officer for work in the planting districts, an entomologist, a second botanist and a third deputy director, and the various experts were provided with laboratories and facilities for research. Thus, by 1914, the department had reached a stage at which rapid advance might confidently be expected. It was tolerably well equipped in regard to fundamental research, investigation of local problems, education and propaganda. The immediate need was for more district officers of all grades to strengthen the link between the department and the cultivator. The non-gazetted staff was completely reorganised in 1916 and divided into two main sections, scientific and agricultural, each of which was subdivided into upper and lower divisions; and, by 1919, the number of deputy directors' circles had increased to eight. Progress was to some extent retarded during and immediately after the war by the deputation of officers for duty in Mesopotamia, by the era of retrenchment which affected all departments, and subsequently by the fact that three of the most experienced officers in the department accepted posts elsewhere. The present strength of the department is—

Indian Agricultural Service officers	13
Madras Provincial Service officers	31
Officers on special contract	2
Subordinate Service—	
Upper	116
Lower	218

An indication of the rate at which the activities of the department are expanding is given in the fact that the departmental budget has increased from Rs. 7·73 lakhs in 1916-17 to Rs. 16·66 lakhs in 1926-27.

The research work is of two kinds. There is first of all the research into the fundamental problems underlying the practice of agriculture, which is carried on by a staff of specialists at the central institute at Coimbatore and at special stations. Linked up with that is the research carried on by deputy directors in charge of circles who have their own stations at which the discoveries of the central institute are tested for their suitability to local conditions, and who carry out investigations in connection with local problems affecting their circles. With the object of co-ordinating the experimental work carried on by district officers throughout the presidency, an advisory committee, consisting of the Director, the Agricultural Chemist, a crop specialist, the Professor of Agriculture and a senior deputy director has very recently been formed. Its functions are to review the experiments in progress at the district stations, to suggest new lines of enquiry and examine similar proposals put up by the deputy directors, to advise on the methods by which these should be carried out and to assist in interpreting the results.

The activity of the department centres in the estate attached to the Agricultural College and Research Institute, Coimbatore. The total area of the estate is about 500 acres. Of the 315 acres under cultivation, 45 acres are irrigated from the Noyil river, 124 acres are medium quality black soil, and the rest is red soil, partly under dry cultivation, and partly under garden crops irrigated from wells. A wide variety of crops is grown, including rice, sugarcane, cotton, wheat, millets, pulses, tobacco, linseed, garden crops and several fodders, and small plots of every crop in the presidency are grown for teaching purposes.

With the exception of the Paddy Specialist, who has a separate area away from the main farm, and the Livestock Expert whose headquarters are at Hosur in Salem district, all the investigations of the specialists are conducted on the Coimbatore estate. Considerations of space make it impossible to give more than a brief description of the more important lines of research now in progress or already completed.

An important activity of the Chemistry Section has been the conducting of soil surveys in several districts. The main result of these has been to show that phosphates are markedly deficient in all soils, although the deficiency does not appear to be quite so much in evidence in south Malabar which is the area at present under investigation. Of great potential importance in this respect are the mineral phosphatic deposits which are found in large quantities in the Trichinopoly district. These deposits are very insoluble, and the question of making them readily available as plant food and of the best combination in which they can be used is under investigation. A great deal of preliminary work has been done on the subject of the preparation of synthetic farm yard manure from straw and waste products such as groundnut husk and prickly pear, and the department hopes that it will soon be able to devise a simple method which can be demonstrated to the ryots. The only nitrogenous manure which has as yet found favour with the cultivator is ammonium sulphate, particularly when used in conjunction with superphosphate. Interesting work is in progress on the manner in which the manuring of a crop affects the vitality and the nutritive value of the grain; tests conducted by Colonel McCarrison, I. M. S., have shown that the nutritive value of wheat or *cholam* grown on a plot which received cattle manure was much higher than when the plot was manured with artificials only.

Other important lines of research, work on which has been completed or is still in progress, may be mentioned. The processes which take place in paddy soils during fermentation and nitrification have been studied, together with their bearing on manuring and cultivation of this crop. The great benefit due to green manure arose out of this piece of research. Improvement has been effected in the manufacture of coconut jaggery, an important cottage industry on the west coast. Ordinarily, the jaggery made from the juice of the coconut palm will not keep owing to the presence of chlorine which ultimately shows itself as calcium chloride, a very deliquescent product. A cheap and ready method has been evolved for the removal of the chlorine and good grade hard jaggery can now be made. A method on a practical scale has been worked out for malting *cholam* and preparing breakfast and invalid foods and this is now in a stage at which it can be taken up by private firms, though none have so far come forward to exploit it. A practical method has also been worked out for determining when sugarcane is ripe.

A bacteriologist has recently been added to the staff and a new sub-section to deal with animal nutrition problems is in process of formation. Apart from research, the section has a great deal of routine work to do. This consists mainly in making analyses in connection with the field research going on at the various experimental stations and, to a small extent, of soil and manure analyses for the public.

The Botanical Section has much systematic work to its credit, notably the herbarium collection on which the *Flora of Madras*, now under compilation at Kew, is based. Of chief interest however, from the economic point of view, is the work on the major crops. For rice there are now four breeding stations in the charge of the Paddy Specialist, the main station at Coimbatore, and sub-stations at Aduturai; Maruteru and Pattambi, each serving different rice tracts. Economic work is also being carried out by deputy directors on the stations at Anakapalle, Samalkota and Palur. Four improved late-maturing varieties have been evolved and issued from the Coimbatore farm and seven early varieties from Aduturai, and it is estimated that at least a quarter of a million acres of the latter are now grown in Tanjore and Trichinopoly districts. The other two farms under the specialist have been started only recently and are not yet in full working order, although mass selection for the Godavari delta is being done on four varieties at Maruteru and single plant selection is also in progress. The new station at Pattambi is designed to serve the west coast districts of Malabar and South Kanara and will deal with single crop, double crop, treble crop and dry *modan* (hill) rices.

The Paddy Specialist is also making an attempt to improve the system of *udu* cultivation, a method under which the crops are grazed by cattle or cut to check excessive vegetative growth. His idea is to sow a mixture of short and long duration varieties in suitable proportions, so that when the early variety is harvested there will be plenty of room for the late crop. Other problems, too, are engaging his attention—questions of cultivation and manuring about which no definite conclusions have yet been reached, the effect of sowing at different seasons, the period for which seed retains its germinating power, and the cooking qualities of different varieties. Root systems are being studied in relation to soil conditions in different areas. Technical studies are concerned chiefly with the possibility of evolving, by means of hybridisation, varieties of rice which will be immune to disease. A typical example of the necessity for such work is the case of the *korangusamba* variety which is very popular in the Tanjore delta but is particularly susceptible to attack by the fungus *Piricularia oryzae*. The work is being done in close collaboration with the Mycological Section.

The Anakapalle farm, which serves the Vizagapatam district, is devoting attention to selection work and to manurial questions. Results so far obtained with the latter show that an application of about a ton per acre of *sann* hemp leaf to land well supplied with phosphate will raise the yield by fourteen per cent. This is encouraging as in that district it is possible to grow as much as 4·5 tons of *sann* hemp per acre, as a *punasa* (early) crop, in three weeks to a month. On the Samalkota station, selection work is in progress with intermediate season varieties of rice, as well as second-crop varieties, and comparative trials between these and Coimbatore varieties are being carried out. At Palur, a search is being made for improved long duration and short duration strains with a fair measure of success.

Work on cotton is now in the general charge of the Cotton Specialist. The area under this crop was about 2·2 million acres in 1927, practically all of which was medium staple. It is an important crop in four distinct tracts, the Deccan districts in the north, the Guntur and Kistna districts in the east, the Salem and Coimbatore districts in the centre, and the Tinnevelly, Madura and Ramnad districts in the south. The two common indigenous varieties grown are *Gossypium herbaceum* and *Gossypium indicum*, and are known on the market under various trade names. 'Westerns' and 'Northerns', which are grown in the Deccan districts consist of varieties of *herbaceum*, with a variable proportion of *indicum*; they have a staple of $\frac{5}{8}''$ to $\frac{7}{8}''$ and a low ginning percentage. Important progress has been made, as the result of work by the present Cotton Specialist when he was a district officer, by the introduction of a pure *indicum* type of 'Northerns' (Nandyal 14) and a selected 'Westerns' (Hagari 25), both of which command a premium over the ordinary crops which contain a mixture of red and white cotton. 'Tinnevellies', which are grown in the south of the presidency also consist of a mixture of *karunganni* (*indicum*) and *uppam* (*herbaceum*) in varying proportions. This mixture is being widely replaced by selections of *karunganni*, known as 'Company' cottons, evolved on the Koilpatti experimental farm; two strains in particular are favoured, No. 2 and No. 3; the first ripens unevenly and has a ginning percentage of 29 to 31; the second is a uniform ripener with a ginning percentage of 30 to 33; the length of the staple in both strains varies from $\frac{7}{8}''$ to $1''$. The area under improved *karunganni* in the southern districts of Madura, Ramnad and Tinnevelly is now something like 300,000 acres. It should, however, be mentioned that there is practically no pure *karunganni* grown except on seed farms; outside those farms, there is usually a small mixture of *uppam*. *Karunganni* still passes under the trade name of 'Tinnevellies'; with the exception of the Nandyal 14 variety which is grown on a much smaller scale, it is the best of the cottons indigenous to Madras, being regularly quoted and dealt in on the Liverpool market.

More remarkable still has been the success of the exotic cotton, Cambodia, an American type, the seed of which was obtained direct from Cambodia in 1905, by Mr. C. A. Benson, the Deputy Director of Agriculture in Madras. It was grown at the outset as an unirrigated crop on the black soil of the Koilpatti farm and, in such conditions showed little promise. Its rapid extension throughout the southern districts of Madras was, in no small measure, due to the discovery by Mr. A. Steel, of the firm of Messrs. A and F. Harvey and Company, of its possibilities as an irrigated crop on red soils. At times it suffers severely from attack by the stem weevil (*Pempheres affinis*). A new strain, No. 440, which is vigorous enough to yield well despite attack has been isolated.

Cambodia is found chiefly in the Salem-Coimbatore area, and in Trichinopoly, Madura and Ramnad in the south. It has not replaced any indigenous cotton but is cultivated mainly on land which had previously yielded precarious crops of rice, on very favourably situated dry land, and as a rotation in garden land under well-irrigation. The best quality comes from Tiruppur in Coimbatore and from Bodinayakkanur in Madura. When grown as an irrigated crop, it is superior to all the indigenous cottons in yield and quality, with a staple of 1 to $1\frac{1}{8}$ inches and a ginning percentage of 33. The unirrigated crop is, however, apt to be inferior and there is a tendency to grow it on unsuitable land. In such cases, an attempt is being made to replace it by 'Company' cottons. At present, Cambodia covers an area of about 410,000 acres, two-thirds of which is irrigated.

Although, as we have seen, the improved *indicum* strain (Nandyal 14) and Company strains have found favour, the ryot has a strong liking for *herbaceum* varieties on account of their early and uniform maturing qualities. For this reason, an intensive investigation has been undertaken with the help of funds supplied by the Indian Central Cotton Committee, the object being to evolve from the *herbaceum* constituent a strain in which will be combined the respective merits of both *indicum* and *herbaceum*. Arrangements have been made, again with financial assistance from the Indian Central Cotton Committee, for research into the relative susceptibility and immunity of various strains of cotton to damage by the stem weevil, and into the problems connected with bud, flower and boll shedding. These investigations will be undertaken as soon as the necessary staff is forthcoming.

Work on sugarcane is the parent of the research activities of the department. It began indeed many years before the department came into existence. Varieties from other cane-growing countries had been imported by the Board of Revenue as long ago as the early 'forties' of last century, and at later dates by Mr. Gillman, I.C.S., manager of the Vizianagram Estate, from Mauritius. The latter varieties were transferred in 1900 to the Samalkota farm which was established for the purpose of discovering canes capable of resisting the "red rot" disease then so prevalent in the Godavari delta. The work done on that farm led to the speedy replacement of the local canes by the Striped and Red Mauritius varieties. The former quickly succumbed to disease and the latter underwent deterioration, and both were superseded by the Purple Mauritius variety in the Godavari area, though Red Mauritius is still a favourite in some localities.

A breeding station was started at Coimbatore in 1912, at which new canes are raised from seed. As the station is under Imperial control and was designed to meet the needs of northern India, attention has in the past been concentrated mainly on thin canes rather than on the thick canes suited to the Madras Presidency. The station has, however, recently been extended in order to provide space for work on thick canes. These, in the meantime, have been studied at Samalkota, Palur and Anakapalle, the last named of which is to be developed into a cane-testing station for the presidency, at which the seedlings evolved at the Imperial station will be tried out. Apart from Red Mauritius, the varieties which have been introduced in recent years are J247, B208, and Fiji B. Among others, J247 has achieved popularity owing to its disease and drought resisting qualities, although it has the defect of late maturing.

Work on millets has only been taken up in recent years. It is under the charge of a specialist who has a special staff and a breeding station at Coimbatore. Progress is being made rapidly with *cholam* and *ragi* and it is expected that the Millets Specialist will be in a position to put out new and improved strains in the course of a year or two.

Coconuts are a very important crop on the west coast. Out of a total estimated area under this crop of 552,815 acres, 376,500 are situated in Malabar and South Kanara. Three special experiment stations have been established, one of which was an existing garden, the other two being planted *de novo*. A number of valuable discoveries have been made, chiefly concerning the benefits to be obtained from wide spacing and inter-cultivation. One of the most important relates to the method of planting this crop on high lands. It has usually been held by the cultivators that coconuts can only be grown if they can be watered during the hot weather. The department has shown that this is not the case, and that if wide spacing is adopted and the land is originally cultivated and drained, and if it is constantly inter-cultivated during the hot weather in order to maintain the soil mulch, watering is quite unnecessary. Two stations have been planted up on this dry system and the trees have not only grown very satisfactorily but have come into bearing much earlier than is usually the case in the district. This method has been widely demonstrated by the establishment of small plots in the compounds of travellers' bungalows, municipal and taluk office compounds, etc., and large areas of hitherto waste land are in consequence being planted up. It is estimated that some 500,000 acres or more might be similarly planted up.

Recently, work has been begun with the cross fertilisation of selected types of palm with the idea of evolving a high yielding strain. This will naturally take time and it is complicated by the fact that, in Madras conditions, the palm is always cross-fertilised.

The necessity for a Mycological Section was brought into prominence by a severe attack of bud-rot (*Pythium palmivorum*) on the palmyras of the Godavari delta. The disease was first investigated by the Imperial Mycologist in 1906, but it was not until 1913 that the fungus was isolated and proved to be fatal to coconuts as well as palmyras.

The preventive measures recommended are the cutting away and burning of all diseased tissue before the growing tip is affected. These measures have been applied with the help of legislation, to the Guntur, Kistna, and Godavari districts. This campaign has undoubtedly diminished the disease and brought it under a measure of control, but it still exists and there is little prospect of eliminating it altogether. Cyclones, which are of frequent occurrence in these districts, are a factor in its dissemination and, after one of these visitations, the disease always appears again with renewed activity. Another fungus which has been dealt with is that which causes "bleeding disease" in coconuts, the symptom of which is the exudation, from the stem, of a red viscous liquid. The remedy consists in cutting out the affected part, burning the wound so as to check the flow of sap, and then coating the cut surface with tar. *Mahali* disease, a form of phytophthora which affects the fruit of the areca palm, has been very successfully dealt with by spraying with Bordeaux mixture and this practice is now adopted on millions of trees. The 'mildew' disease on grapes has been effectively dealt with in a similar manner.

Other instances are the protection of the *cholam* and *tenai* crops against smut by steeping the seed before sowing in a solution of copper sulphate and the prevention of red rot in sugarcane by introducing resistant varieties. Methods of preventing the spread of disease have been partially worked out in the case of paddy 'blast', 'fruit rot' in chillies, 'leaf rot' in ginger, 'scab' in lemons and limes, and various diseases affecting planters' crops. At the present time, the relative resistance of different varieties of paddy to 'blast' is being studied in collaboration with the Paddy Specialist with a view to finding a variety which is more or less resistant in the hope that it may be used for crossing with other varieties, and a similar investigation is in progress with regard to the mosaic disease of sugarcane and the wilt disease of groundnut.

The Entomological Section came into existence as a separate section in 1912. Until then attention had been devoted to the compiling of information with regard to the chief pests of all crops, a work which culminated in the publication of "Some South Indian Insects" by Mr. Bainbrigge Fletcher in 1914. No striking instance can be recorded of control methods being taken up co-operatively by cultivators over large areas at the same time, although the demonstration of simple and cheap methods of control has met with some local success. The section is handicapped by the fact that news of damage by a particular pest seldom arrives until the damage has already been done and by the fact that it is practically impossible to persuade ryots to co-operate to deal with a pest over a large area, however simple the methods recommended may be. In some places, the religious objection of the people to taking life is also a handicap to the entomologist.

Perhaps the most important work of this section has been the detailed research into the life histories of the pink boll worm and stem weevil, and the damage done to cotton by these pests. The loss to the crop was so severe that the aid of the Madras Insects and Pests Act was invoked to check it. The only method of control which has been discovered is to ensure a dead season between one year's crop and the next, so that no cotton will be left on the ground on which the grubs can feed. When the Act was first applied in 1920-21, it was laid down that all Cambodia cotton should be removed from the fields and destroyed by the 1st of August each year, thus ensuring a dead period of at least two months before the next sowings began. The Act, however, provided for notice of eradication being given and also allowed time for appeal, with the result that the cotton was seldom removed before the end of August. In view of the extreme unpopularity of the original Act, an amendment has now been introduced stipulating that no notice need be given and deferring the date by which removal must be complete till the 1st of September, but the opinion of the Agricultural Department is that the resulting dead period is insufficient for effective control and that extension rather than curtailment of the period originally prescribed is essential.

A caterpillar pest introduced by rail a few years ago into the west coast districts has done a great deal of damage to coconuts. This pest exists on the coconut palms on the east coast but there it is comparatively harmless, a fact which was found to be due to its being kept under natural control by certain parasites. The pest was unfortunately introduced into the west coast districts without its controlling parasites and consequently it spread very rapidly and became a pest of major importance. The department have taken steps to control the pest biologically by breeding the parasites in large numbers and introducing them into the infected areas. This method has met with encouraging success but it is hampered to some extent by the presence of a hyper-parasite and also by the fact that the climate of the west coast is at certain times of the year detrimental to the parasites proper.

The Horticultural Section is concerned with the botanical gardens at Ootacamund, the pomological station at Coonoor and the experimental fruit gardens at Burliar and Kallar. The pomological station, which is about twelve acres in extent, was opened in 1920 for work on the different fruit trees suitable to the hills of southern India. Experiments in pruning and manuring as well as systematic testing out of different varieties are carried on. At the Burliar garden near Coonoor, a large number of varieties of tropical fruits and spices are grown. The Kallar garden, which is at the foot of the hills near Mettupalaiyam, was taken over from the Forest Department in 1900. It is planted with rubber, fibre-producing plants, teak, mahogany and tropical fruit trees. Experiments are being made with the valuable medicinal plant *Cephaelis ipecacuanha.*

The Engineering Section is in the charge of two gazetted provincial officers, one of whom is concerned solely with teaching work in the college. The whole time of the other is devoted to the upkeep of the estate buildings and equipment. A post of research engineer has been sanctioned and the appointment will be made in April, 1928.

For administrative purposes, the presidency is divided into eight circles, each in charge of a deputy director who has the help of an assistant director and of a number of qualified demonstrators. At present, the jurisdiction of each demonstrator extends over two or more taluks, but it is hoped that in the near future, the staff will be increased so as to allow one demonstrator for each taluk. The nature of the improvements which are being introduced is indicated broadly in the general account which has been given of the research work in progress. They consist in the use of iron ploughs and better methods of cultivation, the use of better *mhote* buckets and wheels, the growing of green-manures instead of depending on the forest for leaf mould, better methods of making and storing cattle manure, economical methods of transplanting paddy seedlings, better strains of seed. In the cotton areas, demonstrations deal with new strains of seed which give bigger yields and a better quality of lint, drill-sowing and inter-cultivation with bullock power, better methods of irrigation, clean picking, and co-operative ginning and marketing. In the sugarcane areas, deep cultivation, line planting, propping and wrapping, manuring, the use of iron crushing mills and McGlashan furnaces are demonstrated. Much attention is also given to protective measures against insect and fungoid pests.

With regard to ways and means of bringing improvements to the *notice of the cultivator, past experience has shown that the experimental* farm, in itself, has not exercised a very potent influence. The ryot is not easily persuaded to travel even short distances to visit experimental stations and, when he does, he is apt to think that the practices adopted there are not suited to his limited resources.

Exhibitions and demonstrations provided at fairs and religious festivals have to compete with many counter attractions for the cultivators' interest. Owing to the general illiteracy of the people, publications and leaflets have a very limited field; but where the people are able to read, use is made of them very freely. Departmental leaflets written in simple words and published in the various vernaculars are issued either free or at a nominal cost. Each year, the department issues, both in English and the vernaculars, what is known as "The Villagers' Calendar". This is a simple handbook in which the various activities of the department are explained and which contains a number of articles dealing with simple methods of improvement. Another publication of the department which has proved popular is that known as the "Monthly Digest of the Operations of the Department," a short summary in simple language of the current work of the department, both in the districts and in the research institute. It is also used as a medium of instruction in simple methods of general agricultural improvement. It too is published both in English and the vernaculars and is distributed free to people who are likely to benefit from it.

The method which has achieved the greatest success is the establishing of demonstration plots on the ryots' own land. A complete record of the cultivation expenses of these plots is kept by the demonstrator in charge and, wherever possible, the record is completed right up to the weighing of the produce. In all cases, the improved method is contrasted side by side with the method which it is desired to replace. Many hundreds of such plots are scattered all over the presidency. A variation of the "demonstration plot" is the "demonstration area" system of which three types are found. One method is to mark out an area on an experimental farm and devote it entirely to commercial farming. Another method is in use in No. 4 circle and is really the 'plot' system on a larger and more elaborate scale, the essential differences being that a larger area is taken and a profit and loss statement which includes the cost of all operations is published. The system has been further developed in No. 5 circle where a number of co-operative societies have started demonstrations of their own, under the guidance of departmental officers.

In the absence of reliable seed merchants, the question of the multiplication and distribution of seed, and of keeping it pure, is a very difficult problem. In the case of cotton, the seed of a new strain which it is desired to introduce is given out to selected ryots, on the understanding that they will carry out the cultivation on lines laid down by the department and will keep the seed pure. At harvest time, the department either buys the *kapas* (unginned cotton) outright, retaining the seed for future distribution, or it encourages the ryots to gin their *kapas* co-operatively, and merely buys the seed from them, offering a small premium over the market rate prevailing. An organisation on similar lines is in existence in the paddy areas. This "seed farm" system works very satisfactorily as far as it goes, but the quantity of seed obtained is limited by the amount of funds placed at the disposal of the department for the purpose, and is not nearly sufficient to meet the demand. A scheme is now under discussion with the Registrar of Co-operative Societies which contemplates the conversion of these seed farms into co-operative societies for the express purpose of producing seed in the paddy areas, and for combining seed production with co-operative ginning and selling in the cotton tracts.

We have seen that an attempt was made to impart some sort of training in agriculture in the very early days of the department and that the courses for apprentices at Saidapet were not very successful. From 1872 onwards, schemes for an agricultural college began to receive serious consideration, and the result was the opening of the Saidapet Agricultural College in 1876. The institution was attached to the Education Department; a three years' course was given and no fees were charged. The theoretical nature of the teaching imparted is sufficiently indicated by the fact that the lecturers were members of the staff of the Medical and Engineering colleges and that no laboratory accommodation was provided. Applications for admission came in very freely from places as far away as Ceylon, Bengal and the Punjab. Thirty students attended the first year's class.

In 1884, proposals were put forward that Saidapet should be developed into a central institution for the teaching of agriculture, veterinary subjects, medicine and forestry. These proposals were not fully accepted but, in 1886, the college was brought under the Technical Scheme of Higher Examination in Science and Arts. The tendency under this scheme was to make the course more and more theoretical and the central idea of agriculture appears to have been almost lost sight of. In 1890, a committee, charged with the revision of the curriculum, recommended that certain technical subjects should be abolished, but, even after the recommendation was carried out, the college was still teaching for ten different technical examinations. In 1902, as the result of the findings of another committee, much more attention began to be paid to practical agriculture and, in 1906, the control of the institution passed from the Director of Public Instruction to the newly organised Agricultural Department.

From the point of view of its direct effect on the agriculture of the presidency, the Saidapet College did not prove a success. It had many difficulties to contend with, chief of which was that it was in no sense in touch with the agricultural population, nor did it possess any means of overcoming that obstacle. As has already been mentioned, the college was transferred from Saidapet to Coimbatore in 1908.

Originally, only one course was provided at Coimbatore and all students were put through it, whatever their capabilities or ultimate objects. Even so, it was an advance on the teaching given at Saidapet in that it was not an agglomeration of different courses of which agriculture was one, but a balanced course in which the agricultural aspect was given due prominence. In 1914, two separate courses were instituted, one leading to a diploma and the other to a certificate. The student on entering the college joined the certificate course and, if he attained a satisfactory standard in that course, he was allowed, if he so wished, to proceed to the diploma. The combined course lasted for three years.

In 1920, however, a differentiation was made in the qualifications demanded for admission to these courses, the object being to attract a better type of student to the higher course. A further development took place in 1922 when arrangements for the affiliation of the college to the University of Madras were completed and the diploma course gave way to a three years' course leading to the degree of B.Sc. in Agriculture, admission to which could only be obtained by those who had passed the university intermediate examination in groups I and II. Thereafter the attendance in the certificate course fell away to such an extent that it was abolished in 1924.

Some forty students are admitted every year. About a dozen scholarships are granted, some of which are reserved for members of backward communities.

The new arrangement still fails to attract the desired class, the sons of farmers who intend to earn their living by farming. This is due, in the opinion of the Director of Agriculture, to several causes, the expense of a five-year course—two years intermediate at the university and three years at the college—being one. There is also the desire to utilise a degree to get work other than farming, and the fact that few posts outside government service are open to graduates in agriculture.

Two agricultural middle schools were opened in 1922, one at Taliparamba and another at Anakapalle. For the staffing of these schools, four officers of the Agricultural Department were deputed to the Education Department for a six months' period of training in teaching methods. The students are given practical instruction in ordinary cultivation work on the school farm and are also taught reading, writing, arithmetic, geography, nature study, civics and chain-surveying, elementary entomology and mycology. The Taliparamba school is reported to be doing well, though the ultimate criterion of success will be how far the pupils who pass through it are absorbed in agricultural occupations. The Anakapalle school was closed at the end of last year. In 1927, an officer of the Education Department was deputed to study the Punjab type of agricultural education and a proposal is now under consideration to include agriculture as one of the subjects in higher elementary and middle schools.

The presidency possesses at least three breeds of cattle of recognised merit, namely, the Ongole, the Kangayam and the Allambady. The Ongole breed enjoys a reputation which is not confined to India alone. The males are fine heavy animals which in draught qualities can stand comparison with some of the best known breeds in the world; the cows, too, are heavy milkers when judged by Indian standards. Large numbers were at one time exported to the East Indies and South America but the trade is now prohibited. The Allambady is primarily a light draught animal, long of leg and spare of flesh; it seems to be closely related to the famous Amrit Mahal of Mysore which is considered to be an excellent type of light draught animal. The Kangayam is a short, compact animal, sturdy in build and handy to work. Notable in connection with this breed are the extensive breeding operations being conducted by the Pattagar of Palayakottai, whose cattle are in demand all over the presidency and whose solitary example might well be followed by other large landowners. Apart from the undoubted merits of these breeds, the quality of the cattle in the presidency is, of course, largely dependent on the food supply and climatic conditions. Thus, in the Coimbatore, Salem, North Arcot and Nellore districts where fodder is plentiful, the quality is well above the average; it is not so good in the purely rice areas where they are fed mostly on rice straw, while in the Deccan districts, Malabar and Ramnad it is distinctly worse. In the Deccan districts, the rains are light and there is not enough water to grow purely fodder crops. In Malabar, the question of grazing grounds is not of pressing importance and all over the district there are thousands of acres of unoccupied dry lands and private forests where the cattle graze without let or hindrance. Hence the small area of government forest thrown open to grazing. In the monsoon, the cattle grow sleek and fat upon the new grass that springs up on the waste lands, but in the dry weather, when the grass dies down they revert gradually to their normal half-starved condition. The remedy for this probably lies not in any extension of the already considerable grazing grounds but in the growing, by the ryots themselves, of fodder crops for use in the dry season, an idea hitherto unknown in Malabar but now beginning to receive attention.

The improvement of livestock is entrusted to an expert of the Agricultural Department who has three breeding farms in his charge, with headquarters at Hosur.

The Hosur farm was taken over in 1924 from the Army Remount Department, in whose hands it had been for 96 years. The farm is 1,635 acres in extent, of which 65 acres are irrigable and are under fodder crops: the remainder is pasture land of varying quality. Several lines of improvement are being attempted although none of them are on a very large scale. A small pure-bred Kangayam herd is being improved for the dual purpose of milk and draught. The calves are allowed to suckle but each cow is fully milked one day per week to ascertain the milk yield; the average for the herd is about six pounds (one-and-a-half Madras measures) per day. The so-called "Bangalore" herd consists of half-breds, the result of mating an Ayrshire bull with pure Sindhi and

Sahiwal (Montgomery) cows. Half-bred is mated to half-bred, the object being to produce heavy milkers for the Madras milk supply. The possibilities in this direction, in so far at least as the first Ayrshire cross is concerned, are indicated by the fact that one cow has given over 12,000 pounds of milk in a lactation.

The " Coimbatore " herd is a mixed lot of cross-breds, some being one-quarter Ayrshire, some three-quarters, seven-eights, etc. On some of the cows pure country bulls, and on others half-bred bulls are used. The daily average production of milk per cow is about ten pounds (two-and-a-half Madras measures). It does not appear that the policy of breeding up to the Ayrshire is likely to be a success; the calves are weak and subject to a heavy mortality and, in future, the three-quarters and seven-eighths Ayrshire crosses are to be served by a pure country bull of the Sindhi and Sahiwal breed.

A dairy herd of pure Ongole cattle is in process of being built up, and here the prospects are much more promising. Several cows have given an average of thirteen pounds (three-and-a-quarter Madras measures) of milk throughout a lactation. The average for the whole herd in 1925-26 was over eleven pounds and this was considered to be satisfactory, most of the cows being first calvers.

A small herd of pure Sindhi cattle is also maintained with the object of breeding for the west coast area.

The farm at Chintaldevi comprises about 800 acres, of which 531 acres are under grass. It is situated 36 miles from the nearest railway station and was opened in 1918 for work on the Ongole breed. It carries a stock of about 150 animals. The yields of some of the young cows are promising.

The opening of the Guntur breeding farm dates back only to 1923. The main object here is to improve both the size and the milking capacity of the country buffalo by crossing with the Delhi bull. The farm is 150 acres in extent. This, with the dairy maintained at Coimbatore for teaching purposes, completes the list of institutions dealing with cattle. The department has as yet only touched the fringe of the problem of cattle improvement. Excluding the Coimbatore dairy, the total head of stock carried by the three farms under the Livestock Expert, at the beginning of the year 1925-26, numbered only 388, and the number of bulls sold in the year 1926-27 for breeding purposes was twelve. It is obvious that but little impression will be made on the twenty-two million cattle of the presidency by improved breeding unless and until the scale of the present-day operations is very greatly extended.

6. THE VETERINARY DEPARTMENT.

Thirty-five years ago, the only veterinary organisation that existed in the presidency was a hospital at Saidapet and a few stock inspectors attached to the Agricultural Department. The present Civil Veterinary Department originated with the appointment in 1893 of an executive veterinary officer and was under the control of the Board of Revenue until 1916-17. The department to-day is independent, control being vested in the Veterinary Adviser to the Government of Madras who is directly responsible to Government. His staff consists of four Imperial officers. Of these, three are attached to the college and one is in charge of a circle. There are also five gazetted assistants in charge of circles and one attached to the college. The Subordinate Service is manned by 2C0 assistant surgeons, ten of whom are employed in the college and the rest are employed upon executive work.

The departmental budget in 1916-17 was Rs. 2,20,700 and in 1926-27 Rs. 7,54,900 ; these figures give some idea of the rate at which expansion has proceeded within the past decade.

The activities of the department can be broadly divided into (*a*) Education, (*b*) District Work and (*c*) Research. The college dates from 1903 although the present building was not occupied until 1905. The staff includes the professors of pathology and surgery and several lecturers and assistant lecturers. Ordinary and post-graduate courses are provided. The former leads up to a diploma and lasts for three years. The advisability of adding an extra year has been recognised but financial considerations have up till now stood in the way of this. Definite proposals to extend the course have now been made and are being examined. Forty students can be accommodated in each class. Fifteen stipends, of the value of fifteen rupees per month, are granted annually of which a certain number are earmarked for the backward classes ; the general instruction is free to all students approved by the Selection Committee.

For administrative purposes the presidency is divided into six circles, each in charge of a gazetted officer. The district staff is divided into assistant surgeons in charge of veterinary institutions and touring assistant surgeons. Veterinary institutions are increasing in number year by year and are now about a hundred. Up till 1922, they were under a system of dual control by Government and local bodies, Government contributing part of the expenses of upkeep. The scheme did not prove successful and complete control of all but a few private institutions was taken over by Government. They provide veterinary treatment, free of cost to all *bona fide* cultivators who care to take advantage of the treatment.

The touring staff were originally engaged mainly in attending to outbreaks of contagious disease. The widespread prejudice against inoculation that existed in the early days required the assistants to be constantly moving about among the villages doing propaganda work, with the result that they were on tour for twenty days in the month. Of late, however, prejudice has given way to such an extent that systematic touring of this kind has been abolished, and when not actually attending outbreaks of contagious disease, this touring staff is employed in running camp dispensaries, which are shifted about every ten days or so, and during that time render whatever aid is required in surrounding villages. At one time, a mobile corps existed for the purpose of dealing with severe outbreaks of rinderpest wherever they occurred, but, the necessity for it having disappeared for the time being, it was disbanded and the staff was strengthened in the frontier districts through which rinderpest mainly gains access to the presidency.

Administrative and teaching duties make such a heavy demand on the time of the staff that they have but little opportunity for pure research work. Nevertheless, at least two pieces of good research work have been turned out from the Madras College laboratory, one dealing with nasal granuloma, and the other with bovine lymphangitis in cattle.

A Cattle Diseases Act is in force to prevent movement of cattle from an infected area but strict enforcement of its provisions is often found difficult.

7. IRRIGATION.

In respect of area under irrigation, Madras stands second among the major provinces of India. The total area irrigated for the five years 1921-22 to 1925-26 averaged over 9·3 million acres, of which 3·8 million acres were under canals, 3·4 million acres under tanks, 1·7 million acres under wells and nearly half a million acres under 'other sources.' The irrigation sources of Madras present special features. Tanks occupy a prominent position, the area irrigated from them being nearly twice as great as in any other province, and over half the total area under tank irrigation in British India. The great irrigation systems, the Godavari, the Kistna, the Cauvery and the Pennar differ completely from those in the north of India. They are in the main deltaic, and the problem has been to regulate the supply rather than to extend it to new areas. The works consist of weirs by which a sufficient head of water is obtained to irrigate the lands of the deltas and of sluices and regulators by means of which the water is conducted over the land. The oldest of these is the Cauvery delta system in the Tanjore district, some two hundred miles south of Madras, which dates back some 1,600 years and, even before the improvements effected in the nineteenth century, irrigated over 600,000 acres. It now irrigates nearly a million acres of first and second crop. Of the modern systems, the Pennar River canals system, 100 miles north of Madras, irrigates about 200,000 acres of first and second crop and 100 miles further north again the great contiguous delta systems of the Kistna and the Godavari irrigate between them 1·8 million acres of first and second crop.

The only example of a great storage reservoir in the Madras Presidency at present is the Periyar system. The main feature of this system is the impounding by the construction of a large dam, 3,000 feet above sea level, of the waters of a river which would otherwise have flowed into the Arabian Sea, and their diversion to the other side of the peninsula through a tunnel bored through the main watershed of the country. This system irrigates about 180,000 acres of first and second crop, mostly in the Madura district.

The possibilities of the large systems fed from anicuts have now been largely exhausted and future irrigation schemes will probably have to be of the expensive reservoir type. Several storage projects have been proposed. The Mettur Reservoir, between the Salem and Coimbatore districts, which is now under construction will secure and improve the water supply of an existing irrigated area of over a million acres in the Cauvery delta and will bring under irrigation for the first time a further area of 301,000 acres in the Tanjore district, a large proportion of which may be double cropped. On the Bhavani, a reservoir is proposed near Mettupalaiyam and the scheme provides for the irrigation of 110,000 acres of first crop and 60,000 acres of second crop in the Coimbatore district. The two other principal schemes in view are for reservoirs on the Tungabhadra and Kistna rivers. They have been the subject of prolonged investigation; but both technical and financial difficulties have stood in the way of their execution. Attention is being concentrated at present on a revised scheme for impounding the waters of the Tungabhadra by the construction of a reservoir at Timmalapuram in the Bellary district. This would provide water for wide extensions of irrigation, mainly in the districts of Bellary, Anantapur and Kistna; and would protect a very large area of dry cultivation in a tract liable to scarcity.

Some 28,000 tanks are controlled by Government and of these nearly ninety per cent are in the charge of the Revenue Department. They vary from large works irrigating thousands of acres by an elaborate network of channels, to small pools protecting a few acres in their immediate vicinity or serving to maintain the water level in neighbouring wells. For the last thirty years, an extensive scheme for restoring tanks which have silted up or otherwise fallen into disrepair has been in operation. The scheme covers an area of 102,000 square miles and, by March 1926, restoration over an area of 80,000 square miles had been made at a cost of 1·5 crores of rupees.

Wells, though not so important as either tanks or canals, irrigate nearly 1,700,000 acres or some 20 per cent of the total irrigated area. In certain districts, such as Anantapur on the northern borders of the Mysore State, the cultivator depends mainly on this source of irrigation. Wells are also specially important in the Chingleput, South Arcot and Coimbatore districts. In recent years, except from 1916 to 1920, when the work was temporarily transferred to the Agricultural Department. the Department of Industries has been responsible for the development of wells. Since the Department of Industries resumed charge in 1920 up to March 1927, 8,630 borings have been put down of which about sixty per cent have been successful. Two surveyors have been employed since 1914 on the work of connecting the levels of bore holes put down by the department with main sea level. These surveyors have so far been able to connect the levels of less than 4,000 out of 7,000 bore holes put down in the districts of Vizagapatam, Kistna, Guntur, Nellore, Chingleput, South Arcot, Tanjore and Trichinopoly. The work is in progress in the Tinnevelly and Coimbatore districts. But it is only in the Chingleput and Kistna districts that any appreciable progress has been made and even here, many more borings will be necessary before it is possible to prepare a map of underground water currents. A systematic survey of the underground water supplies would be a very costly proposition.

It has, however, been decided that, as an experiment, an intensive survey of underground water should be made in fourteen villages of Bellary *firka*, a tract liable to drought. The services of a practical water diviner to minimise the number of unsuccessful borings will also be utilised in connection with this experimental survey.

The Table below gives the main particulars of the progress of irrigation in the presidency up to March, 1927, from the year 1908-09, the first year for which figures are recorded in the "Agricultural Statistics of India" in a fairly complete form :—

Year	Area sown.*	Percentage of increase or decrease over 1908-09	Area irrigated*	Percentage of increase or decrease over 1908-09	Percentage of area irrigated to area sown
	Acres		Acres		
1908-09	38,035,000	....	10,827,000	....	28·5
1914-15	39,091,000	+2·8	11,282,000	+4·2	28·9
1920-21	37,606,000	−1·1	11,177,000	+3·2	29·7
1924-25	37,924,000	−0·3	10,956,000	+1·2	28·9
1926-27	37,367,000	−1·8	10,570,000	−2·4	28·3

*Areas twice sown and twice irrigated are counted twice.

The areas irrigated by canals, tanks, wells and other sources at the beginning and end of this period are as follows :—

Year	Canals	Tanks	Wells	Other sources
	Acres	Acres	Acres	Acres
1908-09	3,554,000	3,189,000	1,322,000	1,376,000
1926-27	3,928,000	3,073,000	1,570,000	457,000

Irrigation in the presidency is free from any serious problems arising from alkalinity or waterlogging. Here as elsewhere, however, damage to the soil has occurred in many irrigated areas owing to over-watering. Experiments have been made by the Agricultural Department with a view to determining the amount of water which crops require to give the best results and, on the basis of these experiments, propaganda work has been carried out among the cultivators. It is thought that the introduction of the volumetric system may probably prove the ultimate solution of the problem of securing an economical use of water but there appears no prospect of introducing the system until the cultivators on a branch distributary are willing to co-operate in the distribution of water. It is, therefore, the policy of Government to encourage the formation of irrigation *panchayats* with a view to creating a spirit of co-operation. Certain irrigation channels in the Godavari and Kistna deltas are already managed by *panchayats* and the majority of them are doing their work satisfactorily.

Irrigation advisory boards which, as their name implies, have no executive functions, have been constituted for the irrigated areas under the Godavari, Kistna and Cauvery.

The Government have decided to retain in their own hands the development of the hydro-electric resources of the presidency. The scheme for utilising the waters of the Pykara in the Nilgiris is the only important hydro-electric project which is under active consideration. The scheme is designed to supply the districts of the Nilgiris, Coimbatore, Salem, Madura and Trichinopoly in its first phases. besides supplying current for the electrification of two or three sections of the South Indian Railway. The estimated expenditure is between three and four crores of rupees for an installed capacity of 37,500 K.W. Ultimately this may possibly develop into a wider project with a capacity of 67,500 K.W. and a distribution system extending to Madras. Other schemes are being investigated also, the two chief being for the generation of power at Papanasam in the Tinnevelly district and at Kolal in Vizagapatam.

8. FORESTRY IN RELATION TO AGRICULTURE.

The forests of the presidency cover an area of about 19,000 square miles. They have been divided into two main classes, forests which are of provincial importance, as being either remunerative to the State or protective, and areas, mainly scrub jungle or grass reserve, which are of strictly local importance. In regard to the latter, Madras has broken away from traditional methods of forest administration in India by handing over large areas to *panchayats* working under the Board of Revenue and the District Collector. 3,360 square miles of reserved forest have been classified as ryots' forests, of which 3,264 square miles had been handed over at the end of January, 1928. The *panchayats* are supervised by a special Panchayat Officer who works under the Board of Revenue which fixes the rent to be paid for the *panchayat* area and the number of cattle which may graze in any particular area. All other details of management are left entirely to the *panchayat*. Where the area when under the management of the Forest Department yielded a net revenue, the rent fixed is always less than this. In some cases, no rent is levied and in others, it is charged for three years only. The ryots' forests mainly provide grazing and fodder but some of them are not unimportant as sources of fuel. In the Nellore district, for example, areas bringing in a revenue of some Rs. 40,000 a year, when worked for fuel, have been transferred to *panchayat* management, as have forests in the Coimbatore district which provide the Erode market with 500 tons of fuel annually. Many *panchayats* are attempting to develop the reserves handed over to them as sources of fuel supply and it is reported that there is a growing improvement in the protection of these reserves and in the interest taken by the villagers in limiting the number of cattle admitted to them, in enforcing the accepted grazing rates and in closing the reserves temporarily to improve pasture.

Speaking broadly, the large forest blocks in Madras are not so remote from close cultivation as they are elsewhere. The grazing in the forests which remain in the charge of the Forest Department is of great importance to the cultivator. In 1926-27, 15,769 square miles of these forests were open to grazing by all animals except goats, 849 square miles to all animals except sheep and goats and 2,077 square miles were closed to grazing throughout the year. Occasionally, free grazing is permitted by rights under forest settlement or at the pleasure of Government; in other cases fees are levied, and may be charged at full rates or at privileged rates, or at enhanced or special rates, all of which again vary very considerably from district to district. The general policy is to charge twice as much for a cow as for a sheep, and twice as much for a buffalo as for a cow. The full rate for a cow generally falls between the limits of three and eight annas. A total of 1·81 million animals were admitted in 1926-27, mainly bullocks and cows and sheep, and the total revenue from grazing amounted to about 7·5 lakhs of rupees.

9. GENERAL EDUCATION.

Burma and Bengal are the only two provinces in which the proportion of literates is higher than it is in Madras. In the census of 1921, 21·4 per cent of the men and 2·2 per cent of the women in the Madras Presidency were returned as able to write a letter and read the reply to it. These percentages are for all parts of the presidency and, in estimating literacy in rural districts, allowance must be made for the comparatively high percentage of literacy in the city of Madras and other big centres of population.

The total expenditure on education in Madras was Rs. 453 lakhs in 1926-27, as compared with Rs. 217 lakhs in 1916-17 and Rs. 98 lakhs in 1906-07. The expenditure * on primary education for boys and girls was :—

	Rs. (lakhs)
1906-07	28·83
1916-17	70·13
1926-27	170·51

Of the total expenditure in 1926-27, forty-five per cent was met from provincial funds, fifteen per cent from local and municipal funds, twenty per cent from fees, and twenty per cent from subscriptions and other sources. Ten years before, provincial funds had provided thirty-six per cent, and twenty years before, only twenty-six per cent of the total expenditure.

The total number of male scholars in recognised institutions in 1927 was 1,920,000 of whom 1,713,631 were attending primary schools. If the primary school age is taken as from five to ten years, and the figures of the 1921 census are used for that age period, the percentage of boys of primary school age in Madras attending school in 1927 was 60.

The total number of female scholars in recognised institutions in 1927 was 521,000 of whom 500,300 were attending primary schools.

Calculated in the same way as for male scholars, the percentage of girls of primary school age attending primary schools in Madras in 1927 was 17.

* Excluding the cost of the inspectorate for which no separate figure for primary schools is shown.

In addition to the figures given above, 81,000 males and 1,000 females were attending unrecognised institutions.

The following Table gives further particulars regarding male education in recognised educational institutions in the province;

Kind and number of institutions for males	Number of pupils	Percentage at each kind of institution	Cost per pupil.*
60 Arts colleges ..	12,200	0·6	184·3
10 Professional colleges	2,177	0·1	482·1
342 High schools ..	139,477	6·4	46·7
212 Middle schools ..	27,583	1·2	43·4
46,389 Primary schools ..	1,986,645	90·7	7·2
349 Special schools ..	21,797	1·0	171·2
47,362 Total ..	2,189,879	100·0	13·25

*Based on direct expenditure only.

At the head of the Madras educational system stand the Madras and Andhra universities. The Andhra University, which was constituted as recently as 1926, serves the Telugu-speaking area of the presidency. Both universities have a teaching as well as an examining or external side but the latter is at present predominant. The Madras University was founded in 1857 and is thus one of the three oldest universities in India. It has a faculty of agriculture and grants degrees in agriculture to students of the Coimbatore Agricultural College.

From the point of view of general rural education, the primary schools are of much more importance than the colleges and the high and middle schools. Primary education has received much attention of recent years. The principle of compulsion at the option of local authorities was introduced by the Madras Elementary Education Act of 1920, though but little progress has so far been made in either urban or rural areas as the local authorities have been reluctant to submit schemes under the Act mainly owing to difficulties of finance. By the end of 1926-27, only 21 out of 80 municipalities had introduced compulsory education. Three taluk boards have also introduced compulsion in selected areas. In 1924, a comprehensive survey of the educational position in all the taluks was carried out and one of its results has been the provision of a large number of schools in villages of 500 inhabitants and over which were formerly without them. In 1926-27, three hundred schools were opened under *panchayat* management as an experimental measure. Most of these schools are single-teacher schools. In Madras, as in other provinces, the rate of wastage between the first and second classes is disturbingly high. At present, 60 per cent of the children never get beyond the first class. Several causes contribute to this wastage, the chief of which are the indifference of the parents and the inefficiency of the single-teacher school. The pay of the teacher was increased in 1922 but still remains very low. A teacher in a lower elementary school under government management is still only on a scale of Rs. 20-1-30 per mensem, if he is trained, and if he is untrained he receives only Rs. 15 per mensem. For the higher elementary schools the salaries are Rs. 25-1-50 and Rs. 20 per mensem, respectively. Endeavours are being made not only to increase the number of trained teachers but to improve their quality and, in 1923, the Union Mission Training School at Vellore started training teachers on lines somewhat similar to those of the Moga training school in the Punjab.

The education of the girl is of equal, if not greater, importance for rural welfare. While there has been steady progress of recent years in university education for women, the same cannot be said of secondary and primary education. A feature of female education in Madras is the increasingly large number of girls attending elementary schools for boys. In 1926-27, 298,632 girls attended boys' schools or more than 50 per cent of the total number of girls attending primary schools of any kind.

Up to the present, educational policy has been directed chiefly towards developing general education in the rural districts and far fewer experiments than in some other provinces have been made in the direction of providing a special type of agricultural education. The agricultural middle schools at Taliparamba and Anakapalle have been described in connection with agricultural education where it has also been mentioned that the institution of an alternative agricultural course in higher elementary and middle schools on the lines of the agricultural classes in the vernacular schools of the Punjab is under consideration. Under the scheme for practical vocational training in secondary schools, instruction in agriculture is given in four such schools.

Now that the introduction of machinery into agricultural operations and the development of rural industries is being more and more canvassed, the excellent training given at the Government Trades School in the city of Madras in mechanical and electrical engineering deserves mention.

It would not be proper to close this review of education in the Madras Presidency, brief though it is, without a reference to the remarkable educational work now being done under the direction of the Commissioner of Labour for the depressed classes who number about 6¼ millions out of a total population of 42·8 millions. Religious missions, philanthropic institutions and individual social workers all give their help and in the past five years no fewer than 783 schools have been started with a total strength of over 32,000 pupils.

Finally, whatever makes the country boy a better player as well as a better worker will also make him a better man and a better cultivator. It is, therefore, of good omen that the boy scout movement is steadily gaining in strength in the presidency and is now beginning to make its influence felt among the boys attending elementary schools in rural districts.

10. CO-OPERATION.

As in other parts of India, the co-operative movement in the Madras Presidency dates from the year 1904 when the first Co-operative Credit

Societies Act was passed by the Indian Legislature. But even before that date, the Government of Madras had realised the great possibilities of the movement and had, in 1892, deputed Mr. (now Sir Frederick) Nicholson "to study the theory and practice of the agricultural and other land banks in Europe and to suggest means by which a similar improvement may be popularised in India." The existence, in the presidency, of a number of successful indigenous institutions known as *nidhis*, which were similar to the Friendly and Building Societies of Great Britain, made the province a hopeful field for experiments in co-operation. Sir Frederick Nicholson submitted two reports of great interest and value in 1897-99 and, although no action on them was taken until the Act of 1904 was passed, they were instrumental in familiarising a number of people interested in the economic advancement of the community, with the ideas underlying the movement and the advantages to be derived therefrom.

The earlier rural societies were all credit societies formed for the purpose of giving the ryot financial accommodation for the purchase of agricultural requisites and of the necessaries of life and for the payment of government revenue. Progress was at first necessarily slow, as the work was more or less experimental. The ignorance and suspicion of the people, for whom the movement was started, prevented any great development in the organisation of societies. Another obstacle was the difficulty in getting the necessary funds to finance the societies. Most of the potential depositors lived in urban areas and could not be expected to have sufficient confidence in the newly formed village societies to entrust their money to them. The organisation of the Madras Central Urban Bank in 1906, and of four more financing banks during the next four years, led to the rapid growth of the rural credit societies in their neighbourhood. Reference is made below to the formation of additional central banks and to their influence on the acceleration of the rural credit movement in the presidency.

The growth of the agricultural movement is shown in the following statement:—

Year	Credit societies	Societies for purchase, production and sale	Other forms	Total
1904-05	8	....	....	8
1912-13	1,006	2	....	1,008
1917-18	2,271	19	....	2,290
1919-20	4,156	60	2	4,218
1921-22	6,206	70	4	6,280
1925-26	9,822	103	253	10,178
1926-27	11,000	132	304	11,436

(*Note.*—The majority of the societies of "Other forms" are societies for the acquisition or leasing of land for cultivation by members of the depressed classes.)

At the end of the year 1926-27, the co-operative movement, urban and rural, had a membership of about 833,000, of whom 497,940 were agriculturists.

These can be classified as follows:—

Non-cultivating landholders	52,650
Cultivating landholders	338,611
Tenants	63,378
Field labourers	43,301

It will be seen that the societies benefit not only ryots but also tenants and agricultural labourers. In the year 1926-27, the societies advanced to their members a sum of Rs. 236·5 lakhs, of which Rs. 144 lakhs was for productive purposes, Rs. 89·3 lakhs for reduction of prior debts and Rs. 3·3 lakhs for non-productive purposes Analysing these loans further, we find that Rs. 39·5 lakhs were advanced for cultivation expenses, Rs. 16·3 lakhs for the purchase of cattle, Rs. 13·8 lakhs for the improvement of land, and Rs. 10·5 lakhs for purchase of land. During the *last twenty-three years, a total sum of over Rs. 14 crores has been advanced* by co-operative credit societies to agriculturists at reasonable rates of interest and on easy terms of repayment. Of that amount nearly Rs. 9½ crores were given for productive purposes. The saving to the agricultural population in the shape of interest which the co-operative movement has made possible can be gauged from the fact that the rates of interest charged by societies vary from 9⅜ to 10 $\frac{15}{16}$ per cent as against the 12 to 75 per cent charged by moneylenders.

As has been pointed out above, the progress of the primary credit societies was considerably accelerated by the formation of central banks which have been able to attract a large amount of capital from the public. The number of such central banks, including the Provincial Bank, is now 32 and their working capital over Rs. 6 crores. The deposits which these banks receive at present are more than sufficient to meet their requirements, and, at the end of last year, there were large surpluses in many of the district banks as well as in the Provincial Bank, though these have since been somewhat reduced. There has been no increase in the number of such banks since 1921, as one central bank is usually sufficient to serve the needs of a district. The first few banks consisted entirely of individual shareholders who subscribed substantial amounts of money as the share capital. Now all the banks are of a mixed type, in which primary societies as well as individuals hold shares and both are represented on the directorate. The Madras Central Urban Bank, Ltd., which was the first central bank organised, has been converted into the apex Bank for the presidency and its membership is restricted to district central banks and to individuals. The bank finances central banks but it has lent a very small fraction of its working capital to individuals against their deposit, a privilege which other central banks also enjoy.

Neither the rural credit societies nor the central banks have enough long-term capital to enable them to give sufficiently long-term loans for the liquidation of old debts or for land improvement. To overcome this, difficulty and to bring more long-term money into the movement, it was decided some three years ago to form a number of co-operative land mortgage banks. Fifteen such banks have actually been organised. The operations of each bank which is formed on the limited liability basis are restricted to a compact group of villages situated not more than five to seven miles from the bank's headquarters. The bank issues debentures for sale to the general public on the security of the landed property which the individual borrowers pledge to it. As the scheme is still in the experimental stage, Government have agreed to buy a portion of the debentures so issued.

One unsatisfactory feature in the working of the primary societies in the Madras Presidency has been the increase in overdue arrears in the last few years. Owing, however, to lack of uniformity in the method of calculating overdues in different provinces, it is not possible to compare accurately the position in the presidency with that in other provinces. In the case of primary societies, the percentage of the amount overdue to the demand under principal has increased from 31 in 1920-21 to 46 in 1926-27. As the increase was causing anxiety and in view of other considerations, a committee was appointed in 1927 to review the whole position of the co-operative movement and it has recently submitted a report to Government.

On the passing of the Act of 1912 which allowed societies for non-credit purposes to be registered, the by-laws of all credit societies were amended so as to enable them to undertake joint purchase of the domestic and agricultural requirements of their members as well as the joint sale of their agricultural produce. The local supervising unions were also authorised to act as agents for their affiliated societies in the matter of joint purchase and joint sale. The work of purchase and sale was entirely based upon indents received from members, the societies merely acting as agents. At the same time special societies called trading unions, were started in some areas for joint purchase and sale and attempts were made to supply them with all the necessary information and to place them in touch with wholesale merchants in Madras. Owing to the inadequacy of the official staff and the great difficulty in organising non-credit work, progress in this direction was slow. A stimulus to this branch of the work has, however, been given by the reorganisation of the upper controlling staff in 1925, and more organised work is now being done for the development of agricultural supply and marketing. A recent development which has made considerable progress has been the function of special societies known as crop loan societies or loan and sale societies to advance loans on the pledge of agricultural produce. Such loans are also given by the ordinary rural credit societies. The special societies advance money on the pledge of produce deposited with them for safe custody and for eventual sale. In 1926-27, advances were made on the pledge of produce to an extent of Rs. 9·34 lakhs. In order to remove one of the chief obstacles in the way of the development of these societies, Government have agreed to give long-term loans to a few of them to enable them to procure suitable godown accommodation. Another class of societies which deserves mention is that which deals with the preparation of agricultural produce for the market and for the manufacture of certain agricultural requirements, such as bonemeal and other manures. Societies have also been organised for the hulling of rice, its preparation for the market, for the crushing of sugarcane and manufacture of jaggery, for the crushing of bones and phosphatic nodules and for the decortication of groundnuts. A recent addition to the non-credit movement in the presidency has been the co-operative agricultural demonstration societies, now thirteen in number, of which the society at Lalgudi in the Trichinopoly district was the first. These societies are organised for the purpose of demonstrating to the local agriculturists the value of the improved methods of cultivation, appliances, seed, and manures recommended by the Agricultural Department. A plot of land is taken on lease and is divided into two halves, one of which is cultivated on the old and the other on the improved system. All the work is done by the members or their employees under the guidance of the local officers of the Agricultural Department. The results so far have been very promising. A reference may here be made to the co-operative labour societies which secure work for small agricultural landowners, tenant cultivators and agricultural labourers during their slack time, by taking contracts from Government and local bodies for works which require mainly unskilled labour. There were 57 such societies in 1927, which secured for their members contract work of the value of nearly 7·5 lakhs.

There were also, on 30th June 1927, 109 building societies with 3,383 members and with a total paid-up share capital of Rs. 6·8 lakhs. These societies are given loans by the Government, ordinarily for 20 years, at six-and-a-half per cent interest. They lend to members at seven to seven-and-a-half per cent for the construction of dwelling houses. On June 30th, 1927, the total amount of government loans outstanding with these societies was Rs. 13·5 lakhs and about 1,000 houses had been built.

A dozen milk supply societies have been organised in the Chingleput district in the neighbourhood of the city of Madras. A union for these societies has since been formed and milk and curd prepared by them are taken to the city of Madras regularly in a motor lorry.

Societies for the depressed and backward classes are a special feature of the co-operative movement in this presidency. Last year there were 2,578 of these societies with a membership of 120,093. Their share capital and reserve fund exceeded Rs. 8 lakhs, and borrowings Rs. 18·3 lakhs. 1,600 of these societies are in the charge of the Labour Department.

As regards the question of future progress, while the organisation of agricultural credit societies is now largely in the hands of non-official agencies, these have not yet reached such a stage of efficiency that they can be solely entrusted with organisation, supervision and finance.

The supervision of credit societies has been taken over, during the last few years, by local supervising unions which have been specially organised for the purpose. The vast majority of rural credit societies are now linked up with these unions of which there are 366 in the presidency.

Each union consists of twenty to thirty societies usually within a distance of seven to ten miles. These unions are on the whole progressing fairly satisfactorily and in the more progressive areas are developing a considerable sense of responsibility as well as efficiency and business-like habits. They are federated into district organisations known as district co-operative federations which, besides co-ordinating and guiding the work of the unions, train the *panchayatdars* of the societies. Responsibility for the development of the non-credit movement remains to a very large extent with the departmental staff. There is also a Provincial Co-operative Union in addition to two other propagandist unions, the Andhra Sahakara Sammelanam at Rajahmundry and the Hood Co-operative Institute, Tanjore. These undertake the work of propaganda and training, but do no supervision.

The Director of Agriculture has in recent years attempted to treat the local supervising unions as his agents for the distribution of improved seed, manures and implements and has also used the co-operative movement for the multiplication and distribution of such seed, but with very limited success. Co-operation between the two departments is also secured by meetings of agricultural and co-operative officers in departmental and other conferences.

The staff of the Co-operative Department, excluding clerks and menials, consists of the Registrar, the Joint Registrar, 9 deputy registrars, 27 assistant registrars and 338 inspectors. In addition, the Labour Department has 67 inspectors doing co-operative work. The Joint Registrar, deputy registrars and 24 inspectors look after non-credit work. The cost of the department to Government last year was Rs. 7,29,636.

11. COMMUNICATIONS AND MARKETING.

The presidency is, on the whole, fairly well provided with transport facilities. Regular traffic along the coast is maintained by steamers between the chief ports, whilst on the east coast from Cocanada to Madras and further south, there is, for nine months in the year, an unbroken system of inland water carriage. As regards inland traffic, the area to the south of Madras is served by the South Indian Railway and to the north of Madras by the Madras and Southern Mahratta Railway. The open milage of railway during the year 1922-23 was, broad gauge, 1,718 miles; metre gauge, 1,993 miles; and narrow gauge, 123 miles. In addition to this, there are 275 miles of railway owned by the district boards of Tanjore, Kistna, Coimbatore, Guntur, Salem and Tinnevelly. Further construction is in progress.

The total milage of roads maintained by the Public Works Department is 1,096, and by local authorities 27,279; of these 20,275 miles are metalled and 8,100 are unmetalled.

Roads are classified under four heads :

(a) First class roads or trunk roads.
(b) Second class roads.
(c) Third class roads or other district roads.
(d) Other roads or taluk board and village roads.

Trunk roads are those which were originally Imperial roads and were maintained out of Imperial funds, trade routes or lines of through traffic between one district and another, or roads required for military purposes. The Government determine which roads shall be so classified and, since 1920, meet the actual expenditure incurred by local bodies on such roads, subject to a maximum of Rs. 500 or Rs. 1,000, per mile, according as the road is maintained by a district board or a municipal council. The total annual provision by Government on this account is Rs. 16·45 lakhs. The length of trunk roads is about 3,150 miles. In addition to trunk roads, some hill roads and the roads in the Agency tracts are constructed and maintained by Government.

For second class roads, which are not of the same importance as trunk roads but serve more than local needs, Government make a grant of half the cost of maintenance in rural areas, subject to a maximum for the whole district. Each district board determines for itself which roads should be included in this class. The length of roads so classified is about 12,460 miles and Government contribute each year a grant of Rs. 15·53 lakhs, provided that the total expenditure is at least double the amount of the grant. Collectors are required to make an annual report on the condition of the roads and, if it is considered that any of these are being neglected, the government grant is liable to be reduced.

When the classification of roads was made, it was intended that third class roads and village roads connecting the villages with the district roads should be made and maintained by the local boards concerned from their own resources. Local boards, however, have been able to spare very little towards this purpose and, in fact, village roads are little more than fair-weather tracks and seldom receive any attention whatsoever, and during the monsoon are impossible for vehicular traffic of any sort. As the result of a special representation, Government, since 1925, have been allotting annual grants of several lakhs to district boards for distribution among local bodies for the improvement of village communications, subject ordinarily to the condition that the local boards in each district should contribute from their own resources an amount equal to that allotted to that district. District board works are carried out by a Local-Fund engineering establishment, consisting of a district engineer paid from provincial funds and of a subordinate staff paid from local funds.

The methods by which agricultural produce passes from the producer to the ultimate consumer are far from satisfactory. The cultivator suffers from many handicaps: to begin with, he is illiterate and, in general, ignorant of prevailing prices in the markets, especially in regard to commercial crops; again, he is often indebted to the village merchant and moneylender and, therefore, is not free to market to the best advantage; further, as pointed out above, communications are often defective and this makes the cost of transport unnecessarily high; and, finally, he is handicapped by the lack of standardised weights and measures and by the numerous deductions to which he is subjected, either in the name of charity and religion or over and above what might be regarded as the legitimate recompense of the middleman.

The keynote to the system of marketing agricultural produce in the presidency is the predominant part played by the middleman. There are different grades of middlemen in the case of different crops and, on the whole, they play a larger part in the case of commercial crops such as groundnut, cotton and jaggery than in the case of ordinary food crops. Their part varies, too, according to the economic condition of the cultivator. The rich ryot who is unencumbered by debt, and who has comparatively large stocks to dispose of, brings his produce to the taluk or district centre and sells it through a commission agent locally known as the *dalali* merchant. If it remains unsold on the day on which it is brought in. it is stored in the *dalal's* godowns at the cultivator's expense and as the latter cannot generally afford to wait about until the sale is effected, it is doubtful if, in many cases, he receives the full sale value. The middle class ryot generally disposes of his produce through the same agency but, unlike the rich ryot, he is not free to choose his commission agent, because he has usually taken advances from a particular *dalal* on the condition that he will hand his produce over to that *dalal* to sell. Not only, therefore, does he sell at an unfavourable rate but he pays a heavy interest, up to 36 per cent or even more, on his advances. His relations with the middleman are those of creditor and debtor, rather than of selling agent and producer. In almost all cases, the major portion of the produce of the poor ryot finds its way into the hands of the village moneylender. Whatever remains is sold to petty traders who tour the villages and the price at which it changes hands is governed not so much by the market rates as by the needs of the ryot.

In the case of commercial crops for export, such as groundnut, there is a long chain of intermediaries between the producer and the exporter. The exporting firms have no direct dealings with the producer. First in the chain comes the village merchant and moneylender, or the more well-to-do ryot, who buys at a cheap rate and charges heavy interest on advances; if he is in business on a substantial scale, he may sell direct to the brokers of the exporting firms; if not, he deals with the wholesale merchant in the town, who in turn does business with the broker of the exporting firm. Where producing areas lie close to towns, the wholesale merchant frequently takes the place of the village merchant.

It is the cultivator's chronic shortage of money that has allowed the intermediary to achieve the prominent position he now occupies. Where the cultivators are tolerably well off, as in the Kistna and Godavari deltas, his position is not by any means so strong. There, the ryot, once he has paid his land revenue (*kist*) keeps a very steady eye on the prices prevailing for rice imported from Burma, and is in no haste to come to terms with the agent or buyer if the terms do not suit him. The ultimate market for his produce (Madras city and the inland districts of Coimbatore and Salem) is close at hand: he sells his husked rice to local mill-owners who hull it before passing it on, and who are at least as much concerned to keep their mills working as they are to beat down prices. Thus, in these deltas, the marketing of produce is on a reasonably satisfactory basis. The man who tills the land in the Cauvery delta is not in quite such a happy position, because much of the valuable land there is in the hands of a small number of large landholders, who lease out their land on the share system and who, therefore, accumulate the bulk of the surplus available, for export to Ceylon.

Forward contracts enter very largely into the system of marketing cotton. As in the case of groundnut, the producers have no contact with the larger exporting firms. The latter enter into advance contracts with local merchants for the supply of a definite quantity of cotton at a definite price. The element of speculation so introduced probably affects the cultivator but little in the long run, since the low price he gets in years of heavy outturn will be compensated by the higher price which the merchant will be forced to pay in years when the crop is short and the contract difficult to fulfil.

A Cotton Transport Act is in force in three tracts which produce well-known trade types of cotton (Northerns and Westerns, Tiruppur-Cambodia and Tinnevellies). The object is to maintain and improve the standard of the cotton in the protected areas by preventing inferior cotton being brought in. Previous to the introduction of the Act, merchants and middlemen intent on immediate profit had made a practice of importing inferior cotton with the object of mixing it with quality cotton and so obtaining a price approximating to that of the pure grade, or even of passing it off in its entirety as the genuine article. Under the provisions of the rules issued under the Act no lint, *kapas* or seed may be imported into these areas by rail or sea except under a license issued by the Director of Agriculture. The Act has not yet been applied to imports by road on account of the great difficulties of such control. As a result of the experience of the working of the Act, it has been found necessary to alter the regulations with a view to combine the Tinnevellies and Cambodia areas into one and to allow free movement of cotton seed without license, and it is proposed to take necessary legislative sanction to permit of this.

The sugarcane grower generally markets his produce as jaggery. A special system is in vogue in South Arcot where the East India Distilleries Company advances both setts and money to the cultivators, on the condition that the cane is sold to them.

Scattered up and down the presidency, at distances varying from ten to twenty miles, are innumerable weekly markets owned mostly by local bodies and, in some cases, by private individuals. These are the centres to which, week by week, the cultivators and their families flock in their hundreds to buy their day to day requirements which they pay for either in cash which they have brought with them, or from the proceeds of small lots of produce which they have brought for sale. In certain tracts, as for instance in the Agency and the Nilgiris, barter still lingers. In the deltas, where practically nothing but rice is grown, the weekly market supplies all the other necessaries of life and, at the end of the day, there is generally a considerable accumulation of unhusked rice which finds its way into commerce through the medium of the agents of town brokers who are sent out to buy it. In areas where cropping is diversified and supplies the bulk of the food requirements of the local population, the markets are primarily centres at which small lots of produce of different kinds are re-shuffled, the buyer of one kind being the seller of another, and are therefore of little importance as centres from which large quantities of produce are sent out of the district.

12. LOCAL SELF-GOVERNMENT.

Local self-government in Madras is regulated by the provisions of the District Municipalities Act, the Local Boards Act and the Village Panchayat Act of 1920 and the Madras City Municipal Act of 1919. The local authorities are the municipal councils, district, taluk and union boards and the village *panchayats*. Separate district boards have not yet been constituted for the East and West Godavari districts, but, with this exception, the area under the district board is the revenue district, excluding municipalities of which there are eighty. The total number of district boards is 24 of which 15 have been granted the privilege of electing their own presidents. The maximum membership of a district board is 52. Not more than one-fourth of the members may be appointed by Government and the remainder, excluding presidents of taluk boards who are *ex-officio* members, are elected by taluk boards. In some districts, taluk boards have been constituted for each revenue taluk but more frequently the area of their jurisdiction corresponds to the revenue subdivision and comprises more than one taluk. There are now 129 of them. The maximum membership is restricted to 21, not less than three-fourths of whom are elected, the remainder being nominated by the president of the district board. Union boards, of which there are 486, may be constituted for villages with a population of 5,000 and over and such bodies exist in all districts except the Nilgiris and South Kanara. Membership is restricted to a maximum of fifteen, not less than three-quarters of whom are elected by the taxpayers, the remainder being appointed by the president of the district board. The Madras Local Boards Act of 1920 defines the powers of supervision and control which may be exercised by district boards over taluk boards and by district and taluk boards over union boards. The main source of income of the district and taluk boards is the land cess of one anna in the rupee of the annual rental value of all lands in the district which is shared equally between the taluk board concerned and the district board. In addition, the district board is empowered to levy, for district board purposes alone, an additional cess of three pies in the rupee as is the taluk board for its own purposes. The other sources of income of the district board are tolls on carriages, carts, and animals, taxes on professions, companies and pilgrims, rents from fisheries and fees for the use of markets, cart-stands and slaughter-houses. The income of the union boards is mainly derived from a tax on houses which is levied in all unions.

As elsewhere, the ordinary duties for which local boards are responsible are the construction and maintenance of roads, bridges, hospitals, dispensaries, markets, waterworks, wells and drains, the training of nurses and vaccinators, sanitation and the diffusion of education. Elementary education in Madras is governed by the provisions of the Elementary Education Act of 1920 under which district educational councils are constituted. These councils consist of a president and such members as the Government may prescribe. The president of the district board is an *ex-officio* member of the council and the district board is entitled to elect an additional representative. Municipalities and taluk boards are also entitled to elect representatives. An elementary education fund is constituted for each municipality or taluk board area, the main contributions to which are grants from Government and the proceeds of a tax not exceeding twenty-five per cent of the taxation leviable under the heads, land cess, tax on companies, profession tax and house tax in taluk board areas and property tax, tax on companies and profession tax in municipalities. Where this taxation is levied, as it now is by 93 taluk boards out of 129, the Government make an additional grant of an equal amount.

The functions and the sources of income of the village *panchayats* are very similar to those of the larger bodies. The local Government may also entrust to them the management, protection and maintenance of village forests and the protection, maintenance and management of irrigation works. The *panchayat* movement appears to be gaining in strength. No less than 991 of them were constituted in 1926-27, bringing the total number at the close of that year up to 1924.

13. PUBLIC HEALTH AND SANITATION.

A visitor to Madras who is acquainted with agricultural communities in western countries cannot fail to be impressed with the generally poor physique of the Madras cultivator. The average expectation of life for a male at birth is 26 years and for a female 27·5 years; and the expectation of life in Madras is markedly higher than in any other province in India, excluding Burma.

The problems which confront those whose work it is to seek to improve the general health of the community are many and complex. They originate primarily in the conditions under which the villagers, who constitute nearly 88 per cent of the total population, live. Dwelling houses are badly constructed, devoid of light and ventilation. The houses of the very poor (and these unfortunately form the great majority) harbour both the human and the cattle population under the same roof; and cowdung and house refuse are accumulated in the close vicinity of the houses. In villages which have more than one source of water supply, no particular well or tank is reserved exclusively for drinking water and pollution by washing, bathing and by animal and human organic matter is universal. No system of drainage is in practice, with the result that pools form in every depression during the rainy season and stagnate in the hot weather. Of sanitary arrangements there are almost none so that the soil in and around the village becomes polluted and all waterways are a positive danger. For medical assistance a villager may have to travel miles to the nearest dispensary, unless he is prepared to entrust himself to the administration of the "quack". Little wonder, then, that the deaths from preventible diseases reach appalling figures Of these, the most violent and the most dreaded—cholera, small-pox and plague—are not the most dire in their results. A far heavier toll is taken by diseases like fevers and dysentery, not only in the number of deaths for which they are responsible, but in the general enfeeblement and consequent lowering of productive capacity which they leave in their train. A large proportion of the deaths registered under fevers is ascribed to malaria. People are well aware of the value of quinine as a specific against this disease and, were it available in sufficient quantity and at a price within the means of the people, it would be widely used. But in present conditions, the cost of any scheme of general distribution is prohibitive.

Figures are available which show that in the wet districts, especially where rice cultivation is the main occupation, eighty to a hundred per cent of the people are heavily infected with hookworm. This disease, though not immediately fatal, steadily undermines the physique of the population as do fevers and dysentery. Tuberculosis is believed to have increased rapidly within the last two decades, though accurate statistics are not available. Finally, the proportion of deaths in maternal cases is four times as high as it is in England; and, little wonder, in view of the fact that for every 1,000 births registered in 1927, only 55 women received skilled attention during labour.

Such is, in brief, an indication of the problems which lie before the Public Health Department. It remains to describe how these problems are being tackled.

Prior to the introduction of the District Health Scheme in 1922 and 1923, no co-ordinated system of public health administration existed. Separate organisations there were, each under separate control. The Collector was responsible for plague measures, the Director of Public Health for cholera, and the vaccination staffs were controlled by local bodies. From 1923, three assistant directors of public health have each been placed in charge of a bureau in the office of the Director. A trained health officer is entrusted with the public health administration of each district, and each taluk has at least one health inspector who is under the supervision and control of the district health officer. The strength of the district staff in 1927 was 25 health officers and 252 inspectors. All these officers are government servants, whose services are at the disposal of local bodies for carrying out the provisions of the Local Boards Act, 1920. The salary of all health officers is paid by Government, but, in the case of municipal health officers, twenty-five per cent of the average cost of the posts, together with the proportionate leave and pensionary contribution, is recovered from the municipal councils. The whole expenditure in connection with the prevention of epidemics and for the improvement of sanitation is a charge on the local bodies. Briefly, the organisation is concerned with the investigation and control of epidemic disease, with vaccination, inoculation, improvement of vital statistics, with the drawing up of plans and estimates for sanitary projects and with systematic health propaganda. About two million people are being vaccinated every year, a rate of progress which foreshadows the day when small-pox will no longer be a serious menace to the presidency. Prompt measures in regard to outbreaks, and the efficient sanitary control over fairs and festivals, have resulted in minimising the spread of cholera, and outbreaks of relapsing fever in 1922-23 were speedily stamped out. The hookworm problem is being tackled by a special branch subsidised by the International Health Board of America. A comprehensive scheme of health propaganda has been embarked upon. During 1927, 70,300 lectures were delivered in 41,200 centres to about 3,800,000 people, and some lakhs of posters and leaflets dealing with health subjects were issued; in some cases, local bodies were provided with magic lanterns and slides; miniature health exhibitions were held, and in 3,500 schools, lectures, dialogues and dramas were given. Perhaps the most potent of all propaganda measures has been the inauguration of the "National Health and Baby Week"; and it is worthy of mention that the Bellary exhibition in 1927 was awarded the Empire prize for child welfare schemes. The "weeks" are run according to a model programme drawn up by the Director of Public Health. The movement has appealed to the general populace in an extraordinary manner, substantial evidence of which is forthcoming in the increasing volume of funds raised by private subscriptions.

With regard to medical relief, a scheme has recently been introduced, the aim of which is to induce medical practitioners to settle in rural areas. A subsidy of Rs. 600 or Rs. 400 is granted for one year, according to whether the practitioner holds a degree or a diploma. In addition he is given Rs. 360 for drugs and Rs. 100 if he retains a qualified midwife. Two hundred such practitioners have now been installed and the result of the experiment will be watched with keen interest.