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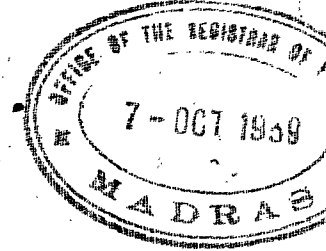
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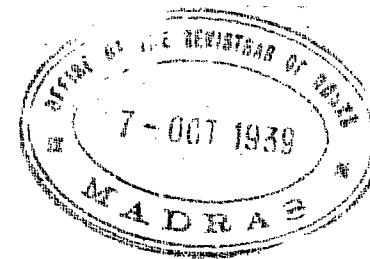
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The Journal of The Madras Geographical Association

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No. 2

Growth of Modern Coimbatore *

By

RAO BAHADUR C. M. RAMACHANDRA CHETTIAR, B.A., B.L., F.R.G.S.

I. INTRODUCTION

The city of Coimbatore has grown within a short period of twenty-five years, by leaps and bounds, into a famous industrial city.

It is now one of the largest towns in the Presidency regarding population, extent, industry, commerce, wealth and public activities. It has one of the most equable climates in the Presidency with a very mild hot weather and a dry atmosphere. It has an elevation of 1426 feet above the mean sea level and is situated within a short distance of the Hill stations on the Nilgiris. It is also located on the borders of a large cotton-growing area. These facts hold the secret of its recent rapid growth. They have no doubt influenced the establishment of a large number of industrial concerns and of educational institutions in and about the town. These establishments have led to the filling up of open fields between a number of scattered hamlets round about the old town, a big city thus forming itself out of the cluster of villages.

II. A SKETCH OF ITS GROWTH

(a) *Origin and early history.* The tract of territory between the upper part of the river Cauvery and the ranges of hills known as the Anamalais and the Nilgiris, has a distinct geographical

* Being the substance of a paper read before the 26th session of the Indian Science Congress at Lahore, January 1939.

feature and has been known as Kongu Nadu from ancient days. It was full of forests in olden times; and people slowly began to occupy at first the tracts along the river courses. The forests were generally inhabited by aboriginal tribes like Irulas. The Boluvampatty valley from which Noyyal river rises and flows eastwards was a thick forest-clad tract about a thousand years ago. On the northern bank of that river in a forest village formed of a few huts, an Irula chief, Kovan, lived. About the beginning of ninth century, a Sivachariya with the help of his friend, the Chera chief, travelled through these parts—both being highly enthusiastic for religion and civilization; the jungle was cut down, three temples were built and a small fort and a petta constructed. In memory of the Irula chief, the place was known as Kovanputhur. The ancient manuscript which records this legend of the town mentions also that the place was colonised by a number of families from the East.

The town grew very slowly and we find according to the inscriptions of the 13th century found at Perur and Komaralingam that it was merely a hamlet in Perur Nadu in that century, that it was also known as Vira Kerala after a victor of that name.

In the subsequent five centuries we hear little of its existence or its growth. In the 18th century, we find its name mentioned in the Mysore wars. Hyder and Tippu occupied the town off and on; and one building, now hostel for girls of the Secondary School, is said to have been the palace of the governors from Mysore and is pointed out to be that which Tippu occupied when he visited the town. The town was besieged thrice in the Mysore-British wars in the years 1768, 1783, and 1790 and was finally occupied by the British in 1799 A.D.

(b) *Under the British.* Even after British occupation, the town did not become capital of the district. Buchanan who visited the place in 1800 A.D. described it as a small town with a population of 15,000. It had only 2,000 houses. It became the headquarters of a district in 1805 A.D. when the two districts with headquarters at Bhavani and Dharapuram were amalgamated into the single district of Coimbatore. The town had the lay-out of the usual gridiron or rectangular pattern, like other South Indian towns. The growth after the British advent was rather slow, irregular and unregulated. A few popular collectors such as Thomas, Sullivan and Wedderburn evinced interest in the formation of extensions and their names have been perpetuated in streets named after them.

On 20—11—1866 Coimbatore was constituted a municipality, consisting of eleven commissioners besides the District Magistrate

and Executive Engineer, the former being the President. Eighteen years later, the strength of the Council was increased to twenty, of whom fifteen were elected and the rest nominated. In 1908 it was further increased to 24 and in 1920 to 32. The privilege of electing its own Chairman was conferred on the Council in 1885.

(c) *Plague and Betterments.* In 1903 plague broke out in the town, which was completely evacuated and the pest was put down temporarily. In 1909, it recurred and persisted for several years. The authorities had to take drastic steps for the mitigation of insanitation and congestion and for the formation of well-laid-out town-extensions. The period of town-extension schemes lasted from 1912 to 1929. Altogether, nine extensions by the Municipality and three extensions by private enterprise were started and completed, during the period. These schemes gave a fillip to the growth of the town; and the adjoining outlying portions of the villages of Krishnarayapuram, Souripalayam, Puliakulam and Ramanathapuram were added to the town.

The area of the town which was 4.2 square miles in 1866 rose to 7.5 square miles in 1930. The municipal limits have been further extended as far as Sanganurpallam in recent years and the area increased to 9 square miles in 1936 and it has again further gone up to 12 square miles at present.

III. A STUDY OF THE GROWTH

We shall now consider in more detail the growth of the town and its causes.

(a) *Population and density.* As stated above the population of the town in 1800 was merely 15,000. In 1866 it was 24,241; in 1921, it rose to 65,788; and to 95,193, in 1931. It is now believed to be nearly a lakh and twenty-five thousands. The town is now divided into twenty wards.

The densest portions of the town are round about the four car streets of the old town through which the main bazaar streets run. In fact, in every other South Indian town, such portion has formed the nucleus of further growth. The population has increased by 44 per cent between 1921 and 1931 and since then it has been increasing more rapidly.

(b) *Increase in number of houses.* In 1800, the number of houses was merely 2,000. Later on, they increased to 7,081 in 1891 and to 9,283 in 1915 and to 13,742 in 1936. The increase shows rapid growth. The numerous extensions both public and private are responsible for this increase. Naturally the houses in the centre or the

nucleus of the town are smaller and more congested than those which are in the extensions where every house is compelled to be constructed with an open space surrounding it. The property tax which is levied upon the houses and other immovable properties shows this increase in the growth. In 1920-1921 the property tax was Rs. 56,884; in 1924-25, Rs. 96,672; in 1930-31, it was Rs. 1,06,423; and in 1936-37, it was Rs. 2,82,785.

(c) *Taxation.* Statistics regarding the taxes collected from various sources by the municipality from 1920 till 1937 show also the rapid growth. The various items of the taxation are property tax, water and drainage tax, private scavenging tax, professional and companies tax, entertainments tax, tax on carriages and animals and tax on carts. Among the above-said taxes, water and drainage tax was started in 1925-26 and shows very rapid increase. This is due to the introduction of Siruvani water supply. Water tax was Rs. 36,875 in 1925; it became Rs. 1,43,170 in 1932-33. Entertainment tax was started in 1928-29 with the establishment of cinemas and yielded an income of Rs. 945 in that year. It rose to Rs. 7,388 in 1932-33. Tax on vehicles rose from Rs. 14,813 in 1921-22 to Rs. 45,385 in 1930-31. These figures also show the great acceleration in the growth of the town.

The cost of collection rose from Rs. 8,704 in 1920-21 to Rs. 15,395 in 1932-33. The net revenue for the municipality was Rs. 79,631 in 1920-21; Rs. 1,60,342 in 1926-27; Rs. 3,29,767 in 1932-33 and Rs. 4,08,955 in 1936-37.

(d) *Industries.* The main industries in the town are of two kinds, old and modern.

Among the old industries, hand-loom weaving is the prominent one. About 3,000 families live by it. During war time, they were very prosperous; but after the world depression, their condition has become very miserable. Among the new industries coffee-and-tea-curing came in the beginning. They are in the hands of foreigners. Tanning is another industry which employs a good number of hands and is in the hands of Indians. But it is dependent on vagaries of the foreign market.

Cement industry has been recently inaugurated at Madukkarai with a huge plant and capital drawn from Bombay.

More than all these stands the textile mill industry. Its growth is recent but rapid. Spinning is common to all mills and weaving is carried on in a few of them. The number of mills within the old municipal limits is only six but the entire number of them is situated within a radius of six miles from the town. The

incidence of taxation on professional companies gives an insight into the growth of industries. In 1920-21 the taxation was Rs. 12,255; in 1925-26 Rs. 30,226; and in 1931-32 Rs. 36,213.

(e) *Education.* The educational institutions in the town and the surroundings are another indication of the growth of the town. Elementary education is imparted by the municipal, missionary, private committee and teacher-manager schools. The council provides at present free and compulsory scheme of education. Out of 53 schools with 11,808 pupils, the municipality runs 18 schools with 5,205 pupils. There is a weaving school attached to the elementary schools and also a deaf-and-dumb school run by the council. The amount of money spent on elementary education by the council was Rs. 56,197, the cost per pupil being Rs. 10-12-9 in a year.

For secondary education, there are nine institutions of which two are middle schools. Out of 2,863 pupils in all the secondary schools, 956 only read in municipal schools. The total cost for the municipality is Rs. 37,201. There is a Government College which works up to the Intermediate standard.

There are a few public libraries in the town, besides a number of associations for various social and cultural objects.

In addition, there are the Agricultural College and the Forest College which virtually constitute two independent colonies adjoining the city. (The Forest College is now closed down.) Industrial educational institutions there are like the St. Joseph's and F. S. G.'s. Training schools for men and women, Police Training School, private schools of commerce, convents and orphanages attract a large number of people from outside.

(f) *Town extensions.* It has been mentioned that there were several extensions, both public and private, within the municipality. They began with the suppression of the insanitation and congestion for eradicating plague from the town. The rapid growth in industries and the inflow of village population in the shape of mill-hands gave the fillip to these extensions. As new extensions began, the town limits had to be expanded. Taking advantage of the Town Planning Act, several private individuals owning vacant plots have planned housing schemes with the permission of the council. Recently, a large plot of ground between the town area and the Sangapurpallam intended by the Tata Company, Ltd., for the installation of a textile mill, has been converted into a housing scheme with the result that a huge profit is being made by the company. Before long, the neighbouring industrial villages of Peelamedu, Singanellur and Podarur will have to be included within the city

limits for these have become not only suburban areas but urban also. The growth of the town tends towards north and east. On the south and west, irrigation tanks and wet fields prevent extension of habitations.

(g) *Textile mills and mill hands.* The first mill in the town was started in 1888 as a limited concern. It was later on taken up by a European and has again come back to Indian management. The second mill was started by a Nattukkottai banker and is still yielding good profit. Then after the coming of water supply and electricity, in recent years, mills have been started in large numbers. Within a radius of six miles from the town, twenty-one mills have come into existence with 383,933 number of spindles and 1,260 looms. The number of mill-hands working in them are 21,526. Besides these, there are six other mills in the district with 72,744 spindles and 126 looms and 4,265 mill-hands. As already pointed out, this sudden up-rise in the mill industry has brought in a huge cooly population from the neighbouring villages. Adequate housing schemes have not been contemplated at all; and as a result of it, large slums have sprung up in and about the mill zones. By 1938, there have sprung up 26 mills in Coimbatore and 8 in the District, five of which have not yet commenced working.

IV. CAUSES FOR THE GROWTH

Regional factors, economic advantages and modern facilities have contributed to the phenomenally rapid growth of Coimbatore.

(a) *Regional Factors*—(i) *Physical features.* The town of Coimbatore is situated on the Noyyal river at the mouth of the Boluvampatti valley at a height of 1,486 feet above sea-level. The valley itself is much of a flat plain, surrounded by high hills in a semi-circle. There is a natural slope from the north-west to the south-east, of about 100 feet. So, there is a natural drainage of waste-water towards the tanks on the south of the town. This slope is taken advantage of in the water-scheme, which locates the supply reservoir at the north-western corner of the town, viz., north of the Forest College. North and east of the town are bounded by dry lands, while the south and west are bounded by irrigation tanks watered by the floods of the Noyyal and the wet fields. There is a belt of cocoanut groves along the Noyyal river which runs to within a few furlongs from the town. Irrigation tanks are about half a dozen and are dry for nearly six months. The portion of the town towards the south which is on the border of the wet fields is low and some parts are insanitary. During infections, invariably this portion of the town was the first to be affected. The north and east

of the town are higher in level and are surrounded, as already said, by dry fields. The big town extensions have been formed in these tracts only. The result is that these tracts stand better off in the matter of health. Surrounding the town, there are a number of hamlets. From the town to the hills on the north-west the lands are dry but fertile in soil. This matter has been taken into consideration in the location of the Agricultural and Forest Colleges. On the north and east the land is a plain with black cotton soil to a considerable extent.

(ii) *Seasonal changes:* The town is noted for its dry atmosphere. The mean temperature for the past 25 years is 79.6°F. The hottest months are April and May with mean temperatures of 85.5°F and 84.2°F respectively. January and December are the coldest months with a mean temperature of 75°F. The prevailing winds are healthy except in the months of June and July, when the winds are somewhat fierce with a mean velocity of 6½ miles per hour; and the humidity of the air is generally high. The average percentage at 8 A.M. is 80 or more in all months except March and April. The average rainfall is only 22 inches per year. Hence the town is always dry and its moderate mean temperature renders it at once healthy and pleasant. The town is protected from the heavy rainfall and winds on the Malabar side, by the range of hills which encircle the valley about a few miles from the town. The Palghat gap which opens towards Kinathukkadavu is six miles away and does not affect the weather of the town to any extent. During the monsoons, heavy clouds over-hang the hills, but the town is not affected by any downpour.

(iii) *Natural advantages.* The strip of land along the Noyyal river is always full of green verdure with belts of cocoanut groves and rice flats. The plains towards the north and east produce dry crops and cotton. The low hills towards the south give considerable quantity of hard granite useful for house construction, and metal for the road. The red soil along the Sangapurpallam is useful for brick manufacture. On the whole, we find that the surroundings of Coimbatore are blessed with neither too much of fertility nor too little of it.

(b) *Economic*—(i) *Natural vegetation:* There are no forests near by; and no hills within ten miles of the town. But in about 15 to 20 miles there are the Western Ghats which abound in minor forest produce and fuel. The town is supplied with enough fuel by the jungles on these hills and by the coups of

Valayar in the Palghat gap. The minor produce of the Forest Department includes wax, honey, gall-nuts, bark, resins etc. Wild animals such as elephants and boars do damage to the neighbouring lands near the hills; but the town and its surroundings are not affected by them.

(ii) *Cultivation*: As already remarked, the fertile belt along the Noyyal basin produces enough crops for consumption in the town. Very little export is possible. On the other hand, food-stuffs have to be imported into the town to a certain extent.

Paddy for man and hay for cattle come in large quantities from Malabar. Millets and cereals come from the dry lands towards the west.

The black soil towards the north and the east produces fine cotton which used to be exported to other places formerly. Now, taking advantage of the vast cotton belt in the taluks of Coimbatore, Palladam and Udumalpet, a number of textile mills have been started which take up most of the produce. It is curious to note in this connection that the Telugu Kamama has taken to the black soil and has become mill-owner; and converts cotton into yarn. Cultivation of cotton has improved of late to a considerable extent and the following figures give an idea of the extent of the produce:—In 1853, there were 152,000 acres under cotton; in 1882, the acres were 241,000; in 1926, the acreage rose to 282,614 and in 1929 it went up to 363,975.

(c) *Modern facilities*—(i) *Communications*: Coimbatore town is a big nodal centre. Through the town, the trunk road from Madras to Malabar passes. It branches from Coimbatore to the Nilgiris. Another trunk road passes from Coimbatore to Trichy and to the eastern districts and a third from Coimbatore to Mysore via Satyamangalam. Yet another road goes south to Pollachi on the way to Palni. There are several other minor roads. All these make the town a big nodal centre from which various roads radiate, thereby rendering them useful for trade. The town itself had only 27 miles and 1 furlong of road in 1866, which increased to 35 miles and one furlong in 1916 and further rose to 52 miles and three furlongs in 1930. The mileage was 82 miles 6 furlongs, in 1937.

The municipal council keeps all the main roads tarred with the result that the dust problem is under control to a certain extent. In 1936-37, it spent Rs. 38,920 for the maintenance of roads.

The railway facilities of the town are very poor for a first-class city. The receipts by way of collections for passenger and goods-traffic are second to none in the road gauge line of the S.I.Ry. The town was neglected till now as it was merely a side-station on the branch line between Podanur and Mettupalayam. Only recently, railway authorities have taken up the station to suit modern needs. According to the plan which is now in the course of construction, Coimbatore will become a junction of S.I.Ry. joining Madras, Mettupalayam, Pollachi and a new sub-station has been opened, known as "North Coimbatore."

Coimbatore is very poor in inter and suburban traffic conveniences. The ill-equipped and rickety jukkas are the chief public vehicles. If tram is uneconomical in Coimbatore, a system of motor buses plying for hire would relieve considerably the town-congestion and would be a boon to the people. But the local municipal council does not support such a scheme. It is fortunate that the town is connected with all the neighbouring taluk centres in the district by a regular system of motor traffic run by joint stock concerns.

(ii) *Water supply*: As already said, Coimbatore is bounded by a number of tanks which are supplied with flood water through channels from the small river Noyyal. The collection of water scarcely stands for more than six months in the year. For some years like the present one, the tanks are dry throughout the year due to failure of rains. The water is used for wet cultivation.

Drinking water used to be got from wells dug in each house. There were a few public wells also which had to be filled up for fear of drownings. A scheme for a perennial water supply was considered by the council and the government, even from 1889. After a number of snubbings by various engineers the Siruvani scheme was finally formulated in 1920 at an estimated cost of 38.68 lakhs. The scheme was "to construct a dam across the Siruvani river in the Muthukulam valley so as to divert the flow through a tunnel cut in the water-shed ridge into the Anayar river where it will again be diverted by an off-take masonry dam to a settling tank from where it will flow along an 18 inch gravitation main 20 miles long into the service reservoir near the Forest College for distribution therefrom to the town. The scheme provides a supply of 20 gallons a day per head on a population of 1,00,000 and 5,40,000 gallons a day for industrial purposes." Siruvani reservoir is an ideal place for picnic. The tunnel has been cut

through a rock about a mile length. Siruvani water is said to be the best in South India for purity and no city in India could boast of more profuse & better water-supply.

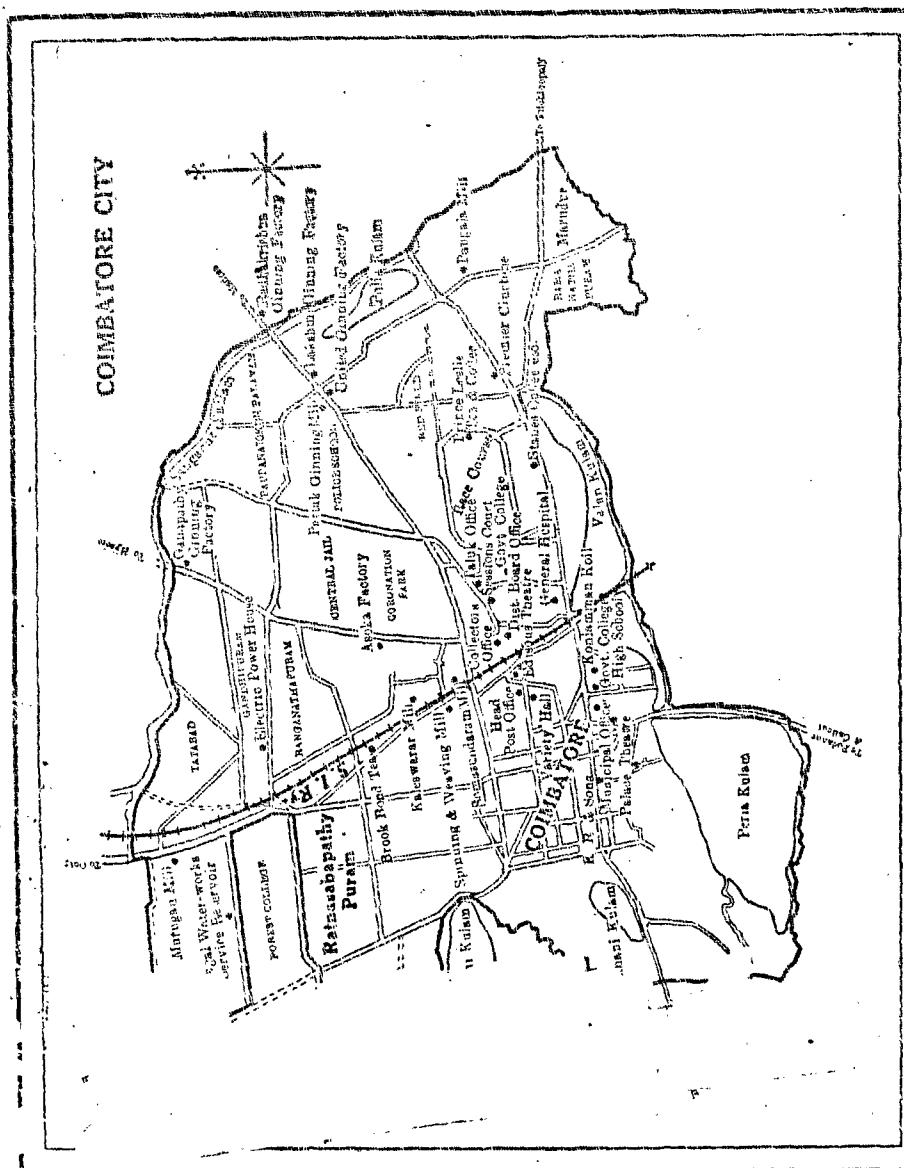
(iii) Drainage: The council has also an underground drainage scheme as well and has already begun to work it out. With water-supply and drainage schemes, the necessities of the town are provided for satisfactorily.

(iv) *Electric supply*: As early as 1930, a private cinema proprietor obtained a licence for the use of the Pykara scheme in the town. It went on for a few years when the Pykara scheme was launched by the Government. Coimbatore has the advantage of being the nearest station from the foot of the Nilgiri hills on which the Pykara waters have been harnessed for the production of electric current. Hence, Coimbatore gets the first supply. There is a huge electric distribution centre constructed at Coimbatore for sending the current to various provincial centres west, south, and east. Even in the first year, Pykara supply was availed of by the town. The council is making large profits out of its distribution scheme. Coimbatore is well lit with 2,366 lights of which 591 are of high power. Not only the major mills of the town but also minor industries such as flour mills and oil mills are worked by electric supply. Irrigation wells also are worked by electricity.

(v) *Aids*: Several other facilities have aided the growth of the town. It was rather a fortunate circumstance that with the growth of industry and trade, various institutions which supply financial help have come into existence.

(1) *Growth of local Banking system*: Even from the beginning of this century the merchants of this town took advantage of the provisions of the Companies Act in floating local banking concerns known locally as Nidhis. Shares were collected from individuals and a board of directors was formed. The Secretary, as the executive officer would do the business. In the course of 25 years, about 50 such Nidhis were started and supplied enough funds to keep trade flourishing. With high rates of interest, the Nidhis were able to declare dividends from 12 to 18%. But owing to mismanagement and the compulsory reduction of interest due to legislation, the Nidhis have begun to fail.

(2) *Nagarathar and Muttams*: Side by side with the local Nidhis, Nattukottai Chettys started their money-lending business. In the beginning, they flourished considerably with their 36% penal interest. With the growth of local banking, Chettys began



to decline in influence. But suddenly an inflow of Multanis from Sind came into the town. With their Hundi system of 87 days' sight they roped in each and every trader. In course of time, even mill-owners could not resist their temptation. Now the entire trade and mill industry is in their clutches. They can make or mar the financial position at any moment.

(3) *Outside and foreign Banking*: The Madras Bank which became later on the Imperial Bank, opened its branch rather early in the century to meet the local as well as the Government demands. After the mill boom, outside financial concerns poured in. The Central Bank of India and P & O Corporation are two such important ones. The west coast concerns which exercised once a strong influence on the trade of the town are dwindling down, being affected by the Travancore National and Quilon Bank crash. These outside concerns are backing up the mill industry to a considerable extent. It is a pitiable sight to see the big mill-owners dancing attendance daily before the foreign banks and the Multanis for financial help.

(4) *Indigenous money-lenders*: Besides the above-said financiers, there are a number of indigenous money-lenders who live upon the interest which they get from their customers. Textile merchants, tanners, petty contractors, grocers and shop-keepers have of necessity to borrow from local money-lenders and have to pay in return a large portion of their profits by way of interest. Artisans, weavers and petty-workers cannot escape from the clutches of small money-lenders who exact high rates of interest. Even the hard Kabulis have come and batten on poor people like mill-hands and railway coolies and clerks, who cannot resist their tentacles.

(vi) *Capital side*. As already pointed out, there are twenty mills in and out of Coimbatore besides the one newly started. The mills are floated by a few enterprising people who constitute themselves as managing agents. For floating a mill and for working it out successfully, the managing agent reserves for himself a certain percentage of commission on the work done. With that assured income, he canvasses for share capital. The shareholders are proprietors of the mill only in name. They are provided with a percentage of the dividend declared each year and they are generally satisfied if a particular percentage of dividend is paid and care nothing to know about the inner working or the management of the mill. So for all practical purposes, the managing agent is the owner of the mill. He has to purchase yarn, provide money for

the running of the mill even by borrowing, earn profits and declare a satisfactory dividend. The tact and skill in the management give credit and fame to the mill. The share-holder supplies the capital and the bankers, the running expenditure. Sometimes, the authorised capital is not fully subscribed and it is kept so purposely in order to declare a large dividend. The management sees that it gets the rest of the recurring expenditure by way of borrowings. Thus, in Coimbatore, the proportion of share capital to block capital is larger than that in the Bombay Presidency. In eight typical mills of Coimbatore the block capital for 1936 was 104.2 lakhs while the paid-up share capital was only 64.34 lakhs. The latter is nearly 61.5% of the former. In Bombay it is 38% Ahmedabad 24%; and Sholapur 13%. Coimbatore has successfully manifested this popular aspect of business.

The profits earned by the mills till now have been considerable and they have been able to declare a good dividend throughout.

The growth in mill industry is illustrated by the following figures which give the number of mills working in each year :—

Year.	No. of mills.	Year.	No. of mills.
1888	2	1923	6
1906	3	1932	8
1910	4	1937	20
1922	5		

The magnitude of the industry may be judged by the number of spindles it employs, which was 352,040 in 1937.

The following comparative statement showing the development of cotton textile industry in Coimbatore area with other centres and with the whole of India is interesting :—

Centres.	Number of mills.		Total number of spindles installed.		Total number of looms installed.		Total number of hands employed per day on the average (day Shift) only.	
							1932.	1937.
Coimbatore.	8	20	177,408	352,040	989	1,260	6,793	14,228
Madras Presidency.	26	47	820,870	1,150,886	5,233	6,169	34,753	49,110
Bombay Presidency.	220	210	6,442,519	6,169,211	141,241	141,471	256,200	243,493
All India.	340	370	9,506,983	9,730,738	197,819	403,226	403,226	417,216

(vii) *Labour Side*: Now let us consider the labour side of the mill industry. From the statement of figures given in the table it would be seen that in 20 mills 3,52,040 spindles have been installed together with 1,260 looms. The number of mill-hands employed per day is 14,228 on an average. The mill hands are generally drawn from the working classes, who are poor. In the earlier days most of the mill-hands were recruited from the town. The hereditary weavers never cared to join the mills. Various causes kept them back from becoming a mill hand. The wages of the mill are generally lower than their earnings. A weaver at home is a freer individual than a millhand. He works in his home as he pleases under a cool shade. On the other hand the mill-hand has to work in hot atmosphere filled up with cotton dust and particles. Hence a hand-loom weaver would never like to become a sickly mill-hand. As mills grew in number outside cheap labour was requisitioned. Hence labourers from the neighbouring villages came flocking to the town. The mill-owner also tried to locate his mills where cheap village labour was available. Hence the larger percentage among the mill-hands in the figure 14,228 consists of village labourers. An ordinary hand-loom weaver would earn about Rs. 15 per month whereas a mill-hand is available for a sum ranging from Rs. 8 to 11. Round about Coimbatore within a radius of six miles there are a number of villages which supply cheap labour. The agricultural labourer's wages are far less than the mill-wages. Hence, a number of agriculturists have left and are leaving their hereditary profession of agriculture in order to become a mill labourer. Every day we can see a number of youths going about the town for the purpose of getting admission to the mill.

The new recruit from the village side may not know in the beginning how to handle the machinery. But in course of time, he learns the work which he has to do. In this way an unskilled labourer becomes a skilled one. The wages for a skilled labourer is far below in Coimbatore than in some other parts of India or the world. 'Skilled' labour is thus obtained without much education, without much trouble or energy or equipment.

As already said, wages are cheap in the village side. Mill owners vied with each other for getting plots of ground for their mills as near the villages as possible so that they might get cheap labour. The wages of a village mill-hand will normally be two thirds of that of an outside skilled labourer.

The cost of living in the village is very small. Hence the village worker who was living on a comparatively small amount of

more, prefers employment in a mill where he could get better wages and enjoyment. The village mill-hand acquires in course of time the habits of a town-labourer and begins to live a costlier life. Hence the cost of living even among the village mill-hands is already on the increase and is certainly far more than that of an ordinary villager, who sweats for his bread under hardest conditions.

The villager who emigrates towards any sub-urban mill area tries to erect a thatched shed and a roof for himself and his family and lives a hard life under insanitary conditions. This question gives rise to a proper housing problem. The public bodies or the mill owners Associations could have started a suitable housing scheme under co-operative lines. If this housing problem is worked out on humanistic lines, thinking it to be an inevitable one, then there would not be any difficulty in having a comprehensive scheme of housing problem for this ever-growing industrial city.

Education among the mill-hands is very poor and the ignorant mill-hand is always under the thumb of a profiteer or a charlatan. Proper educational facilities should be given to the labourer to make him be a man instead of a toiling animal and welfare schemes should be started for his improvement.

(viii) *Stability of Industry*: One risk of too rapid industrialisation is the manipulation of shares, dividends, and debentures; and a train of abuses by Company promoters who prey upon a panicky and gullible public. Of these bitter experiences, Coimbatore has had its share, though not as yet a very large share.

On the side of the labourer, stability is essential. The labourer is entitled to good treatment from the capitalist, which alone will ensure sound and honest work. The labourer must be treated as a human being and all facilities to keep him so should be given. Social work and welfare scheme should be started for the labourer and the labourer must be made to feel that he is a member of the industrial family. In such a case strikes may not occur. A number of strikes has taken place in recent years with the result that the management has lost a good lot; and the labourers, deluded and misled, have lost no less. A machinery to prevent industrial war and promote better relations between labour and capital is a crying need of the hour.

The Future. Owing to the plague, from 1903 to 1918, congested blocks were opened up and open spaces for recreation were set apart. Extensions with garden houses were started at proper centres. Even private individuals have taken up such

schemes. Sanitation has improved and health ensured. Fresh water and drainage schemes are real and invaluable because the town. Building material is available in the neighbourhood, the construction of houses has begun in right earnest. People who do not own money get loans from building societies and then complete their constructions. The aid which co-operative department gives in this line is considerable. Roads have become better.

With such facilities which the science of town planning affords, the municipal council has played a prominent part in the growth of the town and in its local self-government. The principles of town-planning have been observed to a considerable extent.

But that is not all. Factories and Mills are springing up as fast as entrepreneurs can secure money enough to start them, with scant regard to the primary needs of sanitation or housing of mill-hands. There is no reason why provision for these last should not be made as obligatory on them as any other provision. With zeal for public spirit and led by larger vision of Greater Coimbatore, the Municipal Council should obtain powers to rope in all mills and make licence conditional upon such provision. Only so can Coimbatore avoid the slums and chawls that are so heart-rending in the industrial cities of the past.

* The Major Cultivated Crops of the Coimbatore District

By

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Coimbatore is a purely inland district in the Southern part of the peninsula having for its boundaries the lofty Western Ghats on the North-West, West and South (of which the Nilgiris or the picturesque blue mountains lie on the North-West and the Annamalais on the South, leaving, however, a gap on the West-coast known as the Palghat Gap "the importance of which from a climatic and commercial point of view can hardly be overestimated") and the river Cauvery which flows all along the North of the District and for a great part on the East. The whole country is an undulating one with taluqs like Erode, Bhavani, Gobichettipalayam, with an average elevation of 900 ft. above sea level while those like Palladam, Pollachi, Udumalpet, Coimbatore etc., far higher, sometimes the elevation being as much as 1,400 ft. or more above sea level. Besides the Cauvery, which flows only on the borders of the district and is therefore of not much value, there are 3 more rivers which flow through the district, namely, the Bhavani, Amaravathi, and Noyyal. The Bhavani and Amaravathi are perennial rivers, the former having a course of 105 and the latter of 115 miles within the district. The Noyyal bisects the district and though it has a course of 103 miles is not of much value being almost a jungle stream.

The average rainfall for the district is rather poor being only about 25". The fall is heaviest in the North and extreme South. The high Western Ghats almost cut away the district from the influence of the South-west Monsoon while the country is far too inland to have the full benefit of the North-east Monsoon. The following table taken from the statistical atlas of the Madras Presidency by Rao Bahadur D. Ananda Rao Garu, the ex-Director of Agriculture, revised upto 1930-31 shows the average distribution of rainfall in the several parts of the district at different periods of the year :—

* A lecture delivered before the Madras Geographical Association, Coimbatore Branch, on February 7th 1939.

Portion of the district.	Taluqs.	Dry weather (Jan. to Mar.)	Hot weather (April to May)	S.W. Monsoon (June to Sept.)	N.E. Monsoon (Oct. to Dec.)	Amount Total.
1. Pollachi.	Pollachi.	1.83"	4.93"	17.73"	11.53"	36.02"
2. Central plains.	Coimbatore.	2.80"	5.07"	7.53"	13.45"	38.85"
	Palladam.	1.85"	5.19"	3.85"	11.20"	22.09"
	Udamalpet.	2.27"	4.72"	2.95"	16.19"	27.13"
	Dharapuram.	1.49"	4.26"	4.01"	13.12"	22.88"
Average.		2.10"	4.81"	4.84"	13.49"	25.24"
3. Bhavari & Cauvery valleys.	Avanashi.	3.54"	5.47"	7.31"	12.68"	29.00"
	Gobichetti-palayam.	2.32"	6.77"	8.87"	11.39"	29.35"
	Bhavani.	2.92"	5.94"	10.54"	12.06"	31.46"
	Erode.	2.00"	5.63"	8.59"	11.13"	27.40"
	Average.	2.69"	5.95"	8.83"	11.83"	29.30"
4. Kollegal.	Kollegal.	0.94"	7.83"	12.71"	7.71"	29.19"
District average.		1.44"	5.31"	8.73"	11.59"	27.07"

From these figures one can easily see that the rains of dry weather are scanty everywhere and are not of much value for cultivation. They may be of use to crops under wells, tanks or channels but are not of great economic importance. It is also seen that the bulk of the large area of unirrigated crops is dependent on the South-west monsoon. There is much uncertainty indeed from year to year as to the possible amount and distribution of rainfall.

With regard to the prevailing winds there are first the Monsoon winds, the South-west blowing from the South and South-west from June to September and the North-east from the North-easterly direction from October to January. From January to April the winds are from the North-east and East and in April and May it is almost from the South when it is followed by the South-west Monsoon winds. In connection with these Monsoons mention has to be made about the importance of the Palghat Gap in so far as it influences the climate of this district. Those taluqs which are placed close to the gap such as Coimbatore and Pollachi enjoy a very salubrious climate and Pollachi being nearer of the two has

the advantage of the earlier Monsoon rains while it has the disadvantage in that it has to bear all the severity of the Monsoon wind. The district as a whole enjoys a fairly good climate on account of the Palghat gap. As a matter of fact one very much doubts if even Coimbatore in spite of its fairly elevated condition in certain parts can ever enjoy this pleasant climate if it were not for this gap. The gap has not only made Coimbatore climatically so agreeable but has also made it possible for the district to establish easy trade with the districts lying immediately to the West of the gap, namely, Malabar and Cochin.

Having noted the boundaries, rainfall, prevailing winds and climatic conditions of the district a geographical study of the place will be certainly incomplete if a reference to its soils is not made, for soils together with other factors such as rainfall, temperature, humidity, altitude, prevailing winds etc., determine as to the possibilities of crops that can be raised on them. Though on account of the poor rainfall the country presents almost a barren appearance excepting near about the mountains, the soils are really not so bad as they appear to be. With fair rain and good cultivation they are capable of yielding excellent crops. Under well or river irrigation the soils have proved to be exceedingly productive. The soils are made up chiefly of red sand and gravel with a moderate area of red and black loam. The latter two are the best while red sand is the worst. The poverty of rain on the one side of the picture with the potentialities of the soil on the other have made the Coimbatore ryot very thoughtful and the result of it is he has sunk many wells throughout the district and some of them very deep too and this forms a very characteristic feature of this district. From long time ago these have been put to use for irrigation with the help of cattle. As civilization advanced oil engines were employed and to-day most of them are being replaced by motors worked by electricity the current being obtained from Pykara.

The peasants of this district are made up of the Tamil speaking Goundans, the Telugu speaking Kammas and Vadugans and the Kanarese Vokkaligas and many of the Tottians and Palla castes.

The District has a population of 2,445,064 that is very nearly 24½ lakhs and is the fourth in the Presidency. It has a density of population of 300 to 400 per sq. mile.

As regards transport facilities there are the already established railway lines connecting the district with Madras, Trichy, Madura, Nilgiris and Malabar. Direct communication to Madura was established only recently, the line that was running upto Pollachi being

extended further through Palni and Dindigul. The communication that has been now established between Pollachi and Palghat has made Pollachi a very important commercial centre. The continuation of the Mysore railway through Channarayana up to Hardam-halli which is only within a few miles of Satyamangalam has made it possible to establish easy trade relationship between Mysore and this District. If the proposed lines, that is (1) from Satyamangalam to Erode making it possible to go to Mysore through this line (2) from Satyamangalam to Mattupalayam (3) from Satyamangalam to Palni through Gubichetripalayam and Tirupur (4) from Pollachi to Vannanthurai at the foot of the Annamalais—if all these are to materialise then the whole district will be knit with a net work of railway which will considerably help the present industrial position of this district. Besides railway there is an excellent motor bus service run by the U.M.S. company of Coimbatore which makes it possible to reach all places in and outside this district which are not within easy reach of the railway line.

Every one is aware that Coimbatore of today is a very important district especially from an industrial point of view. The reason for this is it is the greatest cotton centre for Southern India and the Tirupur Cotton market is one of the great cotton markets in India. The well-being of a district depends on the well-being of its peasants. If Coimbatore is what it is to-day, the credit really goes to the ryot of the district, who is a fairly hardworking ryot and who spares no pains to make use of every cent of rainfall that is obtained. It is his sweat that has in no small measure contributed to the growth of this place. He is the bed-rock on whom the capitalists of this district, some of them mill owners, have built up their solid mansions.

Well, the major crops that have contributed to the wealth of the district form the subject of our lecture to-night. The crops of this district may be broadly classified under two main heads, namely, food crops and money crops.

Talking up the money crops: first and foremost among them stands the cotton plant. The cotton plant is familiar to every one in this district. In fact the largest acreage in the Presidency under irrigated cotton is only in this district. The statistical report for 1937-38 records for irrigated cotton 169,813 acres and Coimbatore takes the third rank in the Presidency in regard to irrigated with 281,227 acres. Having known the position of Coimbatore in the Presidency in relation to this crop it behooves us to know the

position of our Presidency in relation to the rest of India and of India in relation to the rest of the world.

Our Presidency takes only a fifth place in India, Punjab occupying the first place, Bombay the second, Central Provinces the third and Hyderabad the fourth. The United States of America is the largest cotton producing country in the world and India comes next. The figures for 1937-38 are as follows:—

(World's cotton crops (Bales of 500 lb.—000's).)

World's total	.. 40,645
U.S.A.	.. 20,646
India	.. 5,662
Russia	.. 3,782
China	.. 3,083
Brazil	.. 2,282
Egypt	.. 2,202

In spite of the large acreage India compares very unfavourably with regard to the yield per acre. In Egypt the yield is the highest—500 lbs. an acre. In U.S.A. it is 180 lbs. and in India it is only 90 lbs. an acre. That India which has so much acreage being second in the world should yet be able to produce only so poor a quantity is really a very sad feature. Well, what may be the causes for this state of affairs. The less favourable climatic conditions of our country form certainly one of the chief causes. We depend entirely on the Monsoon rains. Another potent reason is the poverty of the ryot. He is not only poor but also conservative. It is believed that if he uses fertilizers more liberally the outturn per acre would certainly improve; but this is a debatable point.

Having considered the production of cotton let us consider our position in relation to its trade. The price that a particular cotton fetches per acre is not in proportion to its quantity only. Quality in cotton is a very important factor. Quality refers to the length of the fibre, fineness, colour, tensile strength etc. There are long stapled, medium stapled and short stapled cottons. The cotton in which the fibre length is below 7½" is a short stapled cotton, that in which it is above 1-3½" a long stapled and those intermediate between these two medium stapled. What is called the Sea Island (*Gossypium Saybadense*) is an American long stapled cotton and it is the finest type that can spin more than 120 counts. A large proportion of the American cotton is medium stapled while two-thirds of our Indian

cotton are short stapled. The longer the staple the higher the counts to which it can spin. It necessarily follows therefore that our cotton being short stapled can spin only to low counts and therefore fetch a poor price. If 840 yards can be spun from 1 lb. of lint it is called one count. If twice as much can be spun from the same 1 lb. of lint, it is termed as 2 counts or 2's. If 20 x 840 yards of yarn are spun from 1 lb. of lint the yarn is said to be 20's, and so on. At this stage it is necessary for us to look back into India's past and review in brief its performances then, its chequered career in the interim period and its hopes in the future.

Who does not know that India held a very prominent place indeed in the textile world in the past? Dacca muslins were the pride of our country and it is asserted by people of authority that one of the cottons indigenous to our country supplied the lint out of which the famous Dacca muslins were spun not by machinery but by hand. Even to-day there are weavers in India capable of spinning cottons like 80's from Podupathi while the same cotton can be spun upto 18's only with the aid of the best machinery. Soon after the glorious days of the Dacca muslins the Indian textile industry had almost a total eclipse, and this was due mainly to competition with the West. The industry broke down and weavers were forced to become agriculturists. Some Indian capitalists came forward and established spinning and weaving mills as in the West and during the last 30 years these have multiplied all over India, Coimbatore inclusive. There have been two moves in the textile trade. One is the starting of the mills by capitalists as in other industrial countries like England, America and Japan and the other the inauguration of the Khadi movement as early as 1906 and this considerably augmented at the present day due to the change in the policy of the Government in the matter of encouraging cottage industries.

Before the World War about 60% of the cotton cloth requirements of India were imported mainly from Lancashire. To-day conditions are far different. The commercial production and acreage of Indian cotton have been gradually increasing from pre-war time to the present day. Though the bulk of Indian cotton is still coarse, the proportion of fine counts is increasing steadily. "30 years ago, more than 80% of the total yarn output in India consisted of 20s and coarser whereas in 1936-37 about 56% was of this description. The production of 10s and coarser yarn was actually smaller during the past five years than in the corresponding period of a quarter of a century ago, but the production of yarns ranging from

21s to 30s increased to about 2.5 times, of 31s to 40s more than 5 times and of counts finer than 40s more than 20 times."

The cotton plants of the world may be broadly classified into two groups, viz., the American and the Asiatic. It might interest you to know that the former have 26 chromosome pairs that is double the number of the Asiatic cottons and this difference in chromosome number is responsible for the differences that we see in general between these two types. The American cottons are generally larger with their plant parts also such as the leaf, boll, lint length etc., correspondingly larger in size. Coimbatore with its dry, fertile, red and black soils seems to suit the cotton crop exceedingly well. Cambodia is the main type of American cotton that is grown in this district under irrigated conditions and only in red soil. Karunkanni is the type of dry cotton that is grown mainly in black soils. Cotton is grown as the chief commercial crop in Coimbatore, Wanashy, Pollachi, Palladam and Udumalpet taluqs. Except Kollegal and Bhavani, other taluqs also are growing cotton on a fairly large scale.

The Department of Agriculture has been doing its best in the matter of improvement of cotton. The introduction of Cambodia, a foreign and a superior type of cotton, was the first step and the further improvement of this and the evolving of such valuable strains as CO 2 (College Paruthi), CO 920, and CO 1267 after a very hard strenuous and careful experimental work are further evidence of the solid work that the Cotton Specialist and his staff have been doing on the vital crop of this district. CO 2 is undoubtedly one of the best and most popular cotton grown throughout this district. It was evolved at Coimbatore Cotton Breeding Station in 1928 from the bulk Cambodia grown in this district. This yields on an average 15% more than the unselected Cambodia and has a ginning percentage of 33%. It is appreciated very much in the Tirupur market and fetches a very good price too when marketed pure. It is fairly drought resistant. It is now being grown over more than 275,000 acres chiefly in Coimbatore, Salem, Madura, Ramnad and Trichy districts. The Department is selling pure seeds of this strain and there is a very great demand for it.

In this connection it will not be out of place if a small suggestion is thrown for the relief of the unemployed agriculturist graduate. In the United States of America it is not merely the Government that supplies pure strains of cotton to the public, it is more the private companies that are responsible for the growing

and the distribution of the several valuable types of cottons grown there. One wonders why our young men should not take to seed farming especially in tracts like Coimbatore, where there is a demand for pure seeds of CO 2, K 1 etc.

Side by side with the improving of the irrigated Cambodia attempts were being made by the Department to improve the dry cotton and this has resulted in the evolving of such valuable types of Kariganni known as K 1, C 7, and 4714.

Tobacco is another major money crop grown in the district. *Nicotiana tabacum* belongs to a family called Solanaceae. It might interest you to know that tobacco, potato, chili and tomato all belong to the same family. Solanaceae plants thrive very well in Coimbatore, all of them excepting potato. Tomato has been brought under cultivation in this district only very recently and it is doing so well and the taste for it has also been well developed that it is being grown almost in every house. The varieties of tobacco cultivated are all only local known as Erumakappal, Usikappal and Vattakappal, so named because of the texture in the first and their respective leafshapes in the latter two. These are useful only for chewing purposes. Guntur leads in tobacco having an area of 123,267 acres, next comes Vizagapatam with 33,473 acres and Coimbatore comes third in the Presidency with 23,237 acres, the crop being grown chiefly in Gobichettipalayam, Palladam and Dharapuram. Tobacco from here is mostly taken away to Palghat from which place it reaches other districts with the name "Palghat Vāsana Fugalai."

Groundnut is also grown on a fairly large scale especially in the Pollachi Taluq where they have the advantage of the early South-West Monsoon rains. The Departmental strain A.H. 25 has almost replaced the poorer local variety. The harvested product is easily marketed by merchants who come from Calicut.

Sugarcane is grown only on a small scale in this district especially in Udumalpet which is famous for its jaggery. The Departmental strains CO 213 and CO 260 known as "College Karumbu" are very popular.

Coming to food crops paddy is grown throughout the district especially in places covered by the rivers Noyyal, Amaravathi and Bhavani. The varieties issued by the Department are chiefly, G. E. B. 24 (Chinna Kichili), CO 1 (Peria Kichili), and CO 3

(Ottu Nelli) etc. Besides the millets made up of a grain there are other food crops, called Sajja (Cumbu-Tamil), Ragi of crops—Jonra (Cholam-Tamil), Tamil), Arika (Varagu-Tamil Kevuru-Tamil), Korra (Tenai-Panivaragu-Tamil) and Kiri, Samai (Samalu-Telugu), Variga the food crops of the Adiravali (Oodalu-Telugu) which are rice. Rice can be grown in poor soil. These crops are complementary to irrigation water which is only in areas which can be flooded with dry crops in the monsoon and in areas of poor rainfall as during summer months. Irrigated crops under wells

grown for grain. A.S. 809 Chinnampal is also equally popular. Among ragi E.C. 593, E.C. 3517 and E.C. 3735 are very good strains.

Among pulses mention must be made aboutorsegram which has an area more than twice that of other pulses in this district. Gobichettipalayam and Bhamani taluqs grow this a large

* 'Cole Cultivation' of Paddy in Cochin

By

A. KARUNAKARAN MENON, B.A., L.T.,

A typical example of the struggle against geographical control by the forces of nature is the 'Cole Cultivation' of Cochin. It is a peculiar type of paddy cultivation on land submerged under fresh water for the most part of the year. These lands are called 'Cole Lands.' 'Cole Lands' are more or less fresh water lakes, situated close to canals and backwaters, and are fed by river and rain floods.

There are several of such fresh water lakes bordering on the backwaters of Cochin, of which the chief are, the Enamakal and Manakodi in Trichur Taluk, and the Kattukampal in Talapilli Taluk. The Enamakal and Manakodi lakes together form one continuous expanse of water, more than twenty-five square miles in area, two and a half square miles of which lie in British Malabar. Three rivers, the Karuvannur, Wadakancheri, and Viyur empty their waters into this area. At two points, Enamakal in the north and Chirakal in the south, the lakes channel out into the sea.

By his singular ingenuity, man there has found out how best to control this environment and utilise such water-logged areas for his own benefit. The outlets into the sea are controlled by bunds or dams provided with sluices, which check the ingress of salt-water from the sea and at the same time allow the free flow of all excess water in the lakes to the sea.

During the South-West Monsoon, that is, from May to August, the whole area is flooded and it stretches to the horizon an endless sheet of water. Many boats big and small traverse the area and fishermen are seen busy fishing with their nets or line and rod. On seeing it nobody can imagine that within a few months this vast sheet of water is to present a magnificent level green expanse of the most luxuriantly growing paddy. The sluices are all now opened and water is allowed to flow out freely. There is no fear

* Being the substance of a paper read before the 26th Session of the Indian Science Congress, at Lahore, January 1939.

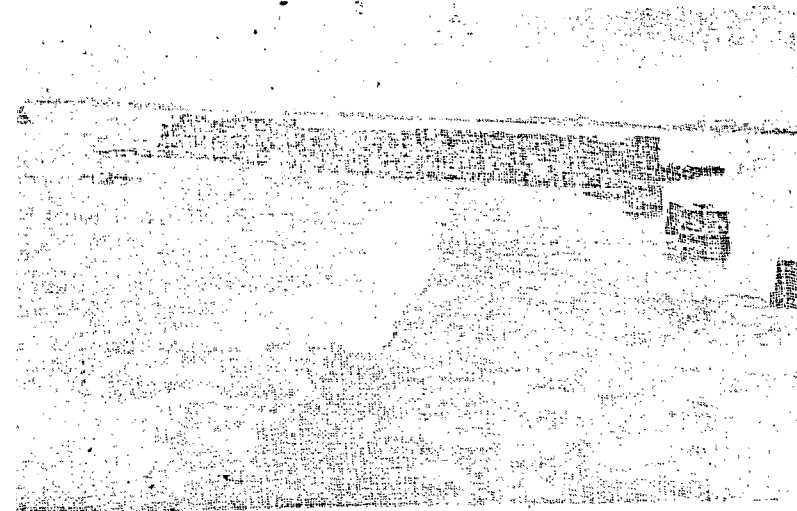
of saline water entering the area, because even the backwaters at this time lose their salinity to a certain extent. But as soon as they turn saline the sluices are erected.

Cultivation of these fields generally begins at the close of the North-East Monsoon, that is, about the middle of December. For convenience of cultivation, the whole area is generally divided into blocks of fifty to hundred acres. Each block is separated from the other by strong impervious high double bunds with a four-to-six feet space between them. This space is used as channel. Cultivators join together and under co-operative effort pump out the water in the area into the improvised channels. There the water is stored. The bunds and channels are the only means of traversing the area now. Boats have to be employed for visiting the different fields, the dry beds of which lie more than four feet below the level of the water in the channels.

The pumping out of water is an interesting process. Originally it was done with the help of numberless Persian Wheels or 'Chakrams' as they are called in Malayalam. A 'Chakram' as the word itself indicates is more or less in the shape of the wheel of an ordinary country cart, with planks of wood for spokes. It is fixed near the mud banks fitted in bamboo framework. Men and even women sit or stand on the bamboo framework and turn the wheel as quickly as they can with their feet. As the wheel turns, the spokes push the water out. Generally numberless 'Chakrams' are used, men and women continually working at it day and night. But times have changed and the wheels are being replaced by patent pumps driven by engines. The Chakram is a common feature in Malabar and it is used even for emptying ordinary tanks.

Every foot of land thus reclaimed from water is well protected with fences of wattle and mud. When the bed of the field is somewhat dry, light ploughing has to be done in some places. In places where the soil is too soft to admit of ploughing, some levelling at least has to be done. If the soil is made too loose it may become saline and the crop adversely affected. Generally no manuring worth the name is done.

The particular kind of paddy sown here is known as the "Cheera", a three to four months' crop specially adapted to water-logged conditions. There are a few other varieties also which are specially adapted to water-logged conditions, but they are not tried here for many reasons. The seeds first undergo the process of soaking and then they are broadcast in the fields. Sometimes paddy



ENAMAKAL DAM.



'COLE LANDS' AFTER HARVEST.

plants are transplanted from seed-beds outside. The actual sowing of the seeds takes place about the beginning of January.

In the somewhat raised beds of the fields, especially on the margin, which are not so much water-logged, another variety known as the "Kuttadan" is sown and it takes pretty long time for harvest.

As the plants grow they require plenty of water. The necessary water is now baled in from the improvised channels where plenty of water has been stored. Sometimes there will be occasional showers and there will be too much water in the channels. In that case the excess water in the channels is drained into the sea through the outlets. The success of the cultivation depends entirely upon the right quantity of water being stored in the channels.

Sometimes it so happens that in some years the storage of water may not be sufficient. In this case the crops dry up or fail. Sometimes it may so happen that the crops suffer from too much water. In some years by the time the crops begin to ripen in April, there may be a sudden downpour of early Monsoon rains and there will be steady rise of floods in the fields. All hands can be seen busily engaged in the struggle with the rising floods, which, if not kept under control is sure to destroy the hard earned fruits of a year's labour. It is really a sight to see "the numberless Persian Wheels bristling in the bamboo frame-works, for the contest with the threatening floods, and as the season advances, thousands of people, both men and women, are perched high above the scene on their machine, continuing their day and night struggle with the rising floods for the preservation of the ripening crops." Often the bulwarks of the fields are breached and the immature crops drowned. In that case, even though the crops are not fully matured, people go about in small boats and head the stalks of the rice plants from their boats. But as a rule the harvest takes place about the end of May and an enormously rich crop rewards this remarkable human industry.

Under normal conditions the yield per acre used to be about 1500 to 2000 pounds of grain. The cost of cultivation comes to Rs. 40 to Rs. 45 per acre of which about ten to twelve rupees have to be spent to pump out the water. Cultivators say that year by year cultivation of these areas is becoming a profitless concern, because considering the amount of money and labour that they have to spend on this, the return is comparatively poor. It is high time that better methods for improving the cultivation are found out.

In Central Travancore, bordering on the deltas of the Pampa river, extensive areas have been reclaimed from the backwaters and are cultivated in a somewhat similar fashion, though the name, 'Cole', is not given to it. Here the water is somewhat saline or brackish; but the crop, usually "Punja" thrives well in that.

It may be pointed out that this type of cultivation is peculiar to a particular region in the West Coast of India where people drain the water from seasonal lakes and tanks into outside and cultivate inside their beds while in the East Coast they retain their water inside for cultivation outside their beds.

Extensive water-logged areas are lying idle bordering on the backwaters of Malabar, Cochin and Travancore. It is worth while experimenting in the cultivation of reeds in these areas, the water-logged condition of which will be really helpful for the luxuriant growth of these plants. Tapping such resources of nature means work for idle hands, bread for many of the starving, and besides, the rise of an industry with a future.

Presidential Address at the Ninth Geographical Conference of the Madras Geographical Association

By

PROFESSOR RAO SAHEB C. S. SRINIVASACHARIAR,
Annamalai University.

It is a source of great pleasure and a matter of pride to me that I should have been called upon by the authorities of the Conference to take part in and preside over this Session held at Madras, just on the eve of the Tercentenary of this City, which will be coming off in the months of August-September of this year. I have been taking some kind of interest in the study of the history and the growth of the City of Madras for the last two decades; and I have rendered my humble bit of service to the Madras Geographical Association itself by reading a paper or two on these subjects and by furnishing illustrative matter for a special number of their *Journal* which reproduced several old maps that serve to show the student the various landmarks in the expansion of the original small settlement of 1639 into the mighty city that it has come to be. I am particularly thankful to my good friend Professor N. Subrahmanyan, who is the life and soul of the Madras Geographical Association and has been the principal instrument for the fostering of a love of Geography and of geographical studies in this Presidency. It is at his suggestion that I might prepare a paper on the 'Historical Geography of Madras' as an appropriate topic on the occasion of the convening of the Conference in the city itself in this historic year of 1939—historic in more senses than one—that I have made bold to follow up his idea and to give expression to a few ideas and features expressive of some of the salient phases in the growth of the original Madraspatam in size, in economic strength, in civic amenities, in population and in appearance through these three centuries that have elapsed since the original English factors built the nucleus of the present Fort St. George, largely with the help of Indian merchants and Portuguese neighbours. It is a matter of pride to all of us who have lived in or, in some way, been associated with, the city that its growth has been continuous and steady and that it has consistently maintained its rank among the great cities of this land of ours.

Madras has had, except for slight and temporary disturbances, an unbroken development for the last 300 years. It is a lucky coincidence that the energetic organisers of the Madras Geographical Association should have made this city which just completes its third century of growth, the venue of this year's session of its annual Conference. From the original site of the village of Madraspatam, which the English acquired by virtue of a grant of the Hindu rulers of the country, the city has grown and grown vigorously sending out its shoots on all sides, assimilating into its civic and economic organisation the surrounding areas stretching down to Pallavaram and Tambaram on the southern side, to Avadi and even Trivellore on the west and going up to Tiruvottiyur and Emore on the northern flank. The map of Greater Madras as it stands at the present time is and should be an interesting object of study to all students of the historical geography of South India.

Professor E. A. Freeman writing as early as 1881, stressed upon the mutual influencing study of local geography as influenced by local history and of local history as influenced by local geography; and he cautioned the student that the Geographical environment should be very carefully examined in its full bearing whether remote or direct, on the formation of the character of the people. A very remarkably apt illustration of this is afforded by the predominant characteristics of the European settlements on the coast like Pulicat, Madras and Pondicherry that were formed and grew up into some appreciable strength in the course of the 17th century. More of it will be stressed in the further course of this paper.

The neighbourhood of Madras city forms a level land of post-Tertiary formation; and there is no part of it which is higher than 40 feet above sea-level. The eastern part of the city is built on a dune running along the coast, while to the west of it can be clearly traced a parallel trough to the West of George Town and Washermanpet, from the People's Park to the Trevelyan Basin and then continuing on to the Ennore back-waters. It was through this trough that the North or Elambore River (as it was called in the East India Company records) flowed into the Cooum (near the Stanley Viaduct). "This feature of dune and trough running parallel to the coast can be traced for miles North and South of the City; and advantage has been taken of its existence in constructing the Buckingham Canal." Surf beats continuously on the coast and the soil is an admixture of sand and loam suitable especially to palm growth. The surf-driven sand moving very near the shore-line is another feature of the locality. Being obstructed by the projecting arms of the harbour from going northwards, the accumulation of

sand has resulted in the accretion of a gradually widening fore-shore that is immediately to the south of the Harbour and that diminishes its width in the south. The Harbour has also been responsible for the erosion of the beach along Royapuram and Tondiarpet and for some distance further north.

As has been elsewhere remarked by a high authority, the Madras elbow has been the vital point of the coast country, viz., the Palar Valley and the hinterland up to the Ghats. This makes it clear that "Madras was the parent of the port, not its child." The encroachment of the Pulicat Lake on the narrow lowland between the outlying spurs of the Seshachallam Hills and the sea narrows the approach from the north to Madras; and even this is broken up by the Nagari Hills, which served as a prominent landmark, being visible 50 miles from the shore and greatly useful to the early European seamen. To the south the hinterland is broken by isolated hillocks of which Gingee group of hills has been historically most prominent and the Tiruvannamalai peak is another landmark rendered sacred by its religious associations. Directly to the west of Madras, in the interior, there are the Javadi Hills marked by two flanks, the Arcot-Wandiwash flank on one side and the Vellore flank on the other. The latter was considered by the English the more important of the two, because the base of political power in the 17th and 18th centuries was "on the plateau behind and not on the sea in front." The position that Madras occupies has thus been "as important politically from the landside as from the sea, in earlier days. It is now provided with a large harbour; and the facilities it possesses for inland water transport deserve better use and encouragement than they enjoy now. It may be objected that the Madras Harbour cannot become a really valuable one, but one merit that the City possesses is that, though the poor land was not valuable, there was little demand for it," because the water spread out in its growth. It is one of the widest spaced cities in the world; and its spread elbow has contributed to its getting a rainfall that is more than normal for the rest of the coast.

One reason not noticed usually by students of history for the selection of the site of Madras for their settlement by Day and his colleagues was that the neighbourhood offered advantages in the matter of securing of cloth that was so much in demand for export to Europe. In his journey of examination of the possibilities of Madras, Day found, after comparing the cloths woven in the locality and their prices with those prevailing at Arumugam, their northern settlement, that the latter were in excess of the former by 20, 30

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on 4 per cent. The first consideration of the English settlement of Arumugam which was the preliminary establishment of Madras was due partly to this fact, that its Nayak was continuously forcing. Dry cloths with kinds of cloth suitable for export

available at the port of S. whether it was itself or not, different kinds of cloth

The fact that the piece of the North was above its more suitable for a normal ship on the beach, and at a distance from the river, those who should the English merchants to the Portuguese was

as Madras, the settlement of the City from the local Madras which

which, as Major Teixeira, a Portuguese, holds that the Persian neighbourhood

side of the river, and came to the north of the river, in

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reference to the author of the Nayak of Poonamale who visited the town and after their father, a well-known Chetty name Chennappa Nayak. Thus the site of the present Fort was originally called Chennapatnam; and the village lying to the north and north-west of it was Madraspatnam. The English preferred to call the united Indian town and Fort by the name of 'Madras' with which they had from the first been familiar; and they have elected to retain the name Chennapatnam.

The earliest Fort, the first English settlement was a small square structure whose building was carried on to completion by the original founders, Francis Day and John Cogan, in spite of lack of money and positive discouragement from the Directors of the Company at home. It was several years before the building (the Factory House) came to be surrounded by a protecting wall. This was the inner Fort containing the quarters of the merchants and factories and the barracks of the small garrison, the former of which with the Governor in the Factory itself, and the latter by the curtains of the walls.

Inside the inner Fort there grew up houses and streets inhabited by the free English merchants of those times and others, Armenians, Jews and Portuguese, who came from the neighbouring settlements of San Francisco forming a suburb of the city to the north of Mylapore) and the privileged Indians. This quarter, known as the European quarter, Christian Town or White Town, came to be walled in later years, the outer walls being provided with bastions at the cardinal points, and thus forming the Outer Fort, with in its centre the inner Citadel.

In the 17th century and in the first half of the 18th century the space occupied by the Fort was much smaller than the area of the present one. It was oblong in shape, broader on the north side than on the south, and occupying an area of only 15 acres. The river on the west then made a much wider channel, the east end flowed along the middle of the present Fort's walls were protected by bastions at the corners and on the sea-side. There was a narrow channel at the North River, which was easily fordable while on the area now occupied by the outer glacis of the Fort. Wireless Installation and the High Court and Law College (as) there was the crowded Old Black Town (otherwise known as the Chattram (Telugu) or Malabar (Tamil Town), the sarais and houses of which ran almost into the Fort itself.

PRESIDENTIAL ADDRESS

was a great

It was found that this proximity of the Black Town to the walls of the Fort was a great source of military weakness at the time of the French wars. When the French got possession of the Fort in 1746, they about strengthening its fortifications, enlarged the bastions and walls of the Outer Fort and demolished the houses in Black Town clustering near the north wall of the Fort. They thus destroyed a great part of the picturesque Old Black Town and created the north glacis of the Fort; but they left its interior fairly intact. When the English got back Madras in 1749, much of the Old Black Town had been destroyed. The English government were advised by their generals to extend the open space thus formed, demolished the remaining houses standing in the Town as well as its walls and left only the Town Temple of Chennai Kesava Perumal intact—as the solitary monument of the vanished place. Even this they pulled down in 1757 on the eve of Lally's siege of the city; and its bricks were used up in strengthening the walls of the Fort.

The Indians now shifted to the hitherto sparsely populated suburbs of Muthialpetta lying to the north and Peddanaickenpetta lying to the west of Old Black Town; and these came to be called the (New) Black Town, a name which they retained till the visit to the City in 1906 of H. I. M., King-Emperor George V, when he was Prince of Wales. On that occasion to mark the event, the name was changed into the present George Town. Both Old Black Town and New Black Town were walled—a measure of precaution taken against the raids of the local chiefs on the former and those of Hyder of Mysore on the latter. The walls of New Black Town were built in the seventies of the 18th century and only covered the exposed northern and western sides, running from Clive's Battery on the Rayapuram Beach westward to the neighbourhood of the present Basin Bridge Railway Station and thence southwards, parallel to the present Wall Tax Road, down to the General Hospital corner. The walls were substantial and provided with bastions and flank-works at intervals; and they were pierced by numerous gateways. About the middle of the 19th century when swords were beaten into ploughshares, these walls were pulled down; but portions of them can be seen still standing, near the Royapuram Stanley Medical College and to the north of Old Jail Street. These walls of New Black Town were faced on the outer-side with a broad glacis—a remnant of which, on the western side, has been converted into the present People's Park and the grounds of the Salt Cotours.

Peddanaickenpetta and Muthialpetta, which formed the nuclei of New Black Town, were originally suburbs of the first Indian city. The former was named after the Peddanaick who was the hereditary

cases of the police of the Indian Town. Muthialpetta and Pagadalpetta (Pearl-town and Coral-Town) — the latter name has fallen into disuse, though still embodied in the present Coram Merchants Street — were originally streets of the traders in pearls and corals, many of whom were Armenians and Jews. The Armenian Church and Cemetery at the southern end of the present Armenian street are the sad remaining relics of the Armenian colony which was once so prosperous an element of the trading community of Madras. The small Jewish Cemetery, buried in a part of crowded Mint Street is similarly indicative of the Hebrew colony that flourished in Madras in bygone times. Some of the Jews were English and others were Portuguese. "Most of them were diamond-merchants, on the lookout for diamonds from the mines of Golconda, which were formerly very productive. Several Armenians of note have left their impression of the city. One of them was Coja Petrus Uscan who owned houses in the Fort and built the Saidapet (Marmalong) Bridge over the Adyar river, as well as the stone-steps leading to the church at the top of St. Thomas Mount.

The English Company traded largely in calico cloth; and hence the necessity for securing a large body of painters, weavers, washers and dyers. Government had always been anxious to encourage their settlement; but they required large open spaces for their operations and hence had to be housed outside the crowded Black Town. Towards the close of the 17th century Governor Yale (1687-92) settled a number of weavers in the street that is now known as Nyniappa Naicken Street, while the washers (washers of cloth and not washermen) were housed in the present Mint Street. These streets were then outside the Old Black Town, in the suburb of Peddanaickenpetta. Later when the settlement grew in trade, Governor Joseph Collett settled a number of weavers in a suburb near Tiruvottiyur; and the village was first named Colletpetta after him, though now corrupted into Kaladipetta (*lit.* Loafers' Refuge). The present Washermanpetta is reminiscent of such a suburban settlement of washers; and the village of Chintadripetta, lying to the west of the Island Ground, was formed about 1735, particularly for the weavers to settle in; and special privileges and advances for building houses, etc., were given to them; and it was declared that none but painters (designers of patterns for chintz cloth), weavers, spinners and dyers and washers (bleachers of cloth) and such others as might be servants of the temple should settle there.

Triplicane, rendered famous by the Parthasarathy Swami Shrine, which goes back to the times of the Vaishnava Alvars and

which was the first village to be acquired by the English after they got Madras, is noteworthy. From the first it connected the City of Madras with the Portuguese San Thome which included the temple village of Mylapore on the west of it; and through it ran the high road connecting the Island Bridge with San Thome. The Triplicane temple was always an object of care to the Company who entrusted its management, along with that of the equally famous Town (or Chennai Kesava Perumal) Temple to their Indian Chief Merchants and set apart certain small items of revenue for their maintenance.

It was in the open ground adjoining Triplicane on the north and abutting on the southern side of the Cooum mouth, that the Governor came to have his Garden-House (first acquired in 1753 and now enlarged into the Government House and Banqueting Hall), and Nawab Muhammad Ali, Wailajah, who after he became a dependent of the Company and loved to reside for most of the time in Madras, built the stately pile now known as the Chepauk Palace, part of which has been converted as the offices of the Board of Revenue. The Nawab's Palace grounds originally covered all the area from the Cooum mouth on the north to Pycroft's Road on the south and stretched inland as far as the present Bell's Road on the west.

The Governors always used to have a Garden-House outside the Fort where they could retire for week-ends and on sultry evenings and in which they used to entertain Indian potentates and European visitors. The earliest Garden-House of the Company was situated in a corner of Old Black Town. Owing to the pressure of the growing population, it was superseded by a larger and more finely-laid-out Garden-House situated at the southern end of Peddanaickenpetta, in the ground of the present Medical College and General Hospital.

The Island itself was a marshy swamp laboriously levelled up and was formed by the bend of the North River to the east and then to the south till it reached the Cooum mouth. The Cooum itself makes a huge S-shaped curve as it runs into Madras and flowing past Chintadripetta, comes very near the North River. At this point a canal was cut, now crossed by the Penitentiary Bridge and the Stanley Viaduct connecting the two rivers. This canal and the joint mouth of the two rivers help to make the Island. Till about 1750, the North River ran much farther east; and it made a bend to the south only in the middle of the present Fort, thus rendering the Island more spacious than it is now. A bridge led from Peddanaickenpetta to the Island, near the Governor's Garden House;

and another, the nucleus of the present Wallajah Bridge, led from the Fort on the western side across the river to the Island and thence on by a third bridge (on the site of the present Government House or Willingdon Bridge) to the Triplicane High Road and the (Mount) Road which led on to the Mount.

The French destroyed the Garden House in Peddanaickenpetta during their occupation of Madras (1746-49). A private garden-house in Chepauk (the nucleus of the present House) was first rented and later purchased from its Portuguese owner, Mrs. Madeiros, a few years after 1750. It was subsequently enlarged on several occasions; and its grounds were extended on the west by the diversion of the Triplicane High Road (which then ran in a direct line from where it terminates at the Chepauk Police Station to the bridge), to its present alignment along the Wallajah and Mount Roads and later by the inclusion of a part of the Nawab's Palace-grounds. On one occasion the Government House was raided by Hyder's troops led by his son Tipu Sultan. The French General, Count de Lally, was kept a prisoner here for some time; and more than one Governor had died within its walls.

Lord Clive, Governor from 1798 to 1803, the son of the Hero of Plassey, greatly improved the Garden-House, and built the beautiful Banqueting Hall by its side to commemorate the fall of Tipu and the English capture of Seringapatam; and "with pious respect for his dead father's memory, (he) coupled Plassey with Seringapatam and ordered that the fine figure-work on the facade of the Hall should be a commemoration of both the vicotries." The Banqueting Hall resembles the Parthenon of Athens, being of the octastyle and Doric order. A few additions have been made to it since, like the terracing of the side-verandahs. On the walls are noble pictures of several former Governors, Viceroys and Commanders-in-Chief, besides those of King George III and Queen Charlotte, Major Lawrence and Nawab Wallajah, and emblazoned mouldings of the royal arms and those of the East India Company. In the Government House also are some fine pictures of historical personages. Later, when the Governor abandoned his house in the Fort and came to live permanently in the Garden-House of Triplicane, the necessity was felt for a country lodge to which he might retire on occasions; and the extensive Guindy Lodge near the Mount and the Race-Course was acquired in the course of the first half of last century.

In those days there was no road on the beach; nor the broad Marina which is the pride of Madras. Till 1846 there was no beach road at all running along the east side of the Fort. It was the prac-

for men to retire to their garden-houses in the evenings, or to take about in the Mount Road—unlike as now when they find the ride on the beach. The surf of the sea washed against the stone wall of the ditch which backed the eastern wall of the Fort. The water was within 20 or 30 yards of the wall, and the spray beat the Fort on stormy days.

Besides Triplicane the city absorbed the famous town of San Thome. San Thome had long been associated in Christian tradition with the Apostle Thomas and contained from very early times a small Christian community and Church. The Portuguese formed a monastic settlement at the place about 1522 and soon a town grew up which became prosperous, though after a time it was injured by foreign aggression and internal strife. It was a fortified place and served both as an object of acquisition and an eye-sore to Madras, and formed a veritable Pandora's Box of political and military troubles and confusion. It was successively taken possession of by the Dutch, the French, the Muhammadans of the Deccan, the French again and then the Golconda and Mughal Empire. Muslim authority was limited to the European quarter. The fortification was also of the neighbouring town of Mylapore. The remains of the fort were except fragments destroyed that not a trace of them remained to-day. San Thome was of a redoubt to the south of the city, more important than Triplicane, Mylapore, which is historically more important than Triplicane, having venerable associations with the sage Tiruvalluvar and some of the Saiva saints and Vaisnavas. The fort was acquired by the English by grant of the Nawab of Arcot after a forcible occupation by their Admiral.

Even within fifty years after the foundation of Madras, the English felt the need for expansion and acquired, after the usual protracted negotiations, in 1693 from the Mughals, the three outlying villages of Egmore and Purasawakam on the west and Tondiarpet on the north. Egmore was the first to be occupied. These three villages were long known as "the three old towns" or including Triplicane, "the four old towns." In 1708 after great troubles, Nawab Daud Khan gave a grant to the English for the five outlying villages namely, Tiruvottiyur, Nungambakkam, Vengalpet, Kottaiyam (near Ennore), and Sathangadu to the east of Triplicane. These came to be known as the five new villages as opposed to the four old towns.

In the 18th century, new settlements were made in some of the acquired villages and in the intervening spaces between

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them, mainly by the washers and the weavers of the Company's cloth. Thus rose up the weavers' village in Triplicane, now known as Tiruvettiswaranpetta, Collettpettah formed by Governor Town lett, who settled 400 weaving families therein, Washermanpettah and Chintadripettah, which was founded in 1735 as a special village for weavers, washers and painters of cloth and for the Brahmans of the temple and its other attendants. Periamet was the great Metta or place of toll-collection at which the *Sanku* dues were levied for long by the Indian rulers on the goods coming into Madras. It continued to be even under British occupation an octroi station, a land customs house with the usual *gudowns* and customs choultry.

The Choultry at Egmore was early converted into a redoubt for the protection of the Fort from attack from the interior. The redoubt fell into ruins about the close of the 18th century and the open space between it and the Spur Tank soon came to be covered with residential houses.

The village of Vepery, lying wedged in between *E* records) Purasawakam (known also as Ypere, Viperi, *Peramixt* in the was mixed up with the Company's *Peramixt* some place for receiving the Nabob's Junkam." The *English* applied for its grant, in 1695. But it was only soon after they got the old village actually from the young orphan in 1742 that they received it. That Nawab was a guest of Nawab Muhammad Said of Arcot. That Nawab was a guest of the *English* Governor of Madras at the time when his father Saffdar Ali was assassinated and he showed his gratitude to his host by granting the English the five villages of Eranavore, Sadiankuppam (both near Thiruvottiyur), Vepery, Perambore and Pudupak as well as the right of coining Arcot rupces and pagodas.

While about 1750 Triplicane was the favourite residential quarter for the Europeans and substantial residences near Government House had arisen, there were a few residences erected in Egmore and Vepery also. Edmund Maskelyne, Clive's brother-in-law obtained a piece of land in the angle formed by the precept Perambore Barracks Road and the Purasawakam High Road which was later on bought by the Nawab and which is even now called Maskelyne Tottam. Gradually the number of such residences increased not only in Vepery but also in Komalcswaranpettah, Pudupakkam, Pudupet and in the large space of ground known as the Choultry Plain. This last was the large and open area which lay to the south of the Triplicane

cane River—which lay between Triplicane and Thome Road on the East, and the long Tank on the West including the villages of Nungambakkam, Tenampet and Poyapet. It was traversed as far as the Long Tank by the high road from the Fort to the Mount. It was so called from White's Choultry which was a prominent sight in the locality, and the first residential building which was erected on the plain is supposed to be "Mackay's Gardens" built by George Mackay. There had grown up by 1780 about 500 to 600 garden houses in the Choultry Plain.

Thus through the eighteenth century the acquisition of land by the Europeans for garden houses and residences was going on to the south-west of the Fort. "As the British acquired the suburban villages, Peddapaickenpetta lost its popularity, and Triplicane rose in favour as a residential quarter. Prior to the capture of Madras in 1746 (by the French) a group of country mansions had arisen on the south side of Triplicane bridge and when the Company purchased one of them for the use of the Governor, the area traversed by the Mount Road was marked as the building site of the future. That area was the Choultry Plain where uncultivated ground was available."

The growth of residential suburbs towards the south in Adyar, and along Mowbray's Road has resulted in the expansion and extension of the city in the course of the last half a century over the area of the Adyar village and the neighbouring Guindy. The swamps and open spaces stretching southwards beyond San Thome and on both the banks of the Adyar are gradually being reclaimed and covered with very fine garden houses and residential buildings.

Towards the west we find equally virile signs of growth and expansion. The chief suburbs in this area are Perambur, Choolai, Vepery, Purasawakam and Kilpauk. The mill area is situated in the wedge between Perambur, Vepery and Basin Bridge at the north-west corner of George Town. Originally all this area was a low-lying swamp. But a portion has been reclaimed and drained by the prosperous Buckingham and Carnatic Mills, which have set an example to Indian industry in the conditions of employment they offer to their workmen. The building of railway yards in the neighbourhood of Thiruvottiyur, the large railway workshop in Perambur and similar industrial activities, though on a much smaller scale, which have grown up in this area, have converted this part of the City and its environments into what may be called pre-eminently "Industrial Madras", as contrasted with the new

residential quarters, planned on a very tempting basis and equipped with fine roads and open spaces in the reclaimed areas of the Spettan Tank, the Nungambakkam tank and the long tank of Mylapore, which has resulted in the growth of thousands of beautiful villa houses on both sides of the Mount Road and of the Poona-mallee High Road and in the open spaces intervening between these two axial highways of the city. Both these roads were military in origin and built for military purposes. The Beach Road and the Marina testify to their peaceful aims at developing trade and promoting recreation. The Triplicane—San Thome High Road is even older than the town of Madras and connects the important places of Mylapore, Triplicane and the City. Formerly it was projected across the Island by a bridge leading into the heart of Peddanaickanpetta. The last great axial highway is the Esplanade—Broadway—Tiruvottiyur High Road, leading to the north through suburbs, whose prosperity depended on their weaving activity and has now begun to show signs of decline.

George Town itself which with its brisk trade of all kinds, great banking and commercial houses and growing harbour still remains the heart centre of the expanding city. It has been separated from the Fort in the 18th century by a large area of Esplanade ground created for military purposes; and had to adjust itself consequently to the indented outlines of the Fort walls and outworks. It has as a result an indented outline itself on the south-eastern side.

The Municipality originally chartered as the Mayor and Corporation of Madraspatnam in 1687 has grown along with requirements of the expanding city and begun to take in areas which have recently grown up, particularly the new residential quarters by the side of the long tank and to the west of Mount Road across the Long Tank into the village of Mambalam. Its limits now go up to the South Indian Railway line near Saidapet. Saidapet, Guindy, St. Thomas Mount and Pallavaram, and possibly Tambaram can be deemed to be the southern out-areas of the city. Similarly all the suburban quarters beyond Perambur and upto Avadi on the west and round about Tiruvottiyur stretching as far as Ennore, may be said to form integral portions of Greater Madras.

Thus Madras has grown gradually, and in the last decade in a very wonderful and striking manner. It has had necessarily to become "the city of distances" which name it deserves in a peculiarly appropriate manner; "for within its limits there are some

magnificent spaces." The original nucleus, the native town was not laid out on any definite plan; nor was any definite scheme followed except here and there on the building of the suburbs. The City has got more than a due share of mean slums and narrow straggling streets; because it had to be allowed to grow just as it would. "But Madras is a fine city nevertheless, and with a number of stately buildings, both public and private, and with great possibilities." Its greatest charm lies in its steady growth and expansion. "The City has grown from strength to strength and in its story there is much inspiration." The electrification of the South Indian Railway's suburban service, the busy plying of motor buses along all the principal roads, and the construction of overbridges at several of the congested level-crossings, have contributed, along with the electric tramway service, to serve the needs of quick locomotion and encouraged a larger proportion of the population to live in the suburbs going into the City for their daily avocations.

Port of Madras

By

MR. C. C. ARMSTRONG,

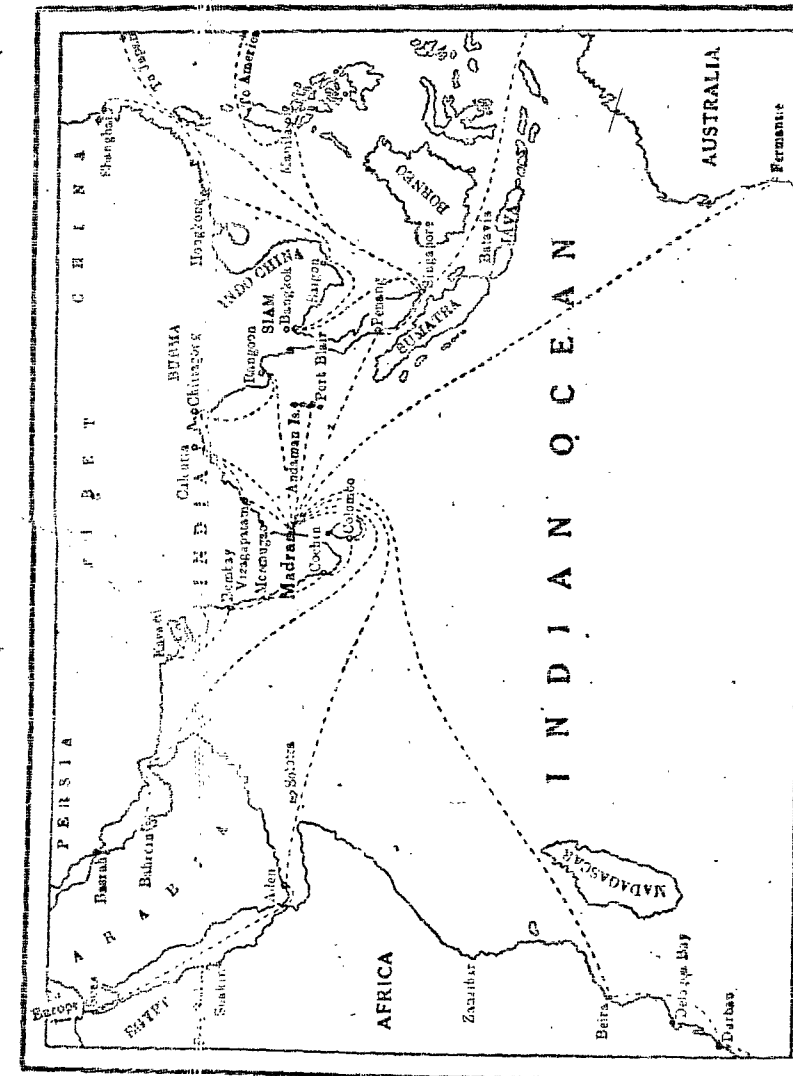
Chairman, Madras Port Trust.

Position of Madras in the World.—If we want to appreciate the geographical situation of any place, the first thing to do is to look at it in relation to the world in general, that is, to look at a map; and if we want to consider the geographical position of a port, the first thing to do is to look at it in relation to other ports of the world.

If then we take a globe showing the map of the world and turn it so that Madras is directly under our eyes, what do we see? The first thing we see is the Indian Ocean with the large country of India lying on the northern edge of it, and we see that India extends southwards towards the middle of the Indian Ocean, and that the Port of Madras is situated near the south-eastern corner of India.

Looking round the Indian Ocean we see other ports. First, in India itself there are Calcutta about 759 miles from Madras, Bombay about 1,453 miles from Madras by sea, Karachi about 1,915 miles from Madras. Then in Ceylon we have Colombo about 580 miles from Madras. Looking to the east we find Burma with the large port of Rangoon about 1,000 miles from Madras and further south Singapore about 1,591 miles from Madras. On the western side of India we have the ports of the Persian Gulf and further west is Africa with its ports of Zanzibar, Beira, and Durban; and right away down in the south across the ocean is Australia. Round the other side of the globe, and quite out of our view as we look at it, are other great ports of the world, many of them connected with Madras by links of Steamer Lines.

It is a good thing to begin our subject by making Madras appear as if it were the centre of the world, but when we come to look closely we find that Madras is only one of the ports of India and actually cannot compare in importance with its large sisters of Calcutta, Bombay, and Karachi. At the same time it can be easily seen that its geographical position near the south of India on the Bay of Bengal gives it a favourable position for exchanging



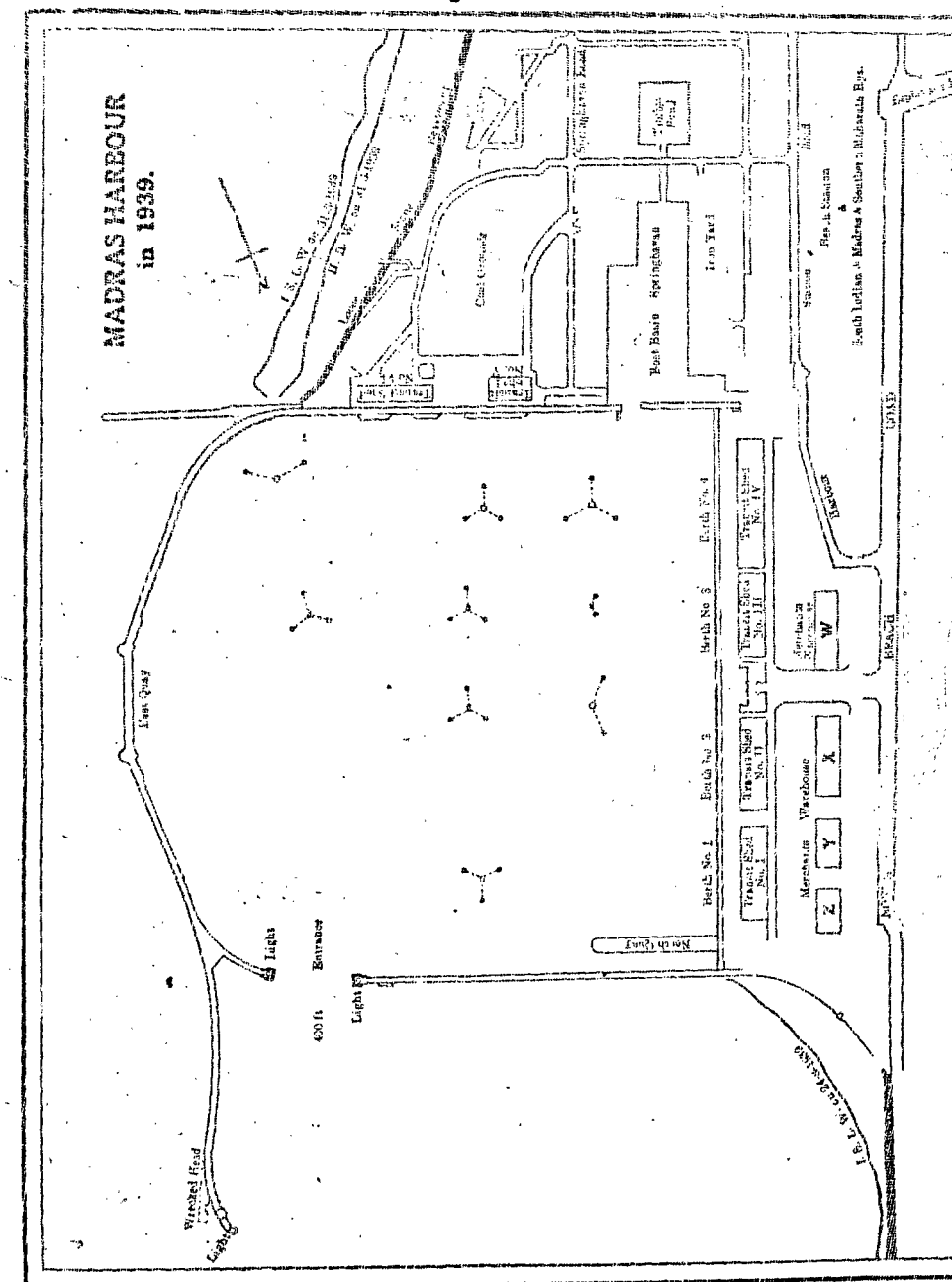
POSITION OF MADRAS IN THE INDIAN OCEAN.

trade with Burma, Singapore and the Far East, with Australia in the south and Africa in the west.

Madras Past.—Let us consider next the place itself. It is perfectly easy to see why Calcutta has become a great port. The reason is that ocean-going ships are able to penetrate 200 miles up the Hoogly River into the heart of the rich country of Bengal. Bombay again is a wonderful natural harbour with land-locked bays. Karachi also has the natural advantages of deep water combined with smooth water. Cochin, which may prove some day to be the principal Port and City of Southern India, has the advantage of smooth and deep water, a land-locked harbour, where ships can lie in safety. But what advantage has Madras got and why has this great City grown up in this particular spot?

In the south-west corner of France in Europe on the borders of the Atlantic Ocean there is a large port which owes its existence to the fact that a broad navigable river at this point runs into the Atlantic. And there is a well-known saying in that part of the country that, if the river had only chosen, she could from her source in the hills very well have run in a different direction and not at all into the Atlantic Ocean and that, if this had come about, the great port would never have existed. But the river did not wish to go elsewhere and so the great Port of Bordeaux came into existence.

The beginnings of Madras were apparently even more accidental. An English sailor named Francis Day cruising along the coast of Coromandel looking for a convenient place in which to open a trading station, found a bare sand bank next to a pleasant stream flowing into the sea and protected by a marsh behind the sand bank, and he came in and settled there. The sand bank became the foundations of Fort St. George; the marsh was drained and became the Island which we all know so well and the pleasant stream became in course of time the muddy and sometimes offensive river Cooum. From its earliest days Madras was a port. That was the reason for its existence; to do trade between India and the world outside India. But, though it was a port, it was by no means a harbour. Ships used to lie without any natural protection outside the Fort opposite the Legislative Council Building, quite close to where the sea used at times to break into the Fort moat. Ships could only come here when the winds in the Bay of Bengal were favourable and, when there were storms, they were frequently wrecked.



As the City of Madras grew and the Fort became too small for all the activities of the citizens, the present George Town began to grow, the Custom House was moved up to its present site and the ships left the front of the Fort and came up northwards to the site of the present harbour. Then, 250 years after the founding of the port, the Madras Harbour was built.

Now, why has Madras, the Capital of this great Province, never achieved the size and wealth of Calcutta and Bombay? The reason is partly in her port and, if you are going to understand at all the reason why Madras Port is so much smaller than the ports of Calcutta and Bombay, you have got to realise first of all that these two latter have always been natural harbours and that, while full protection to ships is given by nature at Calcutta and Bombay, at Madras no protection to ships has been given by nature. The whole of the protection enjoyed by ships in Madras to-day has been provided by the efforts of the Government, the Traders and the Engineers, all of whom did their part in building the Madras Harbour. There are no doubt other reasons—there are plenty of historical ones—why the City of Madras is not so great a City to-day as Calcutta and Bombay; but, apart from these reasons, the hand of nature, in failing to give ships the shelter of a harbour at Madras in the old days of sailing ships, has had a great deal to do with limiting the size and importance of our City.

Madras Present.—Madras is situated in the middle of the east coast of India. I believe that this east coast is a steadily eroding coast, that is the action of the waves persistently washes away the sand of the sea shore and the sea encroaches on the land. But what the coast loses from the action of the waves is made good by the soil brought down by the big rivers such as the Godavari, Kistna and Cauvery. Throughout the year the sand of these rivers is being washed by wave action northwards or southwards along this coast. During the south-west monsoon the wave action washes the sand northwards and in the north-east monsoon it washes the sand southwards.

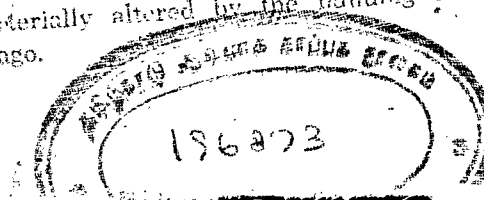
Any obstruction built out into the sea from the shore stops this sand movement and the sand begins to accumulate up against the wall or whatever the obstruction may be. As the movement from the south continues for more months in the year than the movement from the north, the effect of any obstruction built out into the sea, as for instance at Madras, is for sand to accumulate on the southern side of it and to tend to disappear from the

northern side. So we have land accumulating south of the Madras Harbour and subsiding into the sea north of it.

When the building of the Madras Harbour was under discussion this natural fact was perfectly well-known and one of the original proposals was not to build a harbour enclosed by walls but simply to build a break-water parallel with the shore and about 1,200 yards from it; the idea being that ships could come and lie in fairly smooth water between the breakwater and the shore, but the actual movement of the sand up and down the coast would not be interrupted. However, there were many objections to that scheme, and the extent to which the sand would accumulate against the obstruction of the harbour walls was not thought to be serious. So the harbour was built in its present form.

The first harbour was finished in the year 1889, but unfortunately the rate at which the sand would accumulate on its south side was underestimated and in a very few years the sand began to obstruct the entrance of the harbour, which in those days was on the eastern side of the walled enclosure. It was, therefore, decided to do what should have been done in the first place and that was to make the entrance to the harbour on the north side instead of the east. This was done, only the two towers flanking the eastern entrance were left standing as they are to-day, the gap between them was filled up and the northern entrance opened in the year 1910. But again only fifteen years later it was found that the sand was accumulating at a rapid rate south of the harbour and there was fear that it would begin to obstruct the northern entrance also. So an additional arm, now called the Sand Screen, was built out eastwards in extension of the south groyne of the harbour in order to prevent the sand being washed across the entrance. This has been effective so far, but there is reason to fear that it will not be effective for many more years and that further measures will have to be taken. This important question is now engaging the attention of the Port Trust Board.

At the same time as sand is accumulating on the south side of the harbour the coast is being washed away on the north side and probably what has been washed away is nearly equal in quantity to that which has been added to the land south of the harbour. About 500 acres of new land have been added opposite the Fort, Royapettah, Triplicane and Mylapore; in fact the whole sea front of Madras has been materially altered by the building of the harbour half a century ago.



From sand-storms let us pass to cyclones. It may be said that Madras is famous for its cyclones, and yet it is a very curious thing that cyclones almost never strike Madras with their full strength. Their centre nearly always crosses the coast of India north of Madras, usually towards Masulipatam, or south of Madras in the neighbourhood of Cuddalore. It is probable that the shape of the eastern coast of India has something to do with this, for at Madras the coast bulges out slightly to the east and leaves Masulipatam on the north and Cuddalore on the south in bays. In the last eleven years that I have been connected with the port, certainly twice and I think more often, a cyclonic storm has approached from the Bay of Bengal and was apparently destined to pass right over Madras, but on each occasion the cyclone got weak and petered out before it reached the coast. On the other hand much the most serious storm of recent years, that of November 1930, had its centre at Cuddalore one hundred miles to the south of Madras and the previous bad storm of 1916, when the outer arm of the harbour was washed away, was also a Cuddalore cyclone.

It is very fortunate that it is tolerably easy to predict the movement of these cyclonic storms. The port always has warning when a cyclone is beginning to form. It usually starts as a depression somewhere in the Arabian Sea moving west or north-west and it may take anything from twenty-four to seventy-two hours to come across the Bay of Bengal. A cyclonic storm consists of strong winds blowing in a circle and the centre of the circle is the core of the storm. These winds always blow in a particular manner that is, in a contrary direction to the movement of the hands of a clock. This circle of winds, which is commonly known as a cyclone, moves across the Bay gradually increasing in strength and, when it reaches the coast, dissipates and brings down torrents of rain. Any ship in the Bay passing near one of these storms can tell by the direction of the wind whereabouts the centre of the storm is because the winds always blow in a direction contrary to the movement of clock's hands. The ship is therefore able to give a wireless message to the Meteorological Station at Madras giving approximately the position of the storm, information as to where the storm is, which direction it is moving in and whether it is a serious storm or not. All this information Calcutta gets by wireless from ships in the Bay and passes on to Madras. Therefore, long before the storm reaches Madras, the Harbour Authorities here know about it and are able to take precautions against high winds, heavy rain and rough sea. Cargoes

are carefully protected, cranes and railway wagons are fastened down securely and all small craft are moved into the protection of the Boat Basin.

There is a great contrast between the Port of Madras before the harbour was built and the Port as it is to-day, when one of these cyclonic storms is in action. Fifty years ago there was no protection whatever in the Madras roadstead and, if any ship remained near the shore, it was likely to become a wreck should a cyclone blow up. So, when there were indications of cyclonic weather, though in those days there was no wireless to give exact information, all ships went away from the coast and out to sea. Now-a-days ships can lie throughout a cyclone in the harbour and they usually do so. But old customs die hard and even to-day some ships, when there is a storm coming, leave the harbour and go to sea. There is, we may admit, some sense in this because, although the harbour may protect the ships to a very large extent, it is not a comfortable place when a cyclone is blowing and ships cannot work their cargoes without great danger of damaging them; so it is reasonable that ships should, so far as possible, avoid this port during a cyclone. But the difference I wish to emphasise between ports on this coast and those on the west coast of India is that, while ships on this coast can avoid bad weather, those on the west cannot do so because the bad weather of the south-west monsoon lasts for several weeks, and there is no avoiding it.

Further, I want to emphasise the difference between a harbour in old days and a modern port. In old days ships looked to harbours for protection against storms but they need not trouble as a rule to do this now. A modern port is not essentially a harbour of refuge from weather but it is essentially a place where cargo can be moved between ship and shore easily, quickly and without undue damage. The history of the Port of Madras is the story of the development, not so much of a harbour in the old-fashioned sense, where small ships may run for shelter in sudden storms, as of a modern port, a centre of trade with easy communications to the surrounding country and up-to-date equipment and facilities.

Madras Future.—We have looked at Madras Past, her origin and growth; we have considered Madras Present, her position on the Indian Ocean and her trade. What of Madras Future? It is one thing to make assertions about the past and the present. What we say can be based on evidence. It is quite another thing to make assertions about the future, for these cannot be based on actual evidence and proved facts but only on conclusions and

opinions. Therefore, if you find yourselves unable to agree with my conclusions as to the future of Madras, I do not mind at all. In any case you, being young men, will see much more of the future than I shall; the future belongs to you. But my conclusion, based on the past history of Madras and her present standing, is that her future depends upon her trade, specially her overseas trade.

I must remind you again, Madras has not very great geographical advantages. It enjoys fine weather most of the year without heavy rain or violent storms and it is centrally situated in the Presidency and has easy access to the great States of Mysore and Hyderabad. But it has only a small harbour; no very rich country lies behind it; no great natural mineral wealth has been discovered in the rocks or soil. Her one claim to future greatness lies in her trade. The harbour has been built by man; the railways and great highways converging on the City have been laid by man; and all has been done in the interest of trade. Madras is at present the great distributing point of merchandise for Southern India, and this she owes very largely to her overseas trade. For the larger part of the big shops and mercantile business of the Presidency is in the City of Madras. It is true Madras has also become the centre of Government, of education, of culture and of social life of Southern India, but she would soon cease to be the centre if she lost her trade. Her industries would disappear, her wealth decline and grass would grow in the streets. Therefore we must preserve our port and foster our overseas trade, for without them Madras would soon disappear into the back pages of Indian history.

The Industries of Madras

By

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The City of Madras has been growing on residential rather than on industrial lines and her industries, such as they are, reflect largely this aspect of city life and serve to meet what are predominantly local needs. Much of the city's importance arises from its being a capital town and in recent years it has tended to draw a large number of residents who have chosen to settle down permanently in the city on account of the amenities it provides in the form of educational institutions, amusements, etc. Although within the Presidency it always occupied the first place among the port towns, it had no natural harbour and only the expenditure of immense sums of money has created a safe harbour whose success from the financial point of view depends on the volume of the export and import trade which passes through it. The development of the Cochin harbour has to some extent undermined its dominance, but there is no reason to fear that it will at any time become a port of mere secondary importance.

Just as a country's exports give a clue to the nature of its industries, so also a city's exports will enable one to understand its industrial importance. Judged by the nature of her export trade which consists predominantly of raw materials and foodstuffs, the city has no fundamental or even major industries to boast of. The absence of coal and iron in close proximity to it or even within the Presidency has imposed a permanent handicap on its industrial expansion, which all the recent developments of hydro-electric power in various parts of the Presidency have done nothing to remove. The city's industrial power is still unduly costly and while it may be expected that in the years to come Madras too will be connected with the proposed electric grid system, that time is not yet come. In the meanwhile certain other centres like Coimbatore, Mettur and Madura are forging ahead and ousting Madras from its pride of place as the foremost industrial city.

Industries, organised or unorganised, which are special to Madras and which do not arise from the necessity of supplying merely local needs are the cotton textiles, handloom weaving, tanneries,

bidi-making, matches, aluminium and one or two others. A review of these industries will show that they are by no means either large in scale or of basic importance, although in regard to tanneries, Madras occupies a very important place.

Cotton mills.—Considering the fact that the textile industry was a long established one and that the two surviving mills were established over 70 years ago, the industry has had an arrested development. The number of mills in 1911 was 4, in 1921 it became three and now with the closing down of one of the mills there are only two left which are in the hands of one industrial company. The number of workers employed in these two mills, the Buckingham and Carnatic Mills is over 11,000, mostly men and boys. No woman is employed in factory work. The labour for the mills is recruited locally and during the last 15 years almost entirely from their own mill school where boys of the mill workers are trained and taken on to the factories as vacancies occur. In this respect Madras differs greatly from Bombay or Calcutta where labour comes from long distances, is migratory and constantly changing. In Madras on the contrary the labour force is local, stable and permanent. Apart from the special steps taken by the textile mills to get a stable labour population, the main reason for its stability and permanence is that the needs of the textile industry can be more than met by the available industrial population within the city.

Perhaps the main factor explaining the lack of any expansion of the city's cotton mill industry is that compared to certain other centres in the Province, Madras had no special advantages of location. Coimbatore and Madura are nearer the regions of raw cotton and also the consuming markets. It is only if an industry has an export market its location at a port town will confer on it any comparative advantage. More recently however the expansion of Coimbatore and other centres has to be explained by the superior access to cheap electric power which those regions have come to enjoy. Still although judged by the number of mills, Madras is very poor, the output and quality of the goods turned out at these two mills have won for them a very pre-eminent position in the country, and the cotton goods sent out from these mills have a very wide market all over India.

Handloom Weaving.—Although power using cotton mills are few in the city, Madras exports through its port a large quantity of hand woven goods of special kinds known by the trade name of Madras Handkerchiefs and Lungis which in 1937-38 was valued at Rs. 119.82 lakhs. In 1924-25

the total trade amounted to 255 lakhs but since then there was a great decline. Not all is manufactured within the city. The bulk come from inland centres. Out of about 40,000 looms engaged in the manufacture of Handkerchiefs and Lungis, about 9,000 alone are estimated to be in and around Madras city. The weavers are skilled men with knowledge handed down from generation to generation but are entirely in the grips of the capitalist middlemen, who supply them with materials and market the goods. Whereas here the markets are overseas and the materials or fabrics expensive the independent weaver disappears altogether as he does not command credit or organisation for the purchase of materials and for marketing his wares in distant markets. The lungis and kailies are exported to Strait Settlements, Ceylon, F.M.S., Java, Sumatra, Burma; etc. Madras Handkerchiefs are chiefly produced in districts around Madras, viz., Chingleput, Nellore and Chittore. The trade is in the hands of half a dozen exporting firms in Madras who operate through their Dubashes or contractors who arrange from the supplies. These latter in their turn deal with middlemen contractors who are either capitalist weavers or the local cloth or yarn dealer. The weavers belong mostly to the Devanga and Baliga communities.

Tanneries.—Tanned hides and skins have been known to be one of the most important articles of export from Madras port for over 75 years. As long ago as 1875 the value of tanned hides and skins exported was about Rs. 1½ crores, while for the ten years before the War the annual average was about Rs. 4 crores divided equally between hides and skins. The export trade was subject to violent fluctuations after the war. The Madras trade in tanned hides came down from Rs. 6 crores in 1919-20 to less than a crore of rupees in 1921-3 owing to the post-war collapse in trade and went up again to 4 crores in 1927-8. Tanneries are distributed all over the Presidency, but Madras city is the centre of the largest group of tanneries numbering about 200 of various sizes. The biggest among them, not only in India but in the East, which manufactures finished leather goods, is the leather factory at Chromepet managed by Messrs. Parry & Co., whose founder Thomas Parry was also the first to start a tannery on improved lines. The old indigenous method of tanning was improved upon by one De Susa of Pondicherry who used myrobalans as the tanning material. The large number of livestock in the province, the availability of the cheap tanning material, the skill of the tanners and the facilities for export were responsible for the growth of tanneries in Madras. Although tanning is not permitted within the city itself, its outskirts and surrounding villages contain a number of tanneries. In the north near the coast, Thangal

and Tiruvottiyur have a large number engaged in skin tanning and it is in this region that all the fresh skins from the Madras slaughter houses are tanned. At Madavaram and Sembiam on the north trunk road there are also a considerable number where both hides and skins are tanned. At Kodambakam on the S.I.R. line a number of tanneries exist which are engaged chiefly in the tanning of hides, although a few of them also do skins. Further along this line and on the south trunk road over a hundred tanneries working both hides and skins are located at Pallavaram, Chromepet and Meenambakam. Altogether these tanneries employ about 5,000 workers. Almost all are owned by Muhammadans but the workers are predominantly Hindus—chiefly Chakkiliars, while a few are Christians.

To the Department of Industries, Madras, belongs the credit of having proved the success of chrome tanning and after its successful experiments the tannery at Sembiam was handed over to a private capitalist. The chrome leather industry is now firmly established in this Presidency.

Aluminium Factory.—There is one aluminium factory working in Triplicane known as the Indian Aluminium Company making aluminium vessels. It obtains its raw materials from England and Belgium. The manufacture of aluminium vessels was first experimented upon in 1908 by the School of Arts, Madras. From the outset there was a good demand from the Military authorities and from Europeans for aluminium vessels and by establishing agents and subsidiary workshops at various places the Indian demand was also stimulated. In 1909 the Indian Aluminium Company was formed which worked in conjunction with the Department of Industries; in 1903 the Company took over the entire plant, etc. The only major advantage which Madras city possesses in regard to the making of aluminium vessels is that of market. No other company has since come into existence.

Bidi Industry.—Madras city takes a prominent place in the manufacture of what are called bidies, which are tobacco dust rolled into a cigarette-like thing on thumbi leaves. The leaves for rolling come from Hyderabad and the dust from Surat and Belgaum. Although the industry is carried on in several other parts of the Presidency, Madras has a preponderant share. The industry seems to be founded entirely on cheap boy labour and owes its continued expansion to that factor. In the city large numbers of poverty-stricken workers live who are willing to let their children be employed at miserable wages for long hours. No adult worker can hope to earn a living wage even by working 12 hours. It is also the case that

parents pledge the labour of their children in return for a certain sum of money paid to them. The industry is truly parasitic one of which the city has no reason to be proud.

The industry is in the hands of a few big capitalists who purchase the tobacco and the leaves and distribute them among the large number of bidi-makers scattered over the city but somewhat concentrated in Triplicane and Washermanpet. They work through middlemen who actually employ the workers; pay their wages and control the conditions of work. The bidies are taken to the capitalists who pay them by the piece. Bidies have a wide market in India and are also exported. There are over 1,000 little bidi makers in the city. The workplaces are insanitary and congested and the accommodation insufficient for work to be carried on comfortably. The industry is left entirely uncontrolled and it is time that some kind of control is exercised over it.

Match factories.—Only in recent years did Madras city start three organised match factories although the consumption of matches in the province is very large. The biggest factory is that of the Western India match factory at Tiruvottiyur employing about 800 workers and turning out an output of about 1½ million boxes a day. The other two factories are located at Tondiarpet and at Washermanpet. The veneers for splints and boxes are got from Palghat and the remaining processes are carried on in the factories.

Pencils and Glass.—Besides the above there is a pencil factory which was first established by Government and later handed over to a private company. On the outbreak of the war some pencil making plants which had been abandoned were taken over by the Department and pencil manufacture was resuscitated in 1915. The services of an expert were secured and the pencils were so satisfactory that an annual sale of 84,000 dozens were effected in 1919. The factory now employs 50 workers and supplies pencils of various kinds to Government departments. There is also a glass factory at Tondiarpet started by a glassware merchant. The availability of good sand at the place and the cheapness of site were responsible for its location and the factory turns out glass chimneys, domes, and other ware. It employs about 100 persons daily and its output is valued at Rs. 72,000. A drug factory at Vepery manufacturing tinctures, drugs and other chemicals and employing about 50 persons completes the list of these miscellaneous industries.

It will be seen from the above that Madras cannot claim to possess any large number or variety of industries which are in any sense special to it. Its most distinctive industries are tanning, hand-

loom Handkerchiefs and Lungis, and bidi-making. The tanneries are located outside the city and although Handkerchiefs and Lungis are handled in the city for export to other countries, the actual work of weaving is carried on in surrounding districts as well as elsewhere. Its most dominant industry, i.e., the bidi industry, is an unhealthy trade in every sense of the term. It will however be a serious misconception to conclude that the city has therefore no considerable industrial activities to its credit. On the contrary, the city is making rapid strides in the extension of its activities in various directions. What is significant and gives the key to a proper understanding of the subject is that the kind of industries which predominate in the city are those designed to meet the local needs of a growing population whose consumption of goods of various kinds is markedly increasing. Each large city has thus its own local industries but in Madras these are far and away the most important.

What are the predominantly local needs of a city population? They are food, well-drained, lighted and ventilated houses, furniture, clothing, amusements of various kinds, books and newspapers, transport facilities to enable people to go to and return from their places of work and a few others. Corresponding to the above we have in the city bakeries (but in view of the city's consumption of rice, not many), hotels and restaurants, brick industry and house-building industry, furniture trade, a few clothing mills but a large number of tailors and laundries, shaving saloons, printing presses, film industry and picture houses, road and rail transport industry with their numerous workshops, electric industry and others. The city employs a large number in trade and distribution of goods of various kinds to the citizens. Some idea of the way in which the people get their living may be seen from the fact that out of about 1 lakh of earners in occupations in the city

12,000 are employed in hotels and trade in foodstuffs
 12,000 in domestic service
 7,000 in cotton spinning and weaving.
 5,000 as limeburners and masons
 5,000 as carpenters
 5,000 as printers.
 5,000 as jewellery makers
 4,000 as tailors
 2,000 as barbers
 1,500 in electrical works
 3,000 as private motor drivers

4,000 as bidi makers
 8,000 in bus and rail transport
 2,000 as blacksmiths

and a large number, about 25,000 as general labourers. The list does not include clerks, professions, etc. Besides the above there are large numbers employed in laundries, garages, repair shops, furniture trade, etc.

Few of the above trades can be said to be either large or organised. Of those which employ about 20 workers and engage power, the most important are the various workshops and printing presses.

Workshops.—No modern city can be without its own engineering workshops, electric and mechanic. The M. & S. M. Ry. has the biggest workshop at Perambur, employing over 2,500 workers. Besides the Perambur workshop, there are others in the city of which the most important are (1) the P.W.D. workshop, Royapuram, (2) Madras Port Trust Workshop, Harbour, (3) the Corporation Workshop, (4) Massey's, (5) Crompton's, (6) Union Cars, (7) Simpson's, (8) Addison's, (9) Beehive Foundry, (10) Binny's. All kinds of mechanical and electric work are undertaken in these shops and they are a necessary adjunct to the transport industry.

Printing Presses.—There are about 60 presses distributed throughout the city; but the bigger ones numbering 12 are mainly in Mount Road and George Town. The total number employed in the presses is about 6,000. The largest presses are the Government Press, the M. & S. M. Ry. Press, the Addison Press, the Premier Press, the Associated Printers, the Hindu and the Madras Mail.

Tailoring.—Tailoring and dressmaking employ a large number of workers in the city. According to the census of 1931 there were about 4,000 tailors who are distributed all over the city but are predominantly found in Triplicane and George Town. The fact that they are near colleges and residential centres and the further fact that most of the shops where cloth is sold are located in George Town explain the location of the tailoring industry. It is estimated that there are about 600 to 700 tailoring shops in the city but 50% of them are small ones containing less than 3 workers including the master tailor. The bigger shops containing over 10 workers are few in number, probably not more than about 20. Unlike as in England there are very few cases where the tailors themselves own cloth-shops as adjunct to their business.

The Muhammadans form more than half of the proprietors of the tailoring shops; next come the Mahrattis and then Mudaliars. A few Brahmins have also taken to tailoring. Although children are employed in tailoring, they are taken as apprentices and there is no exploitation of child labour here as in bidi shops. The only serious problem in tailoring trade is under-employment and unemployment. Work is available only for 3 or 4 days in the week and consequently the earnings—though not the wage rate—are very low.

Metal industries.—Park Town, Tiruvateesvaranpet and Triplicane are important centres of domestic brass and copper vessels. The workers are mostly Kannars numbering about 150 to 200. They are supplied with sheet metal by dealers and are paid by the piece. There are also two factories employing power which manufacture patented brass cookers and other vessels, viz., the Rukmini Cooker factory and the Kerala Cooker factory.

Steel Trunks, locks, hinges, iron safes.—These give employment to a considerable number of workers. They are made predominantly in Mannadi, Washermanpet and Wall Tax Road. Nearly a thousand workmen are engaged in the making of these goods. They do their work to the orders of the middlemen-traders who supply the materials and take the finished goods.

Jewellers and goldsmiths.—A prosperous city must have its own jewellery shops where the workmen belonging to the asari caste work either independently or at the direction of capitalists. These little shops are distributed all over the city, although the bulk of them are in China Bazaar and Mint Street. The owners are mostly Marwadis and Komatis who supply the material to the workers and take back the worked articles on payment of wages by piece. It is estimated that there are about 400 to 500 workers living in this way; but the high price of gold has recently caused a serious decline in the volume of their business.

Wood and Rattan Work and Furniture shops.—There are over 4,000 carpenters and wood workers who make doors, windows, furniture, etc., and work under contractors. Many of the furniture firms are located in Rattan bazaar, Mount Road and Mannadi and do a fairly prosperous business. As the people's standard of living increases, the demand for furniture also increases. Another industry which also is likely to expand its activities is the sandal-making and shoe-making business. Although Madras is very unlike a northern India city in that most of its citizens walk bare-

footed, there has been a definite change of fashion in this matter in recent years and the increasing number of shoe-makers in the city bears testimony to the shift in demand.

It is not necessary to refer in detail to the host of miscellaneous little trades and industries of which Madras like every other city abounds. Madras gets its fuel of casuarina wood from Chingleput District along the Buckingham Canal and employs a large number in transporting the firewood from the surrounding areas to the city. Similarly the large coast-line of the city gives employment to a number of fishermen who earn their livelihood by fishing. The recent expansion of activity in house-building has led to a number of little brick works at Aminjikarai and other places where the availability of suitable clay has attracted the industry and the allied industry of lime-burning, pottery, etc. The city has a large and growing number of cinemas and theatres and the number of film producing companies is on the increase. The increase in the number employed as motor drivers, conductors and inspectors points to the growing off-road-transport within the city.

Conclusion. From the foregoing it will be observed that Madras has few special industries of note. Its export trade reveals little of manufacturing activities. Even the large export of Madras handkerchiefs and lungis from Madras Port is of goods manufactured predominantly in other districts than Madras. Tanning of hides and skins is the only industry of note, although even here it is more a collecting and exporting region rather than a producing region. Most of her industries serve only local needs and arise out of the necessity of having to supply the needs of a vast city population, which in 1941 may reach 750,000. The industries are generally speaking small and are widely scattered. Land values are not after all so forbiddingly high as to compel a factory to shift to the outskirts. Further the workshops which are the largest factories have necessarily to be located within the city, as distance away from the city will be a serious handicap. The smaller establishments have perhaps even greater chance of success than the bigger ones, as in most cases they are able to take advantage of local conditions and are sometimes free from taxes and other burdens than the bigger ones.

The industrial importance of Madras can grow only when its present handicap arising from costly fuel is removed by the introduction of cheap hydro-electric power. Even then it is doubtful if it will be able to develop many of the basic industries as apart from power they require productive factors in the shape of capital, and business ability which are, by no means, superabundant.

Fruit Supplies of Madras

By

H. G. PUNJA, M.A., Dip. Econ.

Madras with its vast population of 6½ lakhs consumes a large quantity of fruits, but up-to-date and reliable statistics in regard to the supply of fruits to the city are not available. A rough idea of the quantity imported can, however, be had from the following figures. In the months of December 1934 and May 1935, Madras imported the following quantities of fruits.

Name of fruit.	Quantity imported in December 1934.	Quantity imported in May 1935.
Apples.	2,851 cases.	—
Kamala oranges.	8,047 baskets.	3,694 baskets.
Sathgudi and other light-skinned oranges.	7,751 „	283 „
Grapes.	950 pots.	565 pots.
Sapota.	46 bags.	202 bags.
Custard apples.	88 baskets.	—
Pomegranates.	454 „	—
Mangoes.	—	52,538 baskets
Musumbi and figs.	—	+ 4 wagon loads. 255 baskets.

But the above figures cannot be taken to represent the entire imports of fruits in those two months for they do not include the import of plantains and the fruits supplied by lorries and bullock carts. As there has been an increasing supply of fruits by lorries in recent years the above figures cannot give an accurate idea of the present supply. The entire orange supplies of 1934-35 are estimated at 83,760 maunds consisting of 37,860 maunds of Kamala oranges, 35,000 maunds of Sathgudi, 7,000 maunds of Batavian, 4,000 maunds of Salem oranges and 400 maunds of African oranges.

It is estimated that Madras now consumes annually about 300,000 maunds of plantains, 100,000 maunds of oranges, 4,500 maunds of grapes and 4000 maunds of apples. In regard to mangoes, which ranks next in importance to plantains no estimate appears to be possible, for in addition to imports by rail, we receive large supplies by lorries, bullock carts and in head loads. Besides almost all the gardens within the city have a considerable number of

mango trees. The quantity imported and consumed within the city of Madras is considerable as may be inferred from the quantity supplied by rail in the month of May 1935. In addition to the above mentioned fruits we receive several other fruits in varying quantities.

Madras is by far the largest fruit consuming centre in the presidency. Fruits from distant overseas countries, as for instance California in the United States of America, S. Africa, Japan and Australia are imported into the city. In regard to home-grown fruits, even places in remote corners of India such as Quetta, Chama and Kashmir supply fruits to Madras. But the bulk of the supply comes from places within the Presidency. Thus we get our supply of fruits from all over the world, high-grade fruits like apples grown in distant countries down to word apples (Vilam palam) grown in the gardens of Madras can be found in the Madras market.

Of the fruits that are universally consumed in Madras, plantain is the most important. It is found here in abundance all through the year. It is one of the cheap fruits within reach of the poor class of consumers. In regard to this fruit the Madras market is supplied by places served by the South Indian Railway, mainly Cuddalore in the South Arcot district, Tiruvadamardur in the Tanjore District, Karur in Trichinopoly, Dindigal in Madura, places round about Namakkal in the Salem district and Coimbatore. In addition we receive supplies of Nendram plantains from the Malabar district.

Mango ranks next in importance to plantains. We have a very large average under mangoes in this Presidency. Of the total acreage of 7½ lakhs under fruits and vegetables an acreage of nearly 2.5 lakhs is under mangoes alone. We receive large supplies of this fruit from all over the Presidency, but the bulk of the supply comes from the neighbouring districts of N. Arcot, Chittoor, Salem, Cuddalore and Gingelput. The most important consigning centres are Tirupattur, Vandyambadi, Jalarpot, Gudiyattam, Vellere, Pudi Pottur, Tiruttam, Chittoor, Negori, Chinnapatnam, Krishnagiri, Salem, Dharmapuri, Kuppam, Solapur, Oorambadi, Koduru, Nandlur, Sittigunta and Ponnampet. Madras receives some of the finest variety of mangoes from the Northern Circars. From outside the Presidency we receive our supplies of mangoes from Mysore.

Mango has a short season of four to five months in summer. This fruit comes to the market when the supply of other fruits is

not plentiful. As the Madras market receives its supply from all over the Presidency, we have this fruit in our market from April to September and at times in October too. This is because we get our supply from places having an early crop as for instance Malabar and also from places having a late crop. It is not uncommon to find small supplies of mangoes in the Madras market even in November and December. These come from places enjoying a second crop, for instance, Tinnevely. We get the heaviest consignments of mangoes between the middle of May and middle of June.

Citrus fruits (Loose jacket or Kamala oranges).—Madras consumes oranges to the extent of 100,000 railway maunds annually. Of the various varieties imported into the city the loose-jacket or the Kamala orange ranks first. This contributes nearly 45 per cent to the total supply of oranges. The biggest source of Kamala orange is Nagpur in the Central Provinces. The Northern Circars rank next in importance. From about October to January we receive fairly large consignments of oranges from Anakapalle, Narsapatam and Rajahmundry. During this season Nagpur also sends fairly large consignments. Of the 8000 baskets received in December 1934, about 4500 baskets were from Nagpur and the rest from the Circars.

There are three distinct seasons for the Nagpur oranges. The first season is what is known as *Hati-bahar*, which lasts for a short period from June to July. We receive very small consignments during this season in the Madras market. The second season is the *Ambi-bahar* which lasts for about four months from about October to January. On certain days during the season consignments of nearly thousand baskets arrive in the Madras market. The third season is the *Mrig-bahar* and it is the most important season lasting for about three months from February to May. We receive large supplies of oranges during this season. A daily supply of 3 to 4 wagons, each wagon containing 120 to 160 maunds is not uncommon during the height of the season.

• **Tight-skinned oranges (Sathgudi, Batavian, Musumbi and sour oranges).—**The Sathgudi is the most important of this class of fruits and is the most popular with the Madras people. There has been an ever-increasing demand for this fruit in Madras. Sathgudi can be found in our market practically all through the year except in April and May. The bulk of the supply comes from Cuddapah, Chittoor and North Arcot districts. There are two seasons for the Sathgudi oranges, the *angam* and the *gyrangam*. The main season is the *angam* which lasts for about eight months

from August to March. It is during this season that we get heavy supplies. The peak consignment comes in some-time after the middle of September and before the middle of October. The second season, the *gyrangam* is a short one and lasts for about three months from June to August. Thus we continue to get Sathgudi oranges from June right up to March, with an upward trend till about the middle of October, and a gradual decline thereafter.

During the rush of the Sathgudi season i.e., from September to December, the supply of other tight-skinned oranges is very limited. The quality of these fruits in comparison with Sathgudi is inferior and there is therefore, very little demand for them during this season. Consequently the price obtainable for these fruits in that season would hardly meet the cost of transportation. In the off and slack Sathgudi season we get these fruits. Of these the Musumbi comes from Poona (Bombay presidency), the Batavian from the Circars and the sour oranges from Salem. These fruits find a ready sale in the off-Sathgudi season. The sour oranges because of their poor quality and low price find a sale among the poorer class of buyers. At times unscrupulous vendors sell these as Sathgudi.

Among the other fruits that are imported but not in such considerable quantities are apples, grapes, melons, pineapples, sapotas, custard apples, pomegranates, plums, papayas, peaches, grape-fruits, pears, guavas and jack-fruits. Fruits like apples, pears, peaches, grapes and grape-fruits require special climatic conditions for their culture. They are, therefore, rare and too costly to enable even the richer class of people to go in for them. Cheap fruits like custard-apples and guavas are not popular with the Madras public. Of the costlier fruits the apple is the most important. The supply of this fruit to the Madras market is estimated at about 4000 railway maunds. It is a fruit grown in the temperate regions. As Madras grows very little of this fruit, it is but natural that we do not have a plentiful supply of them. All the same, we find apples in the Madras market all through the year. We import the bulk of our requirements in this line of fruits from foreign countries such as the United States of America, Japan, South Africa and Australia. We also get some supply of apples from Kulu in the Punjab, Kashmir, Bangalore and the Nilgiris. Out of 2851 cases received in December 1934, 2100 cases came from the United States, 600 cases from Japan, while only 151 cases came from Kashmir. Apples from South Africa and Australia (countries of

the Southern hemisphere) arrive in the Madras market during summer months, when there is less competition from other sources.

Grapes.—These fruits are imported into the city from Chaman, Quetta, Krishnagiri, Kodaikanal and Bangalore. The quantity imported from Northern India is estimated at about 4000 maunds. But on account of the high transportation costs there appears to be a decline in imports from Northern India. We receive a small supply of this fruit from Australia as well. By far the best variety comes from Chaman and Quetta and we get the bulk of the supply during September and October. Grapes received from within the Presidency are not of such good quality as those received from Chaman and Quetta.

In addition to the fruits mentioned above, Madras gets supplies of melons, pomegranates, pineapples, plums, pomeloes, sapotas, custard-apples, figs, pears and papayas, jack-fruits and guavas in varying quantities. Cuddapah supplies melons from January to March. Pomegranates are imported from Coimbatore, Madura, and Chaman; sapotas from Samalkota, Pithapuram, Anakapalli and Rajahmundry; figs from Rajahmundry (Bombay presidency); Custard-apples from Kuppam and Gudupalle; pears from the Nilgiris; and plums from Mirzapur.

The bulk of the fruit supplies of Madras comes from within the Presidency. The fruits that are received from outside the Presidency are apples, grapes, Kamala oranges, figs and pomegranates. The quantity of fruits received from sources outside the Presidency is, however, comparatively small. The imports from outside continue either because of their scarcity within the Presidency or of the superior quality of certain fruits.

Madras is importing fruits in increasing quantities in recent years. Taking into account the vast population of the city, the quantity of fruits imported and consumed must be considered very low. The problem is not, however, one of inadequate supply, for if at all there is a demand, adequate supplies can be found to meet the increasing needs. The problem is one of prices. Under the existing level of prices, only the wealthy class of people can afford to purchase fruits. To the vast majority of the population fruit under the existing level of prices remains a luxury, and its purchase is limited to festive and ceremonial occasions. At other times the poor class of people buy fruits only when prices fall in the rush of the season. In order, therefore, that there may be greater demand for fruits the prices should be reduced considerably.

ably from the present level. More efficient distribution and lowering of the cost of transportation might go a long way towards the reduction of the prices of fruits.

The question of transportation of fruits is one of the most important problems connected with the fruit trade and the Royal Commission on Agriculture lay particular emphasis on this question. No doubt, Madras is connected with a net work of railways and roads. But it cannot be said that we have an efficient means for the transportation of fruits. So long as the railway freight remains high and so long as we do not have a quick and efficient underground traffic a proper distribution of the fruits cannot be facilitated. Under the existing conditions special reduced rates are allowed when a consignor elects to send fruits at his own risk. This is the cheapest system which fruits can be consigned by rail. But under this system the railway administration cannot be held responsible for any loss, deterioration or damage to the consignment from any cause whatever except upon proof that such loss, destruction etc., arose from the negligence of the Railway Administration's servants, and the burden of proving such negligence rests with the consignor. The burden of proving such negligence rests with the consignor, though the administration is bound to disclose how the consignment was handled throughout the time it was in its possession. Such provisions in the rules account partly for careless handling of packages by company's servants, which is one of the prolific sources of deterioration of fruits. But when it is realised that even these reduced rates consume a good percentage of the prices paid by consumers, transportation of fruits like mangoes and plantains at rates other than reduced, should be considered to be almost impossible.

The problem of fruit transportation involves not only the question of freight but also the proper method of conveyance. In conveying fruits it is of the utmost importance that, as far as possible, the consignment should be transported in a single haul without changing the consignment from one vehicle to another. Unloading and reloading of baskets often cause damage to fruits. But this is inevitable in certain journeys particularly when the gardens are far removed from the railway lines and also when the journey involves a change from metre gauge to broad gauge railways; for instance from Krishnagiri to Madras and from Chittoor to Madras. But in such cases where the distance to be covered is not great, long transport can be substituted for railway transport. In fact some of the growers in Chittoor, North Arcot and Chingleput consign fruits to Madras direct by lorries. This not only

saves time; but also saves money, and, what is more, fruits reach the destination direct from the gardens with the least possible damage. Consequently, there has been an increasing volume of trade by lorries in recent years.

For a better and more adequate distribution of fruits among the citizens of Madras, it is necessary that the retail trade should be more evenly distributed at various centres of population. At present the whole-sale trade and much of retail business are concentrated in George Town. Outside George Town there are a few stalls dealing in many lines of fruits in the Moirai Market. In the Moore market the vegetable vendors deal in a few lines of less. With the exception of plantains, the other fruits reach a few lines of a wealthy class of people through hawkers who deal in a few lines of high grade fruits. The concentration of retail trade is certainly not conducive to the creation of a better demand on the part of buyers to go where there is a desire on the part of the public for a real hand-in for fruits, the absence of good fruits near at hand is a real handicap. It is quite possible, however, in the absence of fruit stalls in certain centres of population. If that be the case an "Eat more fruit campaign", with facilities to purchase fruits at moderate prices without the necessity of spending money on conveyance might create a better demand for fruits.

On account of the extremely perishable nature of most of the fruits and their production at certain seasons only, the distribution of the supply is not uniform throughout the year. We have, except in the case of plantains, periods of heavy and short supplies. Taking for instance the case of the three important class of fruits viz., plantains, mangoes and oranges, the distribution of plantains is more or less uniform. We have mangoes only for a short period during the year and for about a month in May and June we have such plentiful supplies that the prices obtainable for certain varieties of this fruit do not even defray the cost of their transportation. In regard to oranges the distribution is not satisfactory but we have scarcity in the months of May, June and July, while we have a glut in October, February and March. It is in the interest of both growers and consumers that we should minimise the maldistribution as far as possible.

Other fruit-producing countries of the world have sought to prevent maldistribution by providing cold storage facilities and by diverting the excess supplies during periods of heavy output to

canning, preparation of jams, jellies, syrups and beverages. Gluts in the Madras market can be avoided to some extent by providing cold storage facilities. At present the ice factories of Madras provide limited accommodation for storage of fruits. Only high grade and costly varieties of fruits such as apples and grapes are kept in cold storage at present. But with the completion of the Patel cold storage, which is now under construction, better facilities and larger accommodation will be available in future years.

Madras, situated as it is within easy reach of some of the most important fruit-growing districts of the Presidency viz., Cuddapah, Chittoor, North Arcot, Salem, Trichinopoly and Madura, can rely on a plentiful supply of some varieties of fruits. With better facilities for railway transport and reduction of the freight, Madras can provide a market for some good varieties of fruits from the Circars. Greater demand, however, means more reasonable prices. Less of the profit-seeking motive on the part of growers and those engaged in the trade, a more efficient system of distribution and an understanding on the part of consumers of the value of fruit as an article of diet can create a considerably larger demand for fruits.

Fisheries of Madras

By

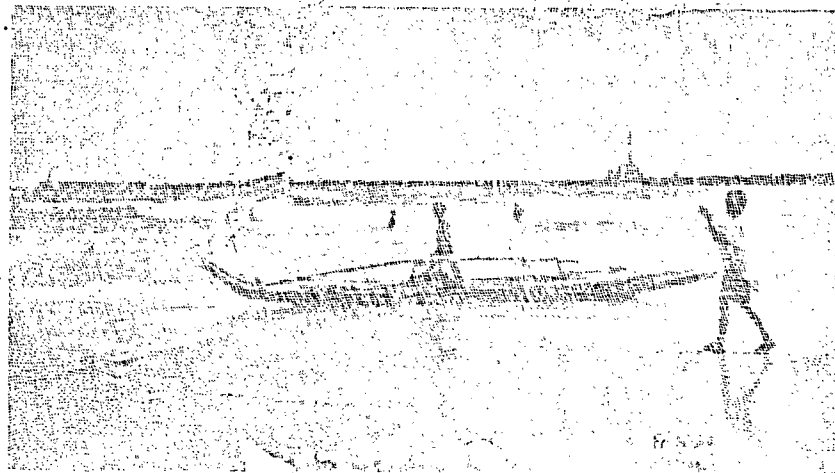
MRS. P. S. SUNDARA RAJ, M.R.S.T., F.R.G.S.

One of the prettiest sights in Madras is to see the fishermen silhouetted in early dawn against the placid waters of the Adyar River, or the fleet of tiny sails returning at evening to the beach. For the Madras fishermen pursue their calling with the age-old methods of their ancestors from the dawn of history. There are two groups of fishermen in Madras, who are quite distinct. The inland fishermen confine themselves to the rivers and backwaters, and never go to sea, while the sea fishermen, though by long custom generally restricted to the ocean fisheries, occasionally bring their big nets into the Adyar, thus stealing a march over the more conservative freshwater fishermen.

The city of Madras includes the lower course of both the Cooum and the Adyar Rivers, the latter forming the Southern boundary of the Municipality. Both rivers are now closed at their mouths by sand bars for the greater part of the year. The water is brackish, except when flood-waters are brought down during heavy rains. The Adyar forms a backwater near its mouth, about a square mile in extent. The Cooum is little more than a tidal creek, though like the Adyar, it will contain a good deal of fresh water during the monsoon. The two rivers are connected by the Buckingham Canal, which has been cut parallel to the sea, crossing both the Cooum and Adyar rivers. In the summer months there is practically no flow in the rivers and so there is a considerable influx of sea water. As the sand banks or 'bars' are raised by the action of the breakers, the effect of the tide becomes gradually less, but a certain amount of percolation from the sea continues through the sand banks. With the coming of the monsoon the bars are opened again and fresh water flows out to sea. During the hot weather the Adyar becomes a series of pools and mud flats, the greatest depth being about six feet in the channel which extends about a mile from the sea. The result is that the fauna of these connected waters show a predominantly marine character. Fifty-four species of fish have been identified, but of these only seven are fresh water forms. A few come in as migrants from the sea, but most appear to be permanent inhabitants of the backwaters and pools. Some of the marine fish, such as white-

bait barracuda, rockcod, snappers, perches, spade fishes, horse mackerel and flat fish (*Pseudorhombus javanicus*) have been caught, but only when the bar is open and the salinity high. Of the fresh-water species, etroplus, catfish, minnows, (*Aplocheilichthys* and *Panchax*) and the tiny carps (*barbus* spp.) are common, but these can all probably breed in brackish water. It is almost universally accepted that all our fresh-water animals are the descendants of ancient marine animals which have learned to adapt themselves to life in a different medium. This process seems to be more accentuated in the Tropics, and a relatively small area, such as is comprised in the connected water system of the Cooum and Adyar, spreading as it does into salt marshes and backwaters, with freshes and tides, deep pools and almost desiccated mud flats, and a corresponding high range of temperature, provides a remarkably interesting field of study. Here the animals of the sea, brackish water and fresh water can be observed in association, adapting themselves for life in a common medium. Of course many changes are required before a marine animal can fully adapt itself to life in purely fresh water, but among the brackish water fauna of the Adyar River some of the most important morphological adaptations can easily be observed. For instance, most brackish water animals have special mucus secreting devices which prevent the passage of water in or out for a certain period, thus guarding against sudden changes in salinity. In addition, if exposed to the danger of desiccation, the presence of mucus would no doubt be a great protection. The water snails (*Gastropods*) of Adyar are without exception capable of copious mucus secretion. Again, not only is the oxygen content low in shallow brackish water, but there is also the danger of the almost complete drying up of the water. In the Adyar the amphibious element predominates, many species inhabiting the marginal zone or the water edge. Crabs and fishes specially have developed extensive means of aerial respiration. The quaint little mud skipper (*Periophthalmus* and *Boleophthalmus* spp.) are fish which seem to prefer being outside the water, though they can swim, while some of the crabs have so adapted themselves to a life on land that they die if submerged for any length of time. Some of the hermit crabs (*Clibanarius*) cannot thrive under water for long periods. Such animals have to remain at the water's edge when changes in level take place by tidal action. In some areas become almost completely dried up, and for the amphibious and attached animals particularly the problem is a serious one. Some of the crabs (e.g. *Sesarma*) burrow deeper and may be said to aestivate. Others migrate to the river bank from the back-

waters as they dry up. The anemones will survive so long as there is the slightest amount of moisture. Another noticeable feature of the fauna of this area is the high rate of reproduction. Apparently many species are able to breed all the year round, and whenever environmental conditions are favourable, a high rate of reproduction takes place, with, in addition, a tendency for early sexual maturity and rapid development.



THE HILL AN AND A CATAMARAM.

The fish obtained from these areas are of course very small and low-priced, but they are eagerly bought by the poorer people. The bulk of the fish found in the Madras markets is sea fish. Of the fifty-three kinds generally found, only a few, such as scur, pomfret, hilsa, Indian salmon, prawns and crabs, and a few others are considered prime fish and fetch good prices. Yet these are not the economically important fish, although they are of prime quality and the supply is never sufficient. The low-priced small fish, such as silver-bellies, are bought eagerly by the poor, and they more than make up in quantity for the relatively small amount of prime fish which is sold.

The river fishermen use hand nets, seines and traps of various kinds, and small catamarans. The catamaran is a simple craft, though it is a mere bundle of reeds. It is used for catching fish from a particularly light weight and speed. Some intrepid fishermen make the long voyage regularly in these crazy

craft in order to bring back fresh logs for making catamarams. The ravages of seawater and insects soon show themselves and when the logs have been reduced in size by shaving off the spoiled outside portion, the catamaram is useful only in the river or backwater. A few fishermen use rods and handlines. The sea fishermen, on the other hand, in addition to the catamaram, use the Masulah boat, a remarkably seaworthy boat built of planks sewn together. These boats will ride the heavy surf and until the construction of the harbour, were the only means of communication between large vessels and the shore. These Masulah boats are used to operate the biggest nets. Other nets are worked from two or four catamarams, and there is a special catamaram built of



THE MASULAH BOAT.

seven logs instead of the usual three to five, which is used for working big nets and for going long distances out to sea. A special catamaram is used for catching flying-fish. Thus, although the Madras fisherman uses the methods of his remote ancestors, various types of craft and nets have been evolved to meet different requirements, and within his limits the fisherman is as skilful and successful as the fisherman of any other country with more elaborate appliances.

Fish arrives in the Madras markets from many sources. A good deal is landed at various points on the beach. The local estuarine and backwater fishermen frequently sell in small quantities near the place of capture. Other sea fish is brought by rail, motor bus, lorry, jukka, boat and head load from Pulicat, Sadras, Ennur and other adjacent fishing villages, and occasionally in ice

from as far away as Malabar. Good fresh-water fish has occasionally come from the big tanks at Sembarambakkam and Sholavaram, and the more distant reservoirs at Mopad and Mettur.

It is perhaps surprising to discover that the average price for fish paid in Madras compares favourably with that obtained in Western countries where the standard of living is so much higher and the trade and industry thoroughly organised. Prices fluctuate considerably, owing to the lack of facilities for storage and distribution. If a good catch is obtained on a day when fish-eating Hindus observe a fast, for example, prices will fall heavily. On the other hand, a scarcity of fish on a festival day means very high prices. The amount of really good fish available is relatively small, and so commands a high price, since there is a real demand. The experiments carried out by the Madras Fisheries Department from 1927 to 1930 by the trawler "Lady Goschen" revealed large potential fishing grounds at present beyond the reach of the ordinary fisherman. It would be useless to increase the supply of fish without a corresponding development of both preservation and rapid distribution. Even as it is, with the ordinary supply unequal to the demand much of the fish goes bad before it can be marketed, and on days of glut good food has to be wasted.

One of the most valuable discoveries of very recent date is the presence of vitamin A potency of a very high order in the liver oils of some of the sharks which abound in Indian waters, including of course the Madras coast. The research is by no means completed, but even with the crude methods of refining that are the only ones available at present, an oil has been found to be nearly three-fourths as valuable as halibut liver oil, the greatest known source of Vitamin A. Experiments with the oil as medicine have yielded amazing results, yet so little is its value known that hitherto it has only been used as a cheap illuminant, and on the West coast for smearing boats,

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Geography from A Railway View-Point

BY

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A railway journey is a familiar experience to most of us, so familiar, sometimes, that it becomes just a means of reaching one's destination. Fortunately, this is not true of children; to them a train journey never fails to be an exciting affair. Much of their interest is in the ever-changing panorama which unfolds before them, to which the average adult is made blind by force of habit and a dulled imagination. To the geographer such journeys afford a most valuable means of "taking in" the meaning of the fleeting landscape and its changing character; a geological map is an invaluable companion for understanding the major features of the landscape. To the teacher of geography they provide most valuable occasions to "demonstrate in the field" all that he has been teaching in the class room. In the following account of the journey from Bangalore to Madras (which has been chosen because it is most familiar to the author), an attempt is made to show how he who runs may read.

* * * *

The railway journey from Bangalore to Madras takes one down from the plateau across the coastal plain and thus provides a contrast between the two as well as a cross-section of both. Bangalore is situated on the undulating plateau, and the landscape after leaving Bangalore is typical of much of the Mysore plateau.

Some of the house types and distributions to be seen along the railway till Bangalore East Station is passed, are representative of several parts of the town and also illustrate some of its history and associations. The bungalows and cottages strung along both sides of the railway line between the Cantonment and the East Stations form parts of the "extensions" of the Cantonment, which were made largely during the periods of prosperity immediately before and after the war. Many of the houses in the outlying extensions remain vacant during most of the year and are occupied only during the season, —April to July,—when visitors from all over South India and also from even farther away come to Bangalore, attracted by the cooler weather and the facilities for rest and recreation which it offers.

Fraser Town, which lies in the valley bottom, is one of the oldest "extensions"; it was formed in 1906 in order to relieve the congestion in the Cantonment, after the outbreak of plague in 1898. The original settlement in the valley was a small village called Papireddypalya, and the "extension" is also known alternatively by this old name. After the plague, it was decided to open out the congested area by means of such extensions and this led to the spreading of the population into the adjacent valleys. Bangalore was originally a group of valley-line settlements separated from one another by ridges which were sometimes cultivated. The British advent brought the first great change. The troops transferred from Seringapatam because of the unhealthiness of that place, were at first garrisoned in the fort, where the Europeans, officers and others, also lived. With the rendition of the State to the Mysore Royal Family, the area known as the Civil and Military Station was assigned to the British, who then moved out of the Fort into this area with their troops. It led to the occupation of the ridges by the military, and the construction of most of the military buildings, barracks, lines and offices, along them. The tops of the ridges were used as parade grounds, and this continues even now.

The next stage was the drifting of civilian population in the wake of the military, attracted by the possibilities of trade resulting from the presence of troops. These later arrivals occupied the intermediate zone, between the original valley-line settlements of the agricultural population and the military population along the ridge crests. The European and Anglo-Indian civilian population settled on the two ridges of the Cantonment,—in what are now called St. John's Hill and Shoolai,—at some distance from the native settlements, and the intervening gaps were filled up by the original valley settlements expanding up the slopes on both sides. The zoning of communities and house types in belts parallel to the ridge and valley-lines, and the location of the markets in the valley bottoms and the churches and European shops along the ridge crests, still preserve the original features.

Some of the newest extensions seen on both sides of the railway between the Bangalore East Station and the Imperial Tobacco Company's Factory, illustrate another feature of the people and the life of Bangalore, viz., its popularity as a place for retirement, mostly among European and Anglo-Indian officials. This popularity is associated with the fact that there is already a large European and Anglo-Indian community in the place, perhaps one

of their largest groups in all India. They have here numerous excellent schools for the education of their children, and some of the parents whose children are being educated in them choose to make their homes in Bangalore.

Between the Bangalore East Station and the Tobacco Factory, on the left or north of the line, is a small rock outcrop, called Machal Betta, from the top of which a very fine panoramic view of the town and the surrounding country is obtained. The Tobacco Factory is unique in South India and enjoys much freedom and many facilities by virtue of its situation within the Civil and Military Station where there are no other factories of its size. Its location was probably determined by the suitable site available adjacent to the Railway line, and probably also by the laxity of state control which it has always enjoyed compared to the factories elsewhere in British India and in the Indian States. There is no other reasonable explanation for the location of the factory at Bangalore, for it gets most of its tobacco from quite distant places within as well as outside India, and likewise exports almost all its output to distant places.

Immediately after passing the Factory, there are the New Sappers' Lines on the right or south of the railway line. This area was taken over by the military only a few years ago and all the buildings seen there have been erected since then. This is explained by the need for evacuating the existing military areas in the "assigned tract" of the Civil and Military Station, which will be retroceded to the Mysore State. The military authorities have therefore concentrated all the areas under their control to the north-east of the Civil and Military Station so as to have them in a small and compact block.

Whitefield, the next station, is an Anglo-Indian colony established there many years ago as an agricultural settlement, and hence called "Whitefield." It has unfortunately proved a failure and the question of resuming the land which the Mysore State gave to the Settlement has recently been seriously considered more than once because of the inability of the inhabitants of the settlement to run it satisfactorily. The settlement was located on the ridge adjoining the valley in which the village of Kadugodi was located, to avoid contact with the villagers and probably also because much of the land in the valley itself was already occupied and cultivated by the villagers. The consequence of this choice of an upland site was that the settlers had to contend from the outset

with scarcity of water even for drinking purposes. Another reason for the failure was probably the fact that the settlers tried their hands at fruit-farming and poultry-farming and other such specialised activities which could not succeed without a well-organised system for marketing the produce. The Anglo-Indians seem to be unable to settle on the land and take to agriculture, perhaps because they are born and brought up in the towns and lack the rural background needed if they are to make good as farmers. A few of the settlers still linger there and the other houses are mostly unoccupied and for sale. These vacant houses afford facilities for picnicking and are popular for that purpose among the Anglo-Indian population of Bangalore. Immediately after leaving Whitefield Station, the railway line crosses the well-watered valley. The valley-line is marked by numerous wells and there is also a canal on the farther side of it; they are both associated with a typical pattern of fields, small in size, very level and terraced wherever necessary, carefully bunded so as to hold the water, and growing paddy. To the south of the railway after leaving Whitefield is to be seen a dome-shaped hill, which rises above the landscape and dominates the view for quite a while. The next station is Malur, where a new siding has been provided because it is a crossing station for trains, which now halt on both sides of the platform. This innovation has also been made to provide for the growing importance of the Station; Malur is an important centre of bus-routes, buses plying from here to Bangalore, Hosur and places in Kolar district.

Several rocky ridges, probably dykes, in a more or less north-south direction across the line of the railway after leaving Malur. These ridges are mostly granitic, whereas a similar ridge, which may be seen shortly after crossing the valley east of Whitefield consists of very dark-coloured fine grained rocks, and does not rise as prominently as the granitic outcrops do. These granitic outcrops also form the hills which occur at Talikal where the rock has been quarried for many years to obtain kerb stones to be exported to England. The demand for these stones has led to similar quarries being opened elsewhere as at Kuppam. Shortly after leaving Malur, the houses in the villages are found to be roofed with straw or with country tiles instead of with the red Mangalore tiles which are generally prevalent all round Bangalore. Probably the limit of transport by road and in bullock carts is to be found somewhere beyond Malur since the tiles are manufactured quite near Bangalore and trans-

ported from there to all the villages in the neighbourhood. The concentration of wells and irrigation along the valley-lines, which are marshy in some cases, and the prevalence of the scrub vegetation on the ridges is typical of the scenery of the Mysore plateau. In many of the valleys casuarina plantations may be noticed in patches; these are largely found on patches of sandy and saline soils in the valleys. The sandy soils are found in localities where (a) sheet erosion has removed the finer particles and the sand has remained as an erosion pavement; (b) the coarser weathered materials have accumulated as talus formations at the foot of the slopes; and (c) they form deposits along water courses, specially in low-lying areas suffering from inadequate sub-soil drainage. In other parts of Mysore State, these saline soils have been found associated with the presence of a kankar (nodular limestone) horizon at a variable depth below the surface. A similar horizon has also been noted in the Tiruvellore taluk of Chingleput district in the case of certain saline soils which overlie the crystalline rocks in that area; it appears to be a feature of some soils formed under conditions which are common and widespread in peninsular India.

As the train approaches Taikal, the soil colour changes from the characteristic reddish brown tinge to a greyish colour. The soil materials are derived from the underlying gneissic rocks in both cases, but have undergone sufficient changes in certain areas to bring about the reddish colour and other characteristics; in the neighbourhood of the granitic hills, the soils still retain the greyish colour of the parent rocks, because of the large amount of freshly weathered material brought down and deposited on the surface. The greyish soil has not yet decomposed far enough to develop the reddish colour which is a sign of greater maturity of soil development. These greyish soils are as a rule much poorer and shallower than the red soils, and the cultivation and villages associated with them show obvious consequences of the poorer soil conditions. The hills on both sides of the railway at Taikal are very typical of granitic weathering and scenery. Here can be seen very clearly various stages in the development of horizontal and vertical joints, and the subsequent weathering of these blocks into rounded boulders, many of which have rolled down the slopes and come to rest at the foot of the hills. We can see the blocks in various degrees of roundness, arranged in distinct layers on the bare rocky surfaces of the hills, or standing up as pillars separated by the gaps which have developed along the joints, or poised in precarious positions.

After leaving Taikal, we enter the valley of the Palar in which the new settlement of Bowringpet is situated. It has grown up after the Gold Mines were started at Kolar and linked up by a connecting railway line from Bowringpet. It is called after Mr. Bowring, who was one of the British Residents in the Mysore State. The Palar valley becomes narrower and gorge-like slightly south of Bowringpet and the scenery changes as the train descends from the plateau shortly after leaving Bowringpet. The topography becomes more uneven and the ridges are more rocky; the railway has also more embankments and cuttings as a consequence. The cultivated land becomes less extensive and the scrub on the uncultivated areas gradually becomes denser. The villages are fewer in number and smaller in size, and the rearing of live-stock becomes important in these villages, as is shown by the larger numbers of cattle and sheep and goats seen grazing in this area.

Bisanattam station has recently become more important because it connects with the new gold mines which have been opened recently at the mining settlement called Narayan Nagar. It is said that this branch line may be extended from Bisanattam to Marikuppam so as to form a loop from Bowringpet to Bisanattam connecting the Kolar Gold Mines as well as this new mining settlement. The new mine has been opened on a southward extension of the same gold bearing reef which is worked at Kolar. It is reported that recent investigations have proved this section of reef to be far more valuable than various previous attempts had shown it to be. Prospecting and mining licences were taken many years ago to exploit this extension of the reef in Kangutudi, but these attempts were abandoned after a while. Opinion is divided regarding the prospects of these new gold mines and its value still remains to be proved. The gold bearing reef is marked on the surface by an associated line of reddish hills which run across the railway line in a north-south direction and their smooth soil-covered slopes contrast very markedly with granitic hills.

The tank which is passed immediately after leaving Bowringpet station is one of the largest in this part of Mysore State and provides the water supply of the Kolar mining settlement. Paddy is cultivated all through the year in the fields irrigated from this perennial source. In the middle of May, the paddy crop in the area commanded by this tank can be seen in every stage of growth. Some of the fields will just have been harvested; whereas in others the paddy crop will be waiting to be harvested; elsewhere the rice

plants just begin to put forth ears; in yet other fields it obviously has been transplanted not very long ago; and some of the fields are being prepared for planting.

The high tension power line from Sivasamudram crosses the railway in this section. It is carried on wooden poles and is a duplicate line between the generating station and the gold mines. The Kolar Gold Mines have always provided the principal load for the Sivasamudram scheme, which could not have been started if the gold mines had not existed.

The soil becomes very poor after passing Kamasamudram. The valley-lines are generally marshy and uncultivated and marked by date palms. Their presence in the poorly drained valley bottoms has also been noted in other parts of the Mysore plateau; the date palm appears to be able to grow on the soils which are frequently characteristic of such ill-drained valley-bottoms. (Ramaachandra Rao's Soil Survey of the Irwin Canal Tract in Mandya). The Ghat section of the railway, which begins from Mulanur, is very difficult country, consisting of numerous granitic hills and ridges separated by densely wooded gorges. The enormous erosive power of the streams traversing these gorges is very apparent as the train comes down the Ghat section. In general, the rocky hills are higher to the south and west of the railway along the ghat section, some of the highest points being on this side.

Kuppam is a more or less isolated island of cultivation and settlement in the midst of the scrub jungle which covers the eastern verge of the plateau, and perhaps because of this setting, it is a zamindari estate. The Zamindar's House is the most conspicuous building in the town as seen from the railway line. A small sandalwood oil factory has been in existence here for a number of years, and it is working quite satisfactorily. Its establishment was inspired by the success of the Sandalwood Oil Factory of the Mysore Government at Bangalore. Large quantities of chrysanthemum and jasmine flowers are sent from Kuppam, at certain periods of the year when they are in season, to Madras and Bangalore, where they find a ready sale at the time of the festivals in the temples, when large quantities of flowers are used for decoration. The soil is coarse and sandy round about the place and carries very poor scrub. Here too can be seen in May the harvesting of paddy in some fields, a growing crop in others and ploughing in yet others, all at the same time.

At the foot of the Ghats, as it approaches Patchur station, the train emerges into the wide, almost level, abandoned valley of the Palar, which is in a very young stage of dissection by the streams which flow down the gorges along the edge of the plateau, and then traverse the plain. Between Jalarpet and Mailpatti, the railway line follows the reversed course of the Palar. As the train runs along the loop by which it enters Jalarpet station, we can see very clearly in the west, the huge windgap marking the former southward course of the river. After leaving Jalarpet, from the time the train approaches Vaniambadi and till it gets out of the progressively narrowing valley at Mailpatti, a series of broken discontinuous ridges may be seen to the east, mid-way between the railway line and the higher hills forming the valley side. These broken ridges become higher as we proceed down the valley. They are the remnants of the former valley floor which was 150 feet to 250 feet higher than the bottom of the valley at present, and sloped south-westward instead of north-east, because the stream in the valley had also flowed in a southwesterly direction, before it was captured at Mailpatti and its direction of flow reversed.

After passing Katpadi, we leave behind the hills which form the easternmost outliers of the plateau and get on to the sedimentary deposits of the coastal plain. The landscape changes its character correspondingly; there are far fewer hills, the surface is more level, the cultivation is more intensive and the water-supply more abundant. The larger area under paddy further serves to make the landscape monotonously green in every direction, in contrast with the valley of the Palar between Jalarpet and Mailpatti, where the crops are as varied as the scenery. At Arkonam and Vallajah Road, we see again some of the outliers of the peninsular rocks which rise above the level country as extremely conspicuous, bare, rocky hills. Outcrops of the Satyavedu pebble beds occur between Arkonam and Tiruvellore, especially on both sides of the railway line near the Tiruvelangadu station. Where the beds outcrop at the surface, they have formed extensive patches of shingle which are very conspicuous because of the total absence of cultivation as well as of natural vegetation of any character. Such a vast quantity of pebbles, of all sizes and shapes is an extraordinary sight in an area where everywhere else the surface is clothed with crops of one kind or another.

All along this section of the line to the north of it can be seen rising well above the horizon in the far distance the crest of the

Nagari and Nagalapuram hills formed by the Cuddapah rocks. They persist on the horizon till we are nearly half-way between Tiruvellore and Madras. Midway between them and the railway line can also be seen, between Arkonam and Tiruvellore, a line of low ridges with an undulating crest; these are the Alicoor and Satyavedu hills formed by the Satyavedu conglomerate beds. Between the crest of the conglomerate hills and the railway line there is a third discontinuous crest, which is nearer to the railway line and also lower than the others. This marks the lateritic formations which are found scattered about as isolated outcrops in various parts of the coastal plain. We cross this lateritic belt at Avadi where the train runs in a cutting.

As we approach Madras, the extremely flat character of the landscape impresses itself upon us in many ways. The gleam of the light-house is visible from the train long before we reach even Basin Bridge Junction. And to the passenger who sees the light, the other towers of the Law College and buildings in George Town are also visible, sharply silhouetted against the sky. The coastal plain is so very flat, because it was once a lagoon, like the others which are still found on this coast at Pulicat, Colair etc., and this lagoon became filled up in the course of ages by steady deposition of materials brought down by the rivers or blown inland by the winds. The very low level of the land around the Basin Bridge Junction and along the railway line after leaving Basin Bridge makes it liable to periodic flooding, and this accounts for the stagnant water which is found in many places, and for the vast heaps of rubbish dumped here to fill up the depressions and thus raise the level of the land. The Buckingham Canal, which runs along these depressions along the coast, is parallel to the railway for the whole of this last section. Another point which is also worth noting is the industrial development, of which there are many visible signs to the traveller in the approaching train. First, there is the vast area occupied by the railway workshops at Perambur; nearer to the city there are several other factory chimneys belonging to the cotton mills situated in the north-west of the City. The route by which the train approaches Madras is not likely to impress upon the stranger's mind that he is nearing a large city with about three-quarters of a million persons. We may contrast Madras in this respect with Bombay, where, long before the destination is reached, the veritable forest of chimneys of the cotton mills, the miles upon miles of the lofty buildings and crowded streets on both sides of the railway line, the numerous suburban

stations passed, and the multiple track of the railway, all serve to emphasise the size and importance of the city. The impression obtained by the passenger who reaches the Egmore station is more appropriate, if we may say so, to the city which is nearing; the succession of suburban localities and stations seem to raise in one's mind an expectation of something greater to follow. The main reason for the unimpressive character of the railway approach to the Central station is the absence of suburban development along the railway line; there are suburbs of the city along this line also, but they are so far away from the railway line as to be invisible, and in general it is only the waste land and cultivation that borders the railway.

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No attempt has been made in the foregoing account to be exhaustive; hence it will be quite possible to supplement what has been said with an even larger amount of detail. The main purpose of this account is to arouse interest and to show how an event in every-day life can be usefully exploited by the geographer. A series of similar accounts of journeys along other routes should form a most useful collection, supplying geographical information suitably assembled for this particular purpose. Such a collection would undoubtedly prove most useful to the student and teacher of geography alike, specially on excursions when they have to travel by train.

* Epic of Mount Everest

By

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To reach the peak of Mount Everest, the highest point on the surface of the Earth, on foot has been the unfulfilled ambition of man for long. In spite of man's unyielding pride as the conqueror of nature, and the immense resources and scientific devices at his disposal he has not been able so far to succeed in this attempt. Even to-day Mount Everest stands majestic a challenge to man.

It is to the various attempts made by man to reach its top in which many have risked their lives, that this talk relates.

Dear young listeners, I propose to tell you to-day the thrilling but unfinished story of the several attempts made to climb Mount Everest, the highest peak in the world, which rises to a height of 29,002 feet.

This peak is situated on the border between Nepal and Tibet; and both the Nepalese and the Tibetans look upon it as holy ground, and have no desire to climb it. But to the European mountaineers, trained in Alpine climbing, it has thrown a challenge, luring them to plant their foot on its summit.

This idea of climbing Mount Everest arose early in the present century; but, before it could mature or materialise itself, the Great War intervened, and it had to be held up for a time. The War itself gave a great impetus to flying; and airmen had proved that man can ascend much higher than Everest with the help of oxygen. But, man's ambition drives him to find out if there is any part of the earth's surface so high that he cannot by his unaided effort reach it. So, he selects the highest mountain for his experiment.

So far five serious attempts have been made to reach the summit of Everest—two in the last decade in 1922 and 1924, and three in the present decade in 1933, 1936, and 1938. Though their details are very thrilling, nothing more than an outline can be given here.

* A radio talk given at the A. I. R., Madras, on 17-3-1939.—Published with the permission of the Station Director, Madras.

In 1921, after obtaining the sanction of the Dalai Lama at Lhasa, a preliminary expedition was sent out, whose work was restricted to reconnaissance, pure pioneering survey of an altogether unknown country. After many arduous weeks of reconnoitring, the defences of Everest were found to be forbidding, a southern face (on the Nepalese side) grimly guarded by great precipices; eastern and western flanks barred by hanging glaciers. After further inspection, a route to the summit was found practicable by a col or saddle (since known as North Col), which led up to the main peak by a north-eastern ridge. To the west of the North Col was the head of the Rongbuk Glacier, and to the east of it the East Rongbuk Glacier, a tributary of the former. It is by the route up the eastern side of the North Col, reached by the East Rongbuk Glacier, all subsequent assaults were made upon Everest, except the last one in 1938.

The reconnaissance of 1921 led to the first actual expedition of 1922. Leaving Darjeeling on March 26 the expedition, consisting of climbers, porters, provisions, equipment, etc., trekked through Sikkim and across Tibet, reaching the Base Camp in Rongbuk valley on May 1. This month's march over the plateau whose altitude is 15,000 feet, though wearisome, did good in hardening and acclimatizing the climbers.

It may be stated here that the mountain can be tackled only in a short interval of about three weeks only between the excessive cold of winter and spring and the breaking of the monsoon in summer, when alone it is assailable. "Just by one narrow strip of space and for a short moment in time is the mountain vulnerable."

A chain of four camps was put up, the fourth one being on the North-eastern Ridge at a height of 23,000 feet.

In the first attack, which was made on their lung power, the climbers, benumbed in body and mind, pushed on, struggling for breath, and reached the remarkable height of 27,000 feet. Feeling exhausted, and battered incessantly by biting gale, they retraced their way back to the camp.

Meanwhile oxygen cylinders were brought up; and three fresh leaders wore them, and made a second assault, reaching a height of 27,300 feet. Though well within 2,000 feet of the summit, they were repulsed and had to retreat.

The third attempt ended in a tragedy. The monsoon had commenced; and even while the North Col was being scaled, an

avalanche overwhelmed a party of 9 porters, two only of whom were recovered alive. This tragic occurrence brought the assault of 1922 to a close.

As a result of this expedition, the mountain itself was found to be no obstacle, as it was only a bare rocky peak. The real hindrance was the weather—the terrific winds, the cold and the snowing, especially the last.

Regarding the use of oxygen against the thin air, there was difference of opinion; and both methods were therefore tried again in the next expedition which was fitted out in 1924. The party reached the site of the old Base Camp on April 19. The three lower camps were set up along the East Rongbuk Glacier as before, leading to the North Col; but bad weather—gale and snowing—prevented action for some days. When it cleared, the attempt was renewed; and the three higher camps were put up on the north-east ridge with the greatest difficulty at 23,500 feet, 25,500 feet and 27,200 feet respectively.

From Camp VI, the highest as their base Norton and Somervell were able to climb up to 28,000 feet *on their own lung power*. They had, however, to retreat, Somervell suffering from sore throat and Norton from snow blindness.

Mallory, a veteran climber and Irvine a junior next went up as the *oxygen party*. But there could be no direct account of how they fared. Odell, who went up to observe them, has given the following account:—"I noticed far away on a snowy slope.....a tiny object moving and approaching the rock step. As I stood intently watching this dramatic appearance, the scene became enveloped in cloud once more; and I could not be actually certain that I saw the second figure join the first." It is not known whether the pair reached the summit or not. Nothing more was known of them. The main party, after scrutiny and waiting, accepted the sad reverse and returned.

By reaching so near the summit, the 1924 expedition proved that climbing the Everest is possible.

For the next 9 years Everest remained undisturbed. In April 1932 there was an aeroplane flight to Everest for making photographic survey of the region, preparatory to the ground expedition of that year under Rutledge. In establishing the Base Camp he had an advantage of full 12 days over the predecessors. The same

six camps were to be established as in 1924; and Camp III was fitted with a wireless receiver to report the approach of the monsoon across the Bay.

Before Camp V could be secured, however, there was gale and snowing; still there was no thought of retreat. On the other hand, Wyn Harris and Wager climbed to 27,400 feet and planted a small tent within half a mile of the summit; and as they went upward and the weather cleared, Wyn Harris found an ice-axe, lying on the smooth slab, looking surprisingly new. There is no doubt it belonged to either Mallory or Irvine, and must have escaped its owner's grip on their fatal downward journey. After reaching 28,100 feet, the limit of Norton in 1924, they felt that safety lay in return, and descended.

Of Smythe and Shipton that made the next party of ascent, the latter had to return due to stomach trouble; and the former who pushed alone to about 28,000 feet, returned after escaping a terrible accident, as a small protuberance on which he was standing came clean away.

The descent was resumed in a storm; and soon Everest was clothed completely in snow. The whole party had to hurry back and give up the attempt.

A reconnoitring expedition in 1935, as in 1921, did excellent survey work among glaciers and mountains, incidentally climbing several high peaks.

This was followed in 1936 by a strong expedition fitted out at a great cost under the leadership of Rutledge. While everything was very promising at the outset, heavy snowing impeded progress and imprisoned the climbers in their camp for some days, while two of them escaped being buried alive by an avalanche. Feeling that the limit of possibility had been reached, the attempt was abandoned and the party returned, without accomplishing anything.

The last expedition, of 1938 was organised on a much smaller scale than all the previous ones on the score of mobility, efficiency and economy. Rongbuk was reached 10 days earlier than the earliest of previous expeditions to avoid a repetition of the 1936 experience. But the monsoon broke still earlier than in that year; and until it broke, wind and cold made climbing impossible. The heavy and frequent snowing made the east face of North Col impracticable; and an assault was made from the west for the first time, marching by the main Rongbuk Glacier. All the six camps

were again established with great difficulty; but when attempts were made to advance beyond Camp vi (2000 feet), it was found that deep powder snow had made the slabs slippery and dangerous. The party had to return, frustrated again by cold and snow.

Thus ended the latest assault of 1938. But the expedition has shown that a small party is as likely to reach the top as a large and costly one. Tilman the leader thinks that the mountain could and should be climbed without oxygen, and that weather is the all important factor for sure success, he says, conditions on the last 2000 feet must be perfect.

Man has thus proved his physical capacity to climb over the earth's greatest height; and the attempt will not be abandoned until it is actually done. "Man comes to it again with increased knowledge, increased experience and increased spirit."

So far it is the British climbers that have been taking part in this glorious enterprise. Is it too much to expect some of our Indian young men, possessing the same strength, skill and indomitable spirit to train themselves to the task and try to achieve similar success?

It is the astonishing endurance of the Indian porters the Ghurkas and the Sherpas—labouring up with camp loads, on their own lung power, to a height of 27,200 feet, that made the pitching of the last camp possible, and enabled the leaders to sally out on the crowning adventure.

Indians have won distinction in hockey and other games, in the army and in aviation. They could easily take to mountaineering with equal zest and success, especially as the opportunity for it lies in our own country, for the glory of which climbers come from abroad.

Correspondence

To the Editor,

Sir,

Permit me to comment upon two points arising out of the papers published in the last (January-March 1939) number of the Journal.

In "Impressions of the Lahore Science Congress" 1939 (Page 60), it is stated that I criticised Prof. Pithawalla's Paper on "The Need for Uniformity in the Physiographic divisions of India" on the score that "it did not adequately provide for climatic differences." I have since received a letter from him on this matter, and I wish to make it clear that the particular interpretation which has been made of what I said during the discussion of his paper at Lahore on climatic boundaries, is neither what I intended nor fair to Prof. Pithawalla.

At the discussion of his paper at Lahore I tried to point out that the proposed physiographic units provided a frame-work to which climatic regions did not readily conform. I was thinking particularly of the southern portion of the peninsula comprising the Tamil Region, Kerala, and, if we may regard it as a separate region, the intervening highland region, which though it narrows down to a range of hills, is nevertheless analogous, in position and structure, to the Dekkan plateau further north. By means of sections and some details regarding the climate, occupations etc., I tried to show how, in the central portion i.e., the zone of ancient crystalline rocks outcropping between the two coastal alluvial belts, we have on both sides of the range of hills, more or less extensive lowlands which resemble the adjacent alluvial tracts in many respects, though structurally they are different; whereas there is only the structural similarity to unite the range of hills in the middle with the adjoining lowlands.

It is possible, in the light of the physiographic "process" by which the coastal plains have been evolved, to regard both the coastal alluvium and the adjoining lowland as results of the same agency, namely, marine denudation. The sea appears to have been mainly responsible for producing the coastal plains; the interior lowland is probably the result of the marine denudation, and the materials derived in the process of planing down this marine platform have been transported outwards and deposited to form the

coastal fringe of sediments of various ages. Hence there is no sudden change in relief as we proceed inland from the alluvial belt or vice versa.

I believe it will be evident, therefore, that it is necessary to carry out any such scheme of divisions, physiographic, climatic or otherwise, to such minuteness, that the smallest units will then be common to all the schemes, and the larger units will be, more or less, different combinations of these small units. For such a detailed scheme of division of India, however, there is still an enormous amount of work to be done by geographers. To mention but one example, attention may be drawn to the lack of any systematic description of Indian landforms, which, as Prof. Pithawalla himself has pointed out, has to be remedied by geographers. The difference between what Prof. Pithawalla has done and what I said, is mainly a question of approach to the problem and not one of principle. It is, I am sure, quite unnecessary for me to point out that to criticise any scheme of *Physiographic divisions* as not taking climatic differences into consideration will be irrelevant.

The second point concerns all geographers in South India and arises out of Dr. Geddes' statement in his paper that "In Southern India, at this time,—I was struck by the rarity of any discussion of possible economic provinces. The concept of the region, and even the word is rarely met with." It seems hardly fair to ignore so completely the work done by geographers in South India.

Yours Faithfully,
B. M. THIRUNARANAN.

Report of the Summer School of Geography

(held at Saidapet in April-May 1939)

The Secretary of the Association has the honour to present the following Report of the Summer School of Geography, held at the Teachers' College, Saidapet in April-May 1939:—

At its meeting held on 17-2-1939, the Executive Committee decided to hold a Summer School of Geography in April-May 1939, and authorised the Secretary to organise and conduct the course as in previous years. 31 teachers joined the School (Appendix I), some of them coming from distant places such as Janjira, Poona, Hyderabad, and Kottayam.

The classes were formally opened by Miss J. M. Gerrard at 10.30 A.M. on Monday the 17th April 1939 with an Address (Appendix II). The work of the Summer School went on steadily for five weeks at 5 to 6 hours a day; and the following scheme of work was gone through:—

- (a) *Pedagogy of Geography* by Mr. N. Subrahmanyam;
- (b) *Elementary Surveying* by Mr. K. Srinivasaraghavan;
- (c) *Map Work* by Mr. N. Subrahmanyam;
- (d) *Mathematical Geography* by Mr. M. Subramaniam;
- (e) *Diagrammatic Methods* by Mr. S. Balakrishna Ayyar;
- (f) *Land Forms* by Mr. V. D. Krishnaswami;
- (g) *Climate & Weather* by Miss E. D. Birdseye;
- (h) *Oceanography* by Mr. K. Ramanurthy; and
- (i) *Economic Geography* by Mr. V. Thyagarajan.

The following general lectures were also delivered to the teachers attending the course:—

- (1) *Some Aspects of Plant Geography* by Mr. M. S. Sabhesan;
- (2) *Earth as the Abode of Man* by Mr. George Kuriyan;
- (3) *Identification of Rocks* by Mr. P. G. Dowie.

Miss H. T. Scudder gave a show of *Geographical Films*.

Besides short excursions to St. Thomas Mount, Pallavaram Hill, Madras Harbour and Ennore Backwaters, two whole-day major excursions were conducted by bus under the joint auspices of the Summer School, the Geographical Conference and the Pro-

vincial Educational Conference. The first of them which included a party of 45 persons in all, was a circular tour, conducted on 6th May to Poonamallee, Sriperumbudoor, Trivellore, Tripasore, Pundarikottai, Manickarainai, Red Hills Tank and Kilpak Waterworks. The second major excursion was on 7th May to Tirukkalukundram and Mahabalipuram.

On the afternoon of 20th May, the last day of the course, a tea party was held, after which Mr. M. Subrahmaniam presented the certificates to the teachers who attended the Summer School, and delivered the valedictory address to them.

The total collection of fees amounted to Rs. 465, out of which a sum of Rs. 115 was expended on conveyance allowance of lecturers, clerical and other services and miscellaneous expenses, leaving a net balance of Rs. 350.

The thanks of the Association are due to the Lecturers for their honorary work in the Summer School as well as to the Director of Public Instruction, Madras and the Principal, Teachers' College, Saidapet, for permitting the Officers of the Educational Department to work in the Summer School and for allowing the course to be held in the Geography Department of the Teachers' College.

APPENDIX I

List of Teachers who attended the Summer School of Geography in April—May 1939

1. Aiyakutti, Mr. K. S., M.A.; 32 Pycroft's Road, Triplicane, Madras.
2. Ananthachary, Mr. T. S., B.A., Thillayambur, Valangan P.O.
3. Devadasan, Miss N., B.A., L.T., Methodist Girls' High School, Royapettah.
4. Devaprasadam, Mr. S., M.A., L.T., Model High School, Saidapet.
5. Gokulapala Sarma, Mr. V. G., B.A. Hons., L.T., P. S. High School, Mylapore.
6. Jagannathachari, Mr. C., M.A., Srinivasa Agraharam, Triplicane.
7. Jayaruman, Mr. S., B.A., L.T., Muthiapet High School, Madras.
8. Kothandaraman, Mr. N., Higher Elementary School, Gopalapuram.

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9. Krishnamurthy, Mr. P. R., B.A., P. S. Higher Elementary School, Mylapore.
10. Krishnamurthy, Mr. P. V., B.A., Poyyamani, Pettayaithalai P.O.
11. Luke, Mr. Ch., B.A., L.T., Methodist Boys' High School, Hyderabad.
12. Nagasubramaniam, Mr. S., B.A., L.T., A. C. High School, Pallatur.
13. Narasiah, Mr. P., B.A., Magampeta Agraharam, Kodur, P.O.
14. Narayanaswami, Mr. G. K., Primary Department, Muthialpet High School, Madras.
15. Patankar, Mr. M. N., Modern High School, Poona.
16. Phadake, Mr. G. D., M.A., B.T., Private High School, Pen- (Bombay Presidency).
17. Raghunadham, Mr. N. R., B.A., Singaram Pillai Higher Elementary School, Villivakkam.
18. Sathiana Rama, Iyengar, Mr. C., Hindu Union Committee School, Choolai, Madras.
19. Solomon, Mr. Paul Edward, S. P. G. Secondary School, Cuddalore O.T.
20. Srinivasan, Mr. A.R., Hindu Union Committee School, Choolai.
21. Srinivasan, Mr. A. V., B.A., Hons., Trichinopoly.
22. Srinivasaraghava Iyengar, Mr. S., B.A., Hindu High School, Triplicane.
23. Srinivasasikachari, Mr. R., B.A., Srikalpakavalli Balika & Bala Entasala, Mylapore.
24. Subramanian, Mr. K. V., B.A., No. 7, Chidambaraswami Street, Mylapore.
25. Sundam Raju, Mr. D., B.A., L.T., Concordia High & Training School, Ambur.
26. Thomas, Miss Grace, B.A., L.T., Baker Memorial School, Kottayam.
27. Vadivethu, Mr. P., B.Sc., Mathanam, Shiyali Taluq.
28. Venkataruman, Mr. S., All Saints' High School, Hyderabad.

29. Venkataraman, Mr. S. K., B.A., I.T., Kindergarten Section, Teachers' College, Saidapet.

30. Virkud, Mr. M. G., B.Sc., Sir S. A. High School, Murud-Janjira.

31. Vithal, Mr. G. R., Nutan Marathi Vidyalyaya High School, Poona.

APPENDIX II

Inaugural Address

By

MISS J. M. GERRARD

It is a great pleasure to me to be here to-day to open this Summer Course in Geography; for I consider the establishment of this course year after year a notable achievement of the Madras Geographical Association. It is over 10 years since the course was first started; and when you consider how comparatively small is the Association (i.e., how few in the number of trained geographers) and what little support it gets, this continuity is little short of marvellous. This Summer Course in Geography has become an established tradition; and without advertisement applications for attendance come steadily in year after year.

Teachers' College may be called the first home of Geography in India; and as many of you know, its Lecturer in Geography, Mr. N. Subrahmanyam is the doyen of geographical studies. The spirit of the place must have been seriously ruffled last year—when the summer course was held at Bangalore at the invitation of the Vice-Chancellor of Mysore University. I feel glad that the College is once again the venue of a band of enthusiastic teachers from the four corners of the peninsula.

The directing force, as I have said, has been the Madras Geographical Association,—and for a long time Mr. Subrahmanyam has been the life force of that Association. The way it has successfully nursed the tiny seed of geographical research through these difficult years is, I think, a magnificent achievement; and side by side with that has been its influence upon the teaching of Geography in the schools through these vacation courses.

To-day we have a situation in which the schools and the teachers are crying out for training in Geography. From Hydera-

bad, from Bombay, from Travancore they are here to-day, besides from all the districts of our own Presidency! But the Colleges stand aloof, refusing to give the instruction for which there is so great a demand. Thus the future Geography teacher is penalised by having to put in a fifth year, if he wants to be fair to his pupils, and he takes the Diploma Course of the Madras University. That there are some who do take this extra year says a great deal both for them and for the interest the subject gives. Such men and women are the fortunate few who can afford it, and they are limited to a large extent to those who live in the metropolis. But for the greater number of Geography teachers—in the schools of this Presidency—alone—no opportunity for geographical study is provided.

This is where the Madras Geographical Association steps in with its introductory course.

Geography is one of the most difficult subjects to teach. Partly it is due to the fact that the subject as a science is developing so rapidly. To look back 25 years as I can, is to realize what strides have been made, and how the emphasis has changed. For the school teacher there is first the problem of selection—what regions to teach and how much detail to be demanded at each stage. Local geography, the homeland, the world—all three have to be kept going simultaneously. There is no subject in the school curriculum which needs so much adjustment to the conditions of the local environment; and every Geography teacher must be capable of re-arranging his teaching syllabus accordingly. Then there is the need for training in geographic method and in the tools of learning. You cannot take a course in map-reading and finish it off in any one year—this involves a progression of training to be accomplished in the whole school scheme. (And what are we going to do about teaching the one-inch map when the medium of instruction is Tamil or Kannada etc.?). The teaching syllabus has to plan for this progression. The teaching of climate similarly has to provide for training in the recording of local observations, in the reading of maps showing the distribution of temperature, pressure and rainfall, and the study of climatic regions—each with its regime of temperature and pressure through the year, where both a spatial and a time factor have to be taken into account. In each year of the school scheme something of this has to be provided for, each stage a little more difficult than the last. Thus all the three aspects have to be provided for, simultaneously in teaching Geography in school—acquisition of skills in the use of geographic

tools, the development of geographic ideas, and the acquisition of geographical facts. Such is the nature of the subject, which is to be taught, apparently, without any previous training—by the light of nature alone.

Now this course has been admirably planned to help the teacher. This year it has been extended to a period of five weeks, giving 180 hours of work; thus it is more intensive than the training given to the Geography teacher in the L. T. course. The emphasis is to be placed on practical work; and this is most wise, for not only is practical work becoming of increasing importance in the school curriculum, but it is just that part of Geography which is most difficult for the learner to acquire without guidance and help. The middle school course should be two-thirds practical. We have tried out this experiment in our school for the past two years; and the good results most noticeable are—the children get a grasp of the fundamentals of Geographic method, the use of maps of all kinds, the value and use of statistics, training in direct observation and some elementary training in deduction and induction, which helps them to understand the work in the upper forms. Unless time is given to this kind of training in the middle school, the later work can be nothing but unintelligible cram.

This course has been planned to give something of that practical foundation. Surveying, you will find, will give you a fresh outlook altogether, and a new sense of power over your environment, besides a deeper understanding of maps. Every school should have a map of its building and lay-out of its grounds, and it is the business of the Geography teacher to produce this. I believe the middle school Mathematics and Geography teaching would benefit by the introduction of a little map-making. This was tried out last year in Form I of the Wesley School, and I believe the interest and enthusiasm shown by the boys was astonishing. The course on map-reading will also be particularly valuable to you, and especially that on the one-inch map, since there is no treatise published to guide you in the intricacies of the geographical interpretation of Indian maps.

In fact, the whole course has been admirably planned to help you; it is being taught by a body of experts; and your teaching of the subject will be enormously enriched by this introduction to it. Not only that, but it will also open a vista to an entrancing subject; and some of you I hope will want to follow it up the whole way. You can do that by taking the Geography Diploma to be

followed up later by an Honours course at some Indian University, if you are lucky enough to get a windfall in cash!

Fellow-teachers—let me congratulate you on your enterprise and your sense of duty to your profession, evidence of which is your attendance here; let me prophesy for you five weeks of intense activity—considerable exercise of brain and limb—and at the end a feeling of satisfaction at a piece of work well done!

The Madras Geographical Association :

*Proceedings of the Ninth Geographical Conference May, 1939
Madras Session.*

The Ninth Geographical Conference of the Association was held at the Leith Hall, Triplicane on the 8th, 9th and 10th May 1939 under the Presidency of Prof. Rao Saheb C. S. Srinivasachari, M.A. of the Annamalai University.

The opening session of the Conference commenced at 2 p.m. on Monday the 8th May before a gathering of members and visitors. After formal Welcome by the Secretary, Prof. V. Rangachari proposed as President Prof. Srinivasachari who was installed in the chair, after being seconded by Mr. Guruswami Sastri and supported by Mr. A. Tirumalai Iyengar. He then delivered his Address on the *Historical Geography of Madras* (published elsewhere).

Two papers were then read in that session—the first by Prof. V. Rangachari on “Some Place-Names of Madras”, and the next by Mr. V. D. Krishnaswami on “Surface Levels of Madras.”

Three papers were read at the second session of the Conference, which met at 2 p.m. on Tuesday the 9th May. The first was by Mr. C. C. Armstrong, Chairman, Madras Port Trust on “the Port of Madras”; the second by Mr. N. Subrahmanyam on “Some aspects of the Recent Growth of Madras”; and the third by Mr. K. C. Ramakrishnan on “the Milk Supply of Madras.”

The concluding session of the Conference was held at 8 a.m. on Wednesday the 10th May, when the first paper read was on “the Fruit Supply of Madras” by Mr. H. Punja. The next was a paper by Dr. P. S. Loganathan on “the Industries of Madras.” The last was on the Buckingham Canal by Mr. T. P. Venkatachari.

The remaining papers contributed for the Conference were taken as read owing to the absence of its authors and for want of time. The President then delivered his concluding Address in which he eulogised the abiding work of the Association in the shape of original papers read at the ordinary meetings and the Conferences, publication of the journal which is well-known in this country as well as abroad, the summer schools and Refresher courses, excursions etc. The Conference then came to a close with a vote of thanks by the Secretary.

Reviews

Physical Geography and Geology. By L. Dudley Stamp (Indian Edition). (Longmans, Green & Co.). 1939. Price Rs. 2 as. 8.

This book is an attempt to build up a knowledge of Modern Geography upon a geological basis, thereby helping to a better understanding of the subject and also to arouse interest in the fascinating secrets of the earth itself. The first twelve chapters deal with the usual topics of Physical Geography, written with a geological emphasis, while the last two chapters of this Indian edition deal with “the History of the Earth” and “the Physiography of India, Burma and Ceylon” in an elementary and interesting manner. The book is copiously illustrated with choice pictures and diagrams, several of the views being Indian; and the treatment is simple and clear. It is suitable for use by students of the High School who take an optional or advanced course in Geography (like the C-Group Geography in Madras) and by the first year University students as introductory to the study of *Physical Basis*.

Discovering Geography: Book 1-Britain, Book 2-Abroad. By T. Herdman. (Longmans, Green and Co., London). Price 1sh. 9d. each.

These two books are prepared on a novel plan, in which the pupil's personal knowledge of the facts of local geography forms the approach and the means to the study of the Geography of the Homeland (Book 1) and of the rest of the World (Book 2). As suggested by the title, he is made to *discover* Geography, in the following manner. Each chapter is prefixed by about a page of preparatory questions, in answering which he will discover something about the Home District or of the chief ideas introduced in it. At the end of each chapter, questions are appended under two heads. The first set entitled “Do you understand the chapter” compels careful reading of the chapter as well as the use of the atlas; while the second set “Now can you discover” induces further revision, and use of maps, statistics, etc. In the last chapter, the pupil is expected to prepare his own Geography of the different regions of the Homeland and of the World in an outline manner, dealing only with essential points. The books are well-illustrated with a number of good pictures, maps and diagrams.

Middle School Geographies: Man's Life on Earth. Books 1, 2 and 3 for forms 1, 2 and 3 (Tamil and Telugu). By Helen T. Scudder. (Oxford University Press). 1938 & 1939. Price 12 as, 14 as. and 14 as.

These text books in Geography for forms 1 to 3 have been prepared by a qualified and experienced teacher of Geography in accordance with the recently revised official syllabus of the Madras Educational Department.

At the commencement of each chapter the main points to be learnt are set forth; and the subject matter is then dealt with in a simple, clear and descriptive way, making an appeal to the pupils' experience or observation, and asking him to do and learn. At the end of each chapter are given suggestive and stimulating questions and exercises which help to revise and to supplement. The copious and useful illustrations, bold print, glazed paper and fine get-up make the volumes attractive to the pupils.

Modern School Atlas. Edited by W. R. Kermack. (W. & A. K. Johnston, Ltd., Edinburgh). Price Re. 1 as 2. ps. 6.

This is one of the good atlases for high school pupils available at a moderate price. It contains physical, political, climatic and economic maps of the several continents as well as of the world with sectional maps of Europe and of the British Isles and a useful index. For use in Indian schools, however, it has to be re-published with systematic and sectional maps of India, omitting if necessary some of the sectional maps of Europe or of the British Isles. One of the great merits of this atlas is the clarity of the maps, due largely to the avoidance of overcrowding of names.

A Map Book of Europe for School Certificate Forms. By A. Ferri-da. (Macmillan & Co., Ltd., London). Price 1sh. 9d.

This map book is suitable for use in senior forms, preparing for school certificate examinations. It contains over 40 sketch-maps the details of which are explained and in some cases supplemented by the matter given on the opposite page.

The questions and exercises at the end of the letter-press will serve to test the pupil's capacity to illustrate his answers with sketch-maps. A similar map book for India is a great desideratum.

The Regions of the World in Pictures: Northern Africa. With descriptive notes by G. J. Cons. (University of London Press). Price 1sh 3d.

It is now universally recognised that the teaching of Geography in schools should be made interesting and realistic in various ways of which the use of illustrative material is not the least important. While pictures are available in plenty nowadays, it is necessary that they should be selected for their geographical content and value. The set under review is one such, containing 16 typical pictures of landscape, physical and human, in Northern Africa—in the Nile valley, Sahara Oases and Barbary States, illustrating the life and work of man in the several regions there. Useful descriptive notes are appended to each picture, drawing attention to salient points of geographic interest. The price is low for the value and quality of the pictures.

News and Notes

A Summer School of Geography was held at the Teachers' College, Saidapet under the auspices of the Association from 17th April to 20th May 1939. It is interesting to note that some of the teachers attending the course came from such distant places as Bombay, Poona, Janjira, Hyderabad and Kottayam. A report of the course is published elsewhere.

The Ninth Geographical Conference of the Association was held at Madras on the 8th, 9th and 10th May 1939 at the Leith Hall, Triplicane under the Presidency of Prof. Rao Sahab C. S. Srinivasacharya. His Presidential address on "the Historical Geography of Madras" along with some of the papers read at the Conference are published in this issue. The remaining papers will be printed in the next (September) number.

Under the joint auspices of the Geographical Conference, the Provincial Educational Conference and the Summer School of Geography, several short and two whole-day excursions were conducted—the latter on 6th and 7th May. The first of these major excursions was a circular tour in which the main object was to study some of the geological formations round Madras as well as the sources of its water-supply. The second major excursion on 7th May was to Tirukkalikundram and Mahabalipuram.

The Tenth Geographical Conference will be held at Tinnevely (Tirunelveli) in May 1940, when papers on various aspects of the Geography of that district will be read and discussed. This will complete the study of a contiguous region and fill a gap.

The Coimbatore branch of the Association has been continuing to show steady work. Under the auspices of this branch a public lecture was delivered on 3—6—39 at the Y.M.C.A. Hall by Mr. N. Subrahmanyam on "Geography in Everyday Life" with Mr. U. Kannappa, District Educational Officer, Coimbatore in the chair.

With the reorganised L. T. Course, the syllabus in Geography has also been completely revised, being made at the same time a bit more elaborate and specific. To meet the present situation, in which students are taught the pedagogy of geography without a preliminary training or qualification in subject-matter, special re-

gions are to be prescribed each year, a knowledge of which will be required in answering the questions on pedagogy.

In the absence of the co-operation of the colleges, which have refrained from providing for the teaching of Geography for which the University has passed regulations, the Diploma is the only other qualification in subject-matter that is available for the prospective teacher of Geography. It is to be regretted that the new regulations have failed to prescribe this or even Intermediate Geography as a preliminary qualification for admission to the L. T. course in Geography. So, the anomaly of putting the cart before the horse, or the cart alone without the horse, will continue.

In the S. S. L. C. course, A-Group Geography is getting to be more and more popular; and the Examiners' Reports state year after year that there is a steady improvement in the answers of the candidates. But the teacher of Geography can get no credit for it, nor discredit when his work is slack, as the S. S. L. C. authorities have refused to show the History and Geography marks separately, before adding them.

At the same time, practically no scope has been given to the high school pupils to specialise in Geography; and only a dozen out of over 400 schools teach C Group Geography. More schools and more teachers of Geography are keen on providing for its teaching; but so long as it is a blind alley, leading to no college studies, they cannot have it. Meantime mutual impoverishment continues merrily—Colleges not supplying to schools teachers who have taken their degree in Geography, and schools not supplying to colleges pupils who have specialised in Geography in their S.S.L.C. course. The pessimist puts the question "Can the situation improve in a decade or two?"

Intermediate Geography offers a good grounding for economic and geological studies in the degree course; but due to the intransigence of the colleges, that foundation has not been provided anywhere and cannot be availed of.

The syllabus in Geography for forms 1 to 3 has recently been revised and modernised. But the training in Geography of the secondary grade teacher who is to handle it remains as it was several years ago. It is hoped that the Secondary grade training syllabus will soon be brought into line with the L.T. syllabus.

The Elementary School has not yet been touched at all in the matter of Geography teaching. While deprecating the introduction of an elaborate and uniform syllabus at that stage, we would strongly urge the need for some guidance being given to the elementary school teacher which would help him to teach some good Geography to the children.

While such is the position of Geography and Geography teaching in schools and colleges, the teacher of Geography does not seem to have a place or status in several schools; and anybody is thought to be good enough for handling the subject. This view is not surprising as the Educational authorities do not insist upon the possession of the requisite qualification.

The 27th session of the Indian Science Congress will be held at Madras from January 2 to 8, 1940. Dr. S. P. Chatterjee of Calcutta University has been elected President, Mr. George Kuriyan the Recorder, and Mr. B. M. Thirumaranan the Local Secretary of the Geography and Geodesy section for this session. It is hoped that several good papers will be contributed to this section, which was confirmed as a separate one only last year.

We are glad to record that the Lecturers in Geography at Lahore have organised a University Branch of the Punjab Geographical Association with Miss C. L. M. Geary as President and Prof. E. T. Dean as secretary. The following are among the papers read in their monthly meetings:—

Poona and its Surroundings (Miss C. L. M. Geary); Present Political Situation in Central Europe (Mr. A. N. Kapur); Social Customs of some of the Tribes of South Africa (Mr. Farhat Ullah Khan); and the Damian beyond the braided Indus (Prof. E. T. Dean).

The British Association for the Advancement of Science will hold its next annual session at Dundee August 30—September 6, 1939. The President of the E. Section (Geography) is Mr. A. Steevens, Head of the Department of Geography at Glasgow, and its Recorder Mr. J. N. L. Baker of the School of Geography, Oxford.

The World Federation of Educational Associations will be meeting in Rio de Janeiro in August 6—11, 1939. The agenda of the Geography section of this Conference includes:—

- (a) Means of establishing closer contacts between geography teachers in different countries;
- (b) Sources of Geographical pictures, etc.
- (c) Means of keeping teachers' knowledge of Geography up-to-date.

We welcome with pleasure the *Geo-Press Service*, which illustrates rapidly all important political, economic and social events, natural phenomena and the leading explorations, with clear and comprehensive maps accompanied by adequate comments; and is edited by a staff of expert geographers. In the present rapidly shifting times when far reaching events are of daily occurrence, the Geo-Press Service, Geneva fills a gap.

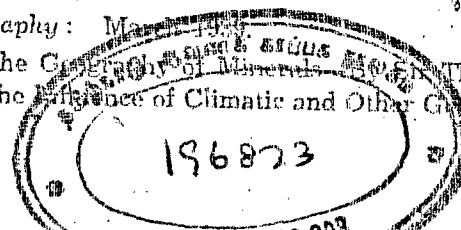
Select Contents

- The Geographical Journal*: April 1939.
 Inland Waterways of Germany—By G. R. Grone.
 A New Orographical Globe—By David L. Linton.
- The Geographical Journal*: May 1939.
 Exploration of Ancient Sites in Northern Afghanistan—By Evert Barger.
 A New Trans-African Route—By A. E. Filby.
- The Geographical Journal*: June 1939.
 A Journey in Dutch Guiana—By Ivan Sanderson.
 Two Waterfalls in British Guiana—By Paul Zohl.
- The Geographical Magazine*: April 1939.
 Canada looks North—By The Hon. Vincent Massey, P.C.
 The Preservation of Big Game in Africa—By Henry Maurice C.B.
 Where the Incas Ruled—By Selwyn Powell.
 Hong-Kong and the New China—By R. T. Barrett.
- The Geographical Magazine*: May 1939.
 Finnish Solstice—By B. H. Wright.
 The Sudan Gezira—By A. R. Lambert.
- The Geographical Magazine*: June 1939.
 Australia's Flying Doctors—By Michael Terry.
 The Empire of the Incas—By Selwyn Powell.
- The Scottish Geographical Magazine*: March 1939.
 Problems of Palestine—By K. H. Huggins.
 Denmark To-day—By Erick Schacke.
- The Scottish Geographical Magazine*: May 1939.
 A Geographical Examination of the Development of Scottish Railways—By Andrew C. O'Dell.
 Forest or Bog: Man the Deciding Factor—By J. W. Watson.
 A New Index for the Analysis of Regional Trends—By Peveril Meigs.
- Geography*: May 1939.
 The Geography of Minerals—By Thomas Holland.
 The Influence of Climatic and Other Geographical Factors upon

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- the Growth and Distribution of Population in Saskatchewan—By Stella W. Alty.
- Geography*: June 1939.
 The Evolution of the Ship in relation to its Geographical Background—By A. Davies and H. Robinson.
 An Enquiry into the Likes and Dislikes of Elementary School Children in Geography—By Beatrice M. Swainson.
- Geographical Review*: April 1939.
 Sea to Sahara: Settlement Zones in Eastern Algeria—By Griffith Taylor.
 A Permanent Loss to New England: Soil Erosion resulting from the Hurricane—By H. H. Bennett.
 The Law of the Primate City—By Mark Jefferson.
 Post-war Locational Changes of British Industry—By E. G. Mears.
 Recent Exploration in the Polar Regions—By R. P. Platt.
 The Agricultural Value of Californian Soils—By H. J. Wood.



Books and Journals Received

- Physical Geography and Geology*: By L. Dudley Stamp.
Discovering Geography: Books 1 & 2: By T. Herdman.
Middle School Geographies: Books 1, 2 and 3 (Tamil and Telugu):
 By Helen T. Scudder.
The Modern School Atlas: Edited by W. R. Kermack.
A Map Book of Europe: By A. Ferriday.
The Regions of the World in Pictures: Set I—Northern Africa:
 With Notes by G. J. Cons.
The Need of Uniformity in the Physiographic Divisions of India:
 By M. B. Pithawalla.
The Educational Review: February, March, April and May 1939.
Indian Co-operative Review: Oct.-Dec. 1938 and January-March
 1939.
The Indian Educator: March, April and May 1939.
The South Indian Teacher: March, April and May 1939.
The Geographical Magazine: April, May and June 1939.
The Scottish Geographical Magazine: March and May 1939.
The International Review of the Hungarian Geographical Society
 Vol LXVI—No. 6-10 (1938).
Quarterly Journal of the Mythic Society: April 1939.
Journal of the Andhra Historical Society: July 1939.
Kalaimagal: April and May 1939.
Educational India: April, May and June 1939.
Nagar Pracharini Patrika: Vol. 43, Nos. 3 and 4.
The Geographical Journal: April, May and June 1939.
Geographical Review: April 1939.
Indiana: December 1938.
Indian Journal of Economics: April 1939.
Geography: June 1939.
Adyar Library Bulletin: May 1939.
Akademiya Navk—U.S.S.R.: Trudi Instituta Geografii: Vol. XXI
 (1939).
Journal of Indian History: April 1939.
Southern India Commerce: April 1939.
Mitteilungen der Geographischen Gesellschaft in Hamburg:
 Bd. XLVI—1939.

TEXT-BOOKS

- New Secondary School Geography*. By L. D. Stamp.
 Incorporating the recent changes in the S.S.L.C. "A" Group Sylla-
 bus.
 English Edition. Re. 1-12-0
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