valleys lying in the midst of mountains, or by the intercepting of streams, and in some places large rivers, near their source, where, after having filled one lake, the river is suffered to escape over a wier lower than the main embankment, and to pass on till another favourable position occurs further down the stream, where it is made again to pay tribute for the same purpose.

"But," the Commissioners remark, "in general it may be affirmed that the greater part of the flood-waters of our rivers are turned to no account, and vast bodies of water flow annually to the sea, which might be made use of to fertilize hundreds of thousands of acres now jungle or waste, to feed and maintain a vast population, and to add enormously both to the wealth of the people, and to the revenue of the Government.

"With the exception of the districts of Canara and Malabar on the western coast, the whole of the territories of the Madras Presidency carry on their cultivation in great part by means of artificial irrigation; the water for the purpose being obtained by channels taken from off the rivers, or by tanks or reservoirs, in which the water of the reservoirs is stored and drawn off for use. Works of both descriptions have existed from very remote times: for the value of irrigation in increasing the fertility of the soil was very early recognized; and princes and rulers of every grade devoted large sums to the formation of such works, which thus, in the course of agos, became extremely numerous. The revenue being IRRIGATION.

so intimately dependent on the efficiency of these works, they received a large share of the attention of the Government, and especially of the revenue officers, in whom their custody was immediately vested. Even in the tumultuous and disturbed times which immediately preceded the introduction of British rule in the Carnatic, this duty was not wholly omitted, though many fine works were then allowed to go to ruin, and all were much neglected."\*

"The mere mention of the number of the works would give no just idea respecting them, as they vary so greatly in size and value." Again: "The number in 14 out of 20 districts (omitting Tanjore, from which accounts are not received, but including Kurnool) considerably exceeds 43,000 in repair, besides above 10,000 out of repair.† The revenue immediately dependent on the Government works of irrigation, is about 135 lacs of rupees (£1,350,000), besides fully 15 lacs, or £150,000 more, alienated as *enum*; ‡ and assuming that they now yield no more than 10 per cent. on their original cost, the amount of the capital invested in their construction may be taken at 1,500 lacs, or £15,000,000 sterling.

"The amount actually expended was probably much more, for many of the old works were constructed on very unfavourable sites, and many others were formed less with a view of profit than as perpetual memorials in honour of a founder, and at a cost very disproportionate to the probable return."§

\* Madras Commissioners' Report, p. 2.

the statement is made in round numbers, and does not profess to be statistically correct.

‡ Land exempt from tax.

§ Madras Commissioners' Report, p. 6.

It may well be supposed that expensive establishments for the supervision of these works and for their constant repair, form a duty which the Government cannot for its own sake venture altogether to neglect, but greater attention has been devoted to it of late years than formerly, and proportionate beneficial results have accrued.

With this Report before me I shall proceed to show what has been effected in the Madras Presidency, within the last few years, in works of irrigation and internal communication.

The extraordinary profitable return on money spent in works of irrigation would appear incredible, unless supported by authentic doctments, embodied in the volume before me. I shall confine myself, however, to two cases the district of Tanjore and that of Rajahmundry :—

"Tanjore has always been better cared for, in the way of irrigation, than any other. In the ten years from 1821 to 1830 inclusive, the expenditure on works of irrigation averaged 49,200 Rs. (£4,920). The yearly average expenditure during the twenty years from 1831 to 1850, is 91,523 Rs., or £9,152. During the first period the average revenue from irrigated land, was 29,44,685 Rs. (£294,468); while during the latter period

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it averaged 30,83,442 Rs. or £308,344,—the aggregate of this period over what it would have been at the average of the former period, was 27,75,250 Rs., or £277,525, being a return directly into the treasury of more than three to one of the additional expenditure. The annual increase of cultivation between both periods, amounted to 79,869 acres. And it is shown by returns which we have obtained from the collector, that the average produce per acre is not only larger than formerly, but less variable."\*

If we take the increase of revenue in Tanjore at 16 lacs, £160,000, and consider it to have been progressive, as it has been upon the whole, the total additional revenue in forty years was, 320 lacs (£3,200,000), while the total irrigation expenditure, 32 lacs (£320,000), being a charge only of 10 per cent. on the net profit accruing to Government. It is hardly necessary to add, that the value of land to the proprietors paying the revenue increased proportionately in the market.

Let us now hear what the Commissioners say, with regard to the works on the Godavery, at Rajahmundry, about 250 miles North of Tanjore.

"The Godavery, like the Cauvery, flows to the sea, through a flat alluvial Delta, and this tract has been for

<sup>\*</sup> Madras Report, pp. 100-3.

many years partially and imperfectly irrigated from the river, but the irrigation had never been laid out on any comprehensive plan, and of late years the works had been almost entirely neglected. The revenue was declining; and while Tanjore was paying with ease a revenue of £450,000, and annually increasing in wealth, Rajahmundry, of similar extent, with a far more fertile soil, and inferior in no one natural advantage, was paying, with extreme difficulty, a revenue of £190,000, and its people were in the lowest state of poverty.

"So long ago as before the close of the last century, an engineer (Mr. Topping) had observed the facility with which the Godavery might be made to irrigate the districts on its banks, and had brought to the notice of Government how desirable it was to throw an *anicut*, or dam, across the river, so as to raise the water, and thus make it available for that purpose."\*

The project was allowed to sleep for half a century; at length it was revived by Colonel Arthur Cotton, chief engineer of Madras, in 1844, and after considerable delay both at home and abroad, it was ordered to be carried into effect in 1847, when the work was commenced. The river Godavery takes its rise in the Western Ghauts, near Nassuck, at an elevation of 1,600 feet above the sea, whence following an easterly course for about five hundred miles, it is joined by the Wardah, running due south,

Commissioners' Report, p. 104.

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and then proceeds in a south-easterly direction for four hundred miles, and enters the bay of Bengal, at the port of Coringa by many mouths. The country drained by its waters, Colonel Cotton estimates at 130,000 square miles. The extreme discharge at its mouth is calculated at 150 millions of cubic yards per hour, and in the driest season, at least half a million. The difference therefore, unless made available either for irrigation or navigable purposes, is entirely lost in the ocean. This affords a fair sample of inland rivers in tropical climates in general, and the splendid hydraulic works of our predecessors in the south of India, only prove how much may be done by availing ourselves of resources which have to such a vast extent been hitherto neglected.

The project was of a gigantic nature, and apparently the most difficult part of the work was the construction of a wier or dam of great length across the bed of a river having no other foundation but loose sand. Fortunately, Colonel Arthur Cotton, who had previously accomplished the repair of the Cauvery dam, had learnt the mode of overcoming the obstacle, from the ancient practice of the Natives, who

carried similar works over fathomless sands, by an ingenious but simple method. In order to obtain a foundation, round pits of three feet diameter are built in the bed of the river, into which earthern cylinders are sunk, one fitting into the other, as the sand and water are removed : in this way each cylinder is built up to the surface, till it has penetrated from twelve to fourteen feet. The cylinder is then filled in with rough stones and clay, by which means a solid pillar of the requisite dimensions is established, which by the equal pressure of the sand on every side keeps it firm and upright. These columns are more substantial and durable. than any ordinary wooden piling. In order to obtain the stone requisite to construct the dam it was necessary to bring it sixteen miles, from quarries whence it had been excavated, and a tramroad was constructed for the purpose. Some notion may be formed of the labour and superintendence required, when it is stated that 10,000 workmen made and laid 200,000 bricks per diem, and consecutively for four months, in order to be prepared to meet the vast body of water that pours down during the season of the floods.

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The works have now nearly come to a close, and a net increase of the land-tax has accrued, of upwards of  $\pounds 35,000$  per annum.

The Commissioners report that-

"The tract capable of being irrigated by these new works, amounts to 3,000 square miles, or about two millions of acres. But a part of it is capable of being watered also from the Kistna, by means of a dam to be constructed at Bezwarah. Colonel Cotton takes 1,200,000 acres, as the actual extent to be irrigated " [by the Godavery].

"And this triumphant success, this magnificent addition to the revenue, is not to be gained by exaction, by trenching on the fair rights of property or industry; on the contrary, the noblest feature of all this is, that this vast gain to the Government is to be obtained by adding in a far higher degree to the wealth, the comfort, and happiness of the people. The value of a crop on an acre of dry land does not exceed 6 Rs. (12s.), but that of an acre of rice is 20 Rs. (£2), and of an acre of sugar 230 Rs., or £23, being a gain of £1. 8s. an acre, in the former case, and £22. 8s. in the latter. The gain to the producer, therefore, by the improvements in question may be stated as follows :—

1,00,000	acres	of	sugar-cane, an	d other	
valuabl	e produ	ucts	at 200 Rs., is		200,00,000
11,00,000	acres	of r	ice at 12 Rs., is		132,00,000

Rs. 332,00,000

Equivalent to  $\pounds 3,320,000$  sterling; out of which the Government will receive 30 lacs, or  $\pounds 300,000$  a year, leaving a clear annual surplus to the landholders of three millions sterling."

Before closing this result of the labours of Colonel Arthur Cotton, in the Godavery, it may be as well to show what has been performed, and what has been the actual cost. In a small but valuable pamphlet, published by that officer last year, before he returned to India, we find the following table, which gives a correct idea of the total profits upon the Rajahmundry works already realized :—

Years	Average Revenue of 10 years before the Works	Revenues of each year since	Additional Revenues in each year	Total additional Revenue up to the end of each year	Expenditure in each year	Total Expenditure up to the end of each year
	£.	£.	£.	£.	£.	£.
1836-1846	196,000	-	-	-	-	-
1846-7	-	242,000	46,000	_	24,000	-
1847-8	-	250,000	54,000	100,000	34,500	58,000
1848-9	-	233,000	36,000	136,000	22,000	80,000
1849-50	-	224,000	28,000	164,000	25,000	105,500
1850-1	-	242,000	46,000	210,000	30,500	136,000
1851-2		245,000	49,000	259,000	21,900	157,900
1852-3	-	250,000	54,000	313,000	30,000	187,900
1853-4	-	244,000	48,000	361,000	-	-

So that while the sum of about £188,000 was expended, £360,000 was received.

The additional exports by sea increased in a greater ratio as the work proceeded, independently of what was exported by land.

Years.	Expenditure on Works up to end of each year.	Additional Sale of Annual Produce Exported by Sea.		
	£.	£.		
18478	58,000	116,000		
1848–9	80,000	183,000		
1849-50	105,500	228,000		
1850–1	136,000	316,000		
1851-2	157,900	398,000		
1852–3	187,900	514,000		
1853-4	-	654,000		

The river Kistna, which debouches a few miles below the Godavery, is also in process of improvement, in the same manner as the latter, and will be connected with it by a navigable canal.

The following letter appeared, in the month of September, in the *Times* newspaper:—

> PUBLIC WORKS IN INDIA. To the Editor of the Times.

SIR,—I think thirty-five years' actual experience in the management of public works in India, during which I have been employed in the execution of many new works of great magnitude, may justify me in offering for insertion in your paper the enclosed memorandum, which is the result of that experience.

I should observe that it is a low estimate of average

results in different districts, and that it is far below the actual results in the only district in India in which such a course has been steadily pursued, that is, in Tanjore.

The result of 50 years there is this—the expenditure on *new* works and improvements has been about £250,000, or £5,000 a year; the number of miles of practicable road made has been not quite 1,000, or 40 miles per annum. The increase of revenue has been from £320,000 to £520,000 or £200,000 per annum—£4,000 each year. The increase of private income, as shown by the increased saleable value of land alone, cannot be less than £200,000 a year. In this case, therefore, the expenditure has been only half what is here supposed, and the increase of revenue more than half as much again.

In the district of Rajahmundry, the only one in which a thorough system of improvement has been begun, including both irrigation and water transit, an outlay of about £30,000 a year, or £188,000 in all, has in six years produced an increase of revenue of £60,000 a year, and of exports from £30,000 per annum to £250,000 in the last year.

These two districts, therefore, much more than support the estimate of the memorandum.

> I remain, yours obediently, ARTHUR COTTON,

> > Late Chief Engineer at Madras.

So much for the Rajahmundry works.

Previously to the departure of the Marquis Dalhousie from India, he deemed it proper to take a review of his administration. As it affords additional proofs of the resources of India, IRRIGATION.

and is not in general circulation, I avail myself of its pages, to give a brief outline of the several public works, which have been constructed under his rule for the benefit of the country. In continuation of the subject of canals for irrigation and traffic, I find the following description of the magnificent task accomplished by Colonel Sir Probey Cautley, K.C.B., of the Bengal engineers, in the Agra Presidency.

His Lordship observes :---

" Of all the works of public improvement which can be applied to an Indian province, works of irrigation are the happiest in their effect upon the physical condition of the people. And foremost among all the works of irrigation that the world as yet has ever seen, stands the Ganges Canal, whose main stream was for the first time opened on the 8th April, 1854. It was then reported to the Honourable the Court of Directors, and was thus briefly described.

"Within eight years the main lines of the Ganges Canal, applicable to the double purposes of irrigation and navigation have been designed, executed, and opened.

"Extending over 525 miles in length, measuring in its greatest depth ten feet, and in its extreme breadth 170 feet, the main irrigation line of the canal is justly described as a work unequalled in its class and character among the efforts of civilized nations.

"Its length is fivefold greater than that of all the

main lines of Lombardy and Egypt together, the only countries in the world whose works of irrigation rise above insignificance.

"As a single work of navigation for purposes of commerce, the Ganges has no competitor throughout the world. No single canal in Europe has attained to half the magnitude of this Indian work. It nearly equals the aggregate length of the four greatest canals in France. It greatly exceeds all the first-class canals of Hollar.d put together, and it is greater by one-third than the greatest navigation canal in the United States of America.

"When the branches in progress shall have been completed, the extent and influence of the work will be vastly increased throughout all its gigantic proportions.

"The cost of this splendid work amounted, in 1854, to  $\pounds$ 1,400,000; when completed it will extend to 900 miles, and it is estimated that it will afford irrigation to 1,470,000 acres. But (says the Governor-General) none can estimate in their full extent, the blessings which its fertilizing influence will confer upon millions, whom it will place henceforth beyond the reach of those periodical calamities of season which from time to time, as in 1837,\* have brought upon the plains of Hindoostan, the wide spread desolation of famine and death.

"The aggregate length of the inundation canals we found constructed by the Native Government, when we took possession of the Punjab, is upwards of 600 miles. They have since been enlarged and improved under the British authority."

<sup>\*</sup> It is generally believed that 500,000 human beings perished on that occasion.

<sup>†</sup> Marquis of Dalhousie's Minute, p. 24.

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No works of irrigation exist under the Bombay Presidency; but a Joint-Stock Company has engaged to undertake the task, which has not yet been attempted by the Government. On the occupation of Candeish, twenty-eight years ago, it was found that eighty dams, diverting the waters of the numerous streams in that province for purposes of irrigation, had been constructed by our predecessors. These works have not yet been repaired, but are calculated to become an abundant source of revenue.

The waste of the waters has been already calculated, for the Godavery alone. It is estimated, in the statistical report of the India House, that the water lost for purposes of irrigation, from the rivers issuing from the Himalayas, in the dry season, would, if applied to irrigation purposes, afford sufficient nourishment for 24,000 square miles, or 15,664,480 acres, and which it is presumed may ultimately be brought into cultivation.

### PART II.-CANALS.

NEXT in importance to irrigation is the conversion of the waters of rivers to the purposes of navigation. The late Governor-General did not overlook this interesting subject. He observes that—

"In Scinde, the construction of a canal connecting the river Indus with the Nara stream has been approved. By this work the channel of the Nara will be annually and regularly supplied with water, which hitherto it has only received by extraordinary inundations, once in twenty years.

"In Lower Scinde the channels of the Foolalie have been cleared and improved; and in Upper Scinde similar and extensive measures of improvement have been executed in the channel of the Begaree Canal."\*

"For some years the Ganges has been covered with a flotilla of steamers. The Government river steamers have for several years periodically made the passage from Karachygo Mooltan along the Indus. That river is now becoming the great highway between Europe and the North-western Provinces. Troops arrive and depart by that route; great quantities of heavy stores follow the same course; and passengers in large numbers now by preference seek by it a point of departure at Bombay.

"Surveys have been made of the principal rivers of

Governor-General's Minute, p. 27.

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the Punjab, with a view to the extension of river navigation still further into the interior of the Province.

"The Indus may certainly be navigated nearly as far as Kalabaug, and at no great expense it might be made navigable to Attock.

"Immediately after the occupation of the Province of Pegu, half of the steam flotilla upon the Ganges was transferred to the Irrawaddy, and it forms now the great vehicle of trade, and for the conveyance of supplies between the frontier and the sea.

"This province is peculiarly fitted for the services of river steamers, and it is to be hoped that the flotilla will be largely increased.

"A survey of the river Godavery upon the opposite coast has also been undertaken. I am fully alive to the importance of opening this great inland navigation, if it be possible, for general purposes. The Government of India, therefore, has given full sanction to the prosecution, with proper precaution, of the extensive operations which the nature of the river channel, so far as it is yet known, seems to render indispensable before the Godavery can be made a navigable stream,"—that is to say, to its fullest extent at all times of the year.

"Besides the measures which have been taken in regard to navigable rivers, the means of internal navigation have been considerably increased during the last eight years by the completion of various navigable canals.

"The works of the great Ganges Canal and Baree Doab Canals, both of which will be available for navigation, have already been noticed.

"In the Madras Presidency considerable improvements have been made in the channel of Cochrane's canal. "A canal has been constructed to connect the ports of Porto Novo and Cuddalore in the district of South Arcot."

Other canals, extending several hundred miles along the surf-beaten coast of Coromandel, are in progress, and the Governor-General adds,---

"In the budget of 1855-56 further proposals were made for extending the several lines of internal navigation at an expense of not less than fifteen lacs of rupees (£150,000), and they have been recommended for the approval of the Honourable Court of Directors."

Such measures were much required, for we find in the Report of the Madras Commissioners of 1853, before alluded to, the following remark : "The river navigation of the country has not been improved, and canals for traffic have only been attempted on the very smallest scale." Since that was written the main canal on the Godavery has been opened, and the following has been the result.

Colonel Cotton, the originator and constructor of the Godavery works, writes,-

"With respect to the internal traffic, the returns I have now received (July, 1856) show that the number of

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boats passing through the head of the channel to the port of Coringa was as follows :---

" For eight	months endin	ng Apr	il,	1852		752	boats
" For year	ending April,	1853				2,297	32
* ,,	**	1854	•••		••••	7,362	33
"	"	1855	•••	•••	•••	8,349	>>

"Besides 933 rafts of timber and bamboos in the last year. The other two main channels leading from the *anicut* (or dam) were not opened till later, and I have returns from them only for two years. They show the number of boats for the whole three channels :---

" For the year	ending April,	1854	•••	11,274	boats
,,	"	1855	•••	18,818	**
•					
-					00

Increase in one year ... 7,544 or 60 p. ct.

"Besides the boats, there passed in the last year 2,270 rafts of timber and bamboos, making a total of 21,000, or nearly eighty every working day in the year. At present the only limit to the traffic is the delay in constructing boats fast enough. Again, on the *principal line* there has already passed, in a single month, 1,137 boats and 644 rafts,—together 1781, or nearly sixty per day on an average of the whole month, and probably more than one hundred on some days.

"Such are the results already achieved, though as yet no communication is open to the two important points, the great town of Masuhpatam, and the chief *entrepot* for internal trade, Ellore.

"Many of the branch channels are not open to the main channel (being closed with wiers) till locks can be built, and many branches remain to be cut. When the works are completed, they will afford 1,000 miles of canal navigation, where eight years ago there was not one."

The importance of navigation by means of the several rivers in India has been admitted by all the authorities to whom the subject has been proposed; yet by the circumstances of their being shallow in the hottest weather, and occasionally obstructed by impediments, the Natives of India have been prevented from making any attempt to carry on inlaud intercourse by these means. One occasionally meets at large towns in the interior permanent ferries throughout the year, and here and there a few clumsily-built boats; but as they have hitherto never learnt how to construct well-built roads, first introduced into Europe by McAdam only half a century ago, it is not surprising that they should, in the low state of the mechanical arts among them, have neglected the advantages which nature offered to them of rendering their rivers available for traffic. The skill and energies of Cautley and Cotton in the north and in the south of India have, with the assistance of Government, pointed out the path for private enterprise to follow.

So little however is yet known of the condi-

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tion of the numerous rivers which run waste into the ocean, that it would be hazardous to pronounce at what cost each may be made navigable. It is an engineer's question, but until it is satisfactorily answered, few private parties would engage in remote speculations without more information than the public has at present; but where that knowledge has been obtained, private enterprise has been rewarded by great returns. For instance, we find a private company, with very insufficient supply of steam-power, in the Ganges, dividing, according to authentic documents, 48 per cent. per annum, in the employment of steamtugs. On the Godavery, hitherto an unnavigable river, we find 55 per cent. to be the profit accruing from a single steamer; and the increase of traffic on the latter river, amounting to twelvefold in the course of four years, offers a very profitable result.

The Ganges, the Indus, the Irrawaddy, and the Godavery, are now occupied by steamers, and the traffic is so rapidly increasing, that the time has arrived when the inland trade of India by these means must be more extensively supplied with carriage than heretofore. A vast field, therefore, lies open to the profitable employment of English capital in such an enterprise. Nor are the Natives themselves indifferent to these specialations. The Parsees in Bombay are extensively concerned in the steam-navigation of the western coast. Many Natives have shares in the Godavery Steam Company, and a new company has lately been formed at Madras, got up entirely by Natives, for navigating the coast by steamers, which is already in operation.

The importance of employing steam-power for many miles up the Godavery, has been forcibly stated in paragraphs 433 to 439 of the report of the Madras Commissioners of 1852 before quoted,\* who also refer to a letter dated 4th March of that year, on the same subject, from the Madras Chamber of Commerce, pointing out the advantages to the public, as well as to the Government, by the latter aiding in rendering that river navigable at all times, whereas at present it is so only for 400 miles at particular seasons. For some

\* The portions of the Madras Commissioners' Report and the letter of the Madras Chamber of Commerce, above referred to, are too long for quotation.

years the mercantile house of Paymer and Co., of Hyderabad, transported cotton in considerable quantities from the interior, during the freshes; but the wait of steam-navigation, and the absence of the necessary means for bringing the boats up the stream during the rapids, together with the failure of the house of Messrs. Palmer and Co., from causes wholly irrespective of this traffic, prevented its continuation.

Nor has the Madras Government, nor the home authorities, been indifferent to this subject. A small steamer of too weak power penetrated for 400 miles up this river during the rainy season, and so satisfied was the Government with the trial, that they ordered a detailed report to be drawn up of the obstacles to navigation at all seasons of the year, and the cost of removing them. A survey was undertaken in the beginning of 1856, and completed with minute details as to expense. The report is before the home authorities, and there is every reason to believe that the work, which has been partially commenced, will be sanctioned and carried out.

The rivers Gogra and Gomty, passing

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through the territory of Oude, are also in progress of improvement, and shallow steamers have already been ordered for the navigation of the Megna, one of the feeders of the Bramapootra. Engineers who have been employed in surveying the rivers of India, are of opinion that in a few years ten thousand miles of inland navigation will be available for steamers and barges, where hitherto there were none, hardly one canal, and but few metalled roads.

### PART III .-- ROADS.

In spite of all other measures to improve the condition of the country, it ought to have been evident to every statesman, more particularly to English statesmen, that the first step towards prosperity is the facilitating internal communication by good roads. How could colonists in a new country succeed without substantial roads? They are the veins and the arteries which nourish commerce and give to it vitality; but all the effect of good Government, and protection of person and property,

will not avail to render a country rich, and its population prosperous, till a complete net-work of roads intersects it, and cheap and easy communication from one station or town to another is established. In vain were these sentiments addressed to the home authorities by our Governments abroad for more than half a century without producing any effect. Highways, termed military roads, were directed to be made from station to station. The work was entrusted to unskilful hands, who lavished the public money, both for want of knowledge and by the incomplete manner in which the socalled roads were constructed. The first or second rainy season rendered them altogether The Government consoled itself impassable. with the reflection, that where the rains were so heavy and the rivers so impetuous, the coustruction of roads in India was impracticable. At all events, instead of viewing internal communication as a primary object, it was long looked upon as the last thing which required attention. At length, about twenty years ago, an apprehension was awakened of a possible failure of the supply of cotton from America, and all eyes were turned towards the East.

Experiments were made in every part to grow the American cotton, and Indian cotton, when cleaned, was found to be a tolerable substitute for that of the United States. A parliamentary inquiry on this subject terminated by declaring its conviction that nothing was wanted to enable India to supply the whole of Europe, if necessary, with cheap and good cotton, but a modification of the land-tax, and good roads available at all seasons of the year. On further inquiry, it was found that the finest cottonfields were in the country of an independent Native sovereign (the Nizam); that the price of excellent cotton in his dominions was low, but that the want of roads rendered it impossible to bring it from the interior to the coast sufficiently cheap to be a source of profit to the merchant.

It was in this state of public feeling that the Indian home authorities were urged to create *railroads*, and they yielded to the pressure. They, however, strenuously resisted the appeal to construct them themselves, though the Government at home and abroad felt the desirability of having the entire control over them, both in the course of construction and after their completion. Under such conditions the English public refused to engage in the work, till by a compromise the money was raised and railways were commenced. The East-India Government agreed to pay five per cent. on all moneys advanced for the construction of railroads in India under the following condition :- First, that a director nominated by the Home Government should sit at the railway board in London, who should have a casting vote on all propositions to be first submitted to him ; secondly, that the lines of railroad should be approved by the home authorities, and that a superintending engineer on the part of the Government should overlook the works in India. That the interest advanced by Government on railway expenses should be repaid out of the working profit, and that no dividend beyond five per cent. should accrue till the whole amount advanced was repaid. According to the last accounts a sum of £9.599,624 has been expended, and £900,000 interest has The sum authorized to be been paid thereon. expended is £15,533,000, which will probably be worked off in the ensuing year, and a permanent demand on the Exchequer of £800,000

annually will have to be paid, till the whole advance has been liquidated. These constructions are denominated "trunk lines." They extend from three or four points, more than a thousand miles apart, and approach each other till they meet, leaving the many thousand miles of intermediate space without road at all. Trunk roads of this description would never pay in Europe, unless intersected by numerous roads and towns, nor can it be anticipated that these railroads will be profitable, until roads or canals or rivers rendered navigable, convey the traffic of the intermediate spaces to the railway-stations. There are those who believe that the roads should have been first made at a considerably less amount than is now sunk in the payment of interest on railway property, and that the railroads might then have been made with a certainty of profit, which at present is more than problematical. Howbert, the construction of these magnificent trunk lines, of from 1,200 to 1,600 miles in length, and unequalled in any other part of the globe, will prove of the greatest advantage to the Government in a military point of view, for if they do

not convey troops to the very spot they may be required, they will convert marches of weeks into days, and of months into weeks. The necessity for the formation of substantially built roads and bridges has now become appa; rent, but the Government has yet to learn that their completion alone will fulfil the object for which railways were established. Having said so much on the subject of railroads, let us see how little has been done, and what is doing for ordinary roads.

Previously to the commencement of the railway, a few short roads had been made in the Madras and Bombay Presidencies, which, like other public works of utility, had repaid their expenses, and were still paying, in the shape of tolls or customs at the seaports, double the amount previously realized. Several other roads were begun, but a conclusion was drawn, that no roads could stand the effects of Indian monsoons. This has since been found to be a delusion; nor is it true that India possesses no materials sufficiently durable to answer the purpose. At length the home authorities, in 1845, authorized an expenditure of £40,000 a year for the construction of roads in Madras.

The condition of the roads and the expenditure is thus adverted to in the Report of the Madras Commission, which sat in 1854 (p. 44). In the twenty years from 1826 to 1845, the average yearly outlay on the communications of the whole Presidency of Madras (138,249 square miles) had been 1,16,926 Rs., or £11,692. 12s. sterling. With the year 1846 a new era commenced, and the operations and the expenditure became somewhat larger. In the year 1845, the home authorities authorized an annual expenditure at the rate of four lacs of rupees (£40,000 sterling), for the construction and repair of roads, of which three diverged from the Presidency: first, to the west, 200 miles; second, to the south, 205 miles; third, to the north, with a branch inland to Cuddapah, 785 miles; with a fourth from the Mysore country, through Kûrg, to Mangalore, on the western coast: total, 1,295 miles. The steps taken to carry these measures into effect have not been successful, and it was found that, owing to the absence of sufficient scientific supervision, instead of the expenditure of £240,000 having been made, as was authorized, only £130,000 had been spent in six years, and the greater part of that sum was laid out in the northern route, in repairing and rendering passable the imperfect road, of 676 miles, to which allusion has been before made. The Report observes that :---

"The roads now existing in this Presidency may be divided into three classes :----

"1. Roads partially bridged and metalled, but not kept by any means in first-rate order. Such is the western trunk road.

"2. Roads formed and partially bridged, but unmetalled. Such are the best in the Tanjore and Salem districts.

"3. Tracks just practicable for carts for two-thirds or three-fourths of the year."\*

Of the first of these classes, there is a very limited amount, not more than 300 to 400 miles; of the second class there is more, possibly 2,000 miles; but the vast bulk of the communications of the country are of the third class. After going into much detail on the cost of a first-class road (" of which we cannot show one single mile in the whole country"), and to keep it in order, the Commission goes to prove that such roads alone, though comparatively expensive, are the only ones that

December, 1852. Madras Report, p. 171.

will repay their cost, and will add not only to the wealth of the people, but also to the finances of the state.

We hear little of roads constructed in Bombay, excepting the railroad.

In Bengal the great trunk road from Calcutta to Benares, 400 miles long, laid down in 1796, and repaired annually at an expense of about £4,000, had not been metalled nor bridged, nor properly drained, till after I saw it in 1831. It was in such a state in 1846, that the officers required to join the army from Calcutta in the field, on the Sutlej were expedited in palanquins, - on men's shoulders, at the rate of three miles an hour, and only two could be so dispatched daily, with all the exertions of the Government ; but matters have since mended, and the late Governor-General thus describes this road, which has now been extended beyond Delhi as far as Amballa.

His lordship observes :---

"The grand trunk road which had, speaking generally, been completed in 1853 as far as Delhi, has since been carried on without interruption." He observes, however, "that several of the large bridges had been unfortunately washed away by the force of the floods; that a bridge

over the Soane (three miles wide) had not yet been begun, but that a causeway, as a temporary expedient, was in the course of construction (1856). When the Punjab became a British province, the prolongation of the grand trunk road across its breadth was seen to be an object of primary importance. Accordingly, the line has been carried from Lodhianah by Jullunder to the Beeas, and thence by Umritsur to Lahore, and from Lahore by Wuzurabad to Jhilem, Rawilpindee, and Attock, to Peshawar.

"Vast expense has been incurred. But the road is rapidly approaching to completion, and by its usefulness will repay a THOUSAND-FOLD the labour and the treasure it has cost. Besides this road in the Punjab, others have been constructed during the last seven years for every different purpose,—military, commercial, and local." A full description will be found in the Punjab Report which has been printed.

Roads have also been constructed in other directions, to communicate with our distant province of Pegu. His lordship complains, however, that for want of engineers the roads in other parts of India cannot at present be constructed.

In the Statistical Report of the East-India House of 1853 the construction of roads is alluded to, and a map exhibiting two great trunk roads are laid down; the one from Calcutta to the north-west, which, though marked out 400 miles in length, as far as Benares, sixty years ago, was only really commenced to be constructed forty years afterwards. In 1836 metal was for the first time laid down : drains were constructed, bridges (many of which have since broken down) were built, and the road continued to Delhi 887 miles, and subsequently as far as Kurnoul, 78 miles further on ; total. 965 miles. From thence it has been surveyed 458 miles beyond, as far as Peshawar, the whole distance being 1,423 miles,-a gigantic work truly. The sum expended in carrying on the work as far as Dehli, including bridges, amounted to £819,410, or nearly £1,000 per mile, exclusive of the expense of convict labour. The cost of keeping it in repair is estimated at £35 per mile, or for the whole distance £50.000.

2nd. The Bombay and Agra road, a branch from the great trunk-road, was commenced under Lord Auckland's administration in 1840; its length is 734 miles, viz. :---

Agra to Indore	 	370 miles
Indore to Akberpore	 	51 "
Akberpore to Sindiva	 	43 "
Sindiva to Bombay	 	270 "
Total	 •	734 miles

ROADS.

This, not being macadamized, except in parts, is, for all mercantile purposes, during four months of the year impassable. The expense of construction amounted to  $\pounds 243,676$ , or about £330 a mile, and the cost of annual repair is estimated at £7 a mile.

A third road, from Calcutta to Bombay, extending 1,170 miles, was sanctioned in 1840. Previously to that time a metalled road had been constructed part of the way between Bombay and Ahmednuggur, 164 miles, but it does not appear that it has been carried on beyond the latter place. It might well have been constructed to Nagpoor, and thence to Jabalpoor, for the cotton traffic to the coast, but it is now proposed to wait till the railway can reach Nagpoor. In the state of the country between Nagpoor and Calcutta, owing to the dense forests, it would be both difficult and dangerous, on account of the climate, to carry out the original project.

In the North-western Provinces the one-percent. fund, paid by the landowners for the purpose of roads, is re-distributed among local committees; and such have been the good effects of this recent arrangement that, independently of a cross-road properly metalled between Cawnpore and Calpee, 40 miles in length, other cross-roads have been constructed by the committees within the province of 300 miles in extent, and are annually increasing.

A mistaken notion long prevailed that the natives would resist the payment of tolls on roads, though, in another shape, they have been familiar with such a tax from the earliest ages. An Act (No. 8 of 1851) was passed to levy tolls, according to a fixed schedule, on roads and bridges thereafter made or repaired at the expense of Government; the net proceeds to be appropriated to the construction of roads and bridges in the Presidency from which they are drawn. It is anticipated, as the traffic of the country increases, new roads will be constructed.

A table given at the end of the Report on Public Works, shows that for roads and bridges alone there had been expended throughout all India, on an average, £141,461 annually, being about ten per cent. on the gross revenue of the country. The amount expended in other public works (for irrigation principally) is about as much more.

Well-metalled and well-drained roads have been constructed among the Himalaya mountains within the last two years, which have not cost more than £90 a mile. Roads in the Deccan, of a similar nature, with metal laid on, the width of 18 feet, and maintained during the first year, only cost £150 per mile; and there can be no doubt that well-constructed roads, with stone drains, causeways, and even bridges of ten or fifteen feet span, could be constructed throughout India at a rate not exceeding, on an average, £250 a mile. If £330 a mile be allowed to include substantial bridges, thirty miles of road could be made at the cost of one mile of railroad. Had the nine hundred thousand pounds already paid in interest, before any profit has accrued on the railways, been expended during the last six years, two hundred and seventy thousand miles of roads had been completed, and a solid basis laid, on which railway traffic might have been remunerative. As it is, the cost of constructing twenty-one thousand miles of road will have to be paid annually to railroads for an indefinite period. Taking this view of the primary necessity of high roads, it has occurred to me

that the funds now set apart for the construction of roads, will be perfectly inadequate to fulfil the object within a limited period, and barely sufficient to keep them in repair. To meet this expense, however, I would suggest that all the money received back from railroad profits in liquidation of the advances made to them, should, instead of being applied to other purposes, be rendered applicable to the making of well-metalled roads.

The following sums have been devoted to public works during the last three years, including more than half a million annually for interest of the principal embarked on railway expenditure :---

In	1853-54	 		£2,520,000
In	1854-55	 		3,000,000
In	1855-56	 	•	2,250,000

It is hoped that no relaxation on the part of the Home Government will take place in these important measures for improving the condition of the people, and enriching the Government, which, as the Marquis Dalhousie has wisely said, "will repay a thousand-fold the labour and treasure they may cost."

It is to be hoped that the necessity of making well-metalled roads will be speedily recognized, and that a body of not less than 1,000 wellskilled overseers or superintendents will be sent out to India to accomplish that very important desideratum, and that they be added to the strength of the Sappers and Miners of the three Establishments.

# PART IV.—POSTAL COMMUNICATIONS AND ELECTRIC TELEGRAPH.

AMONG other benefits conferred on the subjects over which he ruled, the Governor-General undertook the reform of the postage department, and changed a really onerous burthen and an unsafe and tardy means of conveyance, to an improved state of things heretofore unknown. His first step was to reduce the amount of postage to every part of India, to about  $\frac{2}{4}d$ . per half-ounce, and to establish, throughout the country, conveyance, either on horseback or otherwise, which for eighty long years had been effected by foot-runners.

### ELECTRIC TELEGRAPH.

The last, and certainly not the least, of all the benefits he has conferred on India, is the establishment of the Electric Telegraph. We are not ignorant of its wonderful effects among ourselves, but there is something so striking in the energy and ability with which it was conducted, through the agency of one gentleman, Dr. O'Shaughnessy,\* that some account of it merits to be everywhere known.

I cannot give the account of its progress and completion in better language than the Governor-General himself:----

"In November, 1853, the construction of the telegraph line from Calcutta to Agra was commenced. On the 24th March, 1854, a message was sent over the line from Agra to Calcutta,—a distance of 800 miles, which had been completed within five months.

"On the 1st February, 1855—fifteen months after the commencement of the work,—the superintendent was able to notify the opening of all the lines. From Calcutta to Agra, and thence to Attock (on the Indus); and again from Agra to Bombay, and thence to Madras.

\* It is satisfactory to know that the services of Dr. O'Shaughnessy have been recognized by Her Majesty, who has conferred on him the honour of knighthood. These lines included forty-one offices, and were extended over 3,050 miles of space. Nor is this all: since the commencement of the past year, the line of electric telegraph has been completed to Peshawur. It has been extended to Ootacamund (on the Nelgherry Hills), and is nearly finished from Rangoon to Meeady (in Ava).

"To sum up in a single sentence: the superintendent has stated in his last report, that 4,000 miles of electric telegraph have been laid down, and placed in working order, since the month of November, 1853."

It is due to Dr. O'Shaughnessy to state a few of the difficulties he had to encounter, and in what manner he overcame them. Throughout Central India, for instance, he states,—

"The country crossed opposes enormous difficulties to the maintenance of any line. There is no metalled road; there are few bridges; the jungles also in many places are deadly for at least half the year; there is no police for the protection of the lines. From the loose black cotton soil of Malwa, to the rocky wastes of Gwalior, and the precipices of the Sindwa Ghats, every variety of obstacles has to be encountered."

"On the lines that have been mentioned, about seventy principal rivers have been crossed, some by cables, others by wires extended between masts.

"Some of these river-crossings have been of great extent. The cable across the Soane measures 15,840

Report, 9th Feb. 1856, para. 26.

feet; and the crossing of the Toonbuddra river is stated to be not less than two miles in length.

"The cost of constructing the electric telegraph in India cannot yet be accurately calculated. The superintendent, in his last report, has stated it as his belief, that the 'total cost of everything,—construction of 4,000 miles as they at present stand, working of all the offices for two years, spare stores in hand, instruments, houses, &c.,' will not exceed 21 lacs of Rs., or little more than 500 Rs. a mile

"It is to be observed that the construction of the line, though rapid, is for the most part already substantial. The superint indent states that the line 'for threefourths of the distance from Madras to Calcutta is superior in solidity to any ever erected elsewhere.'† On some portions of its length it stands without a rival in the world. For instance, in the Madras Presidency, the line for 174 miles is borne on stone masonry pillars capped with granite; while for 332 miles it is sustained 'on superb granite, sixteen feet high above ground, in single slabs.'‡

"It is satisfactory to be able to add, that the superintendent has officially stated that the tariff of charges on the Indian lines ' is now as cheap as that in use in any other country, having lines of such length as permit a fair comparison with ours.' §

"Thus it is stated that in England a message of twenty words sent 400 miles would be charged five shillings. The charge in India for twenty-four words to Benares, 420 miles, is 3s. ||

\* Report, 9th Feb. 1856, para. 66.
† Ibid. para. 81.
‡ Ibid. para. 32.
§ Ibid. para. 68.
|| Ibid. para. 70.

"Again, in the lines on the continent of Europe, a message of twenty-four words, sent from London to Trieste, would cost twenty-two shillings. A similar message of twenty-four words, sent from Calcutta to Bombay (about the same distance, 1,600 miles, as from London to Trieste), would be 12s.\*

"For a comparison of the charges for greater distances than these, we must look to the United States of America.

"The superintendent states that a message of sixteen words sent from New York to New Orleans, 2,000 miles, world cost 13s. 6d. A similar message of sixteen words sent from Calcutta to Bangalore, which is more than 2,000 miles, costs only 10s.<sup>+</sup>

"Allusion has been made to the physical difficulties which obstructed the formation of the telegraph lines in India. But these were by no means the most serious difficulty with which the superintendent has had to contend. An entire establishment for the working of the lines was to be formed from the commencement; and the materials from which to form it were scanty, and by no means of the best description.

"Hence the superintendent states, even in his last report,<sup>‡</sup> that his 'chief and almost insurmountable difficulty' has lain in the sudden and simultaneous training of some 300 persons, employed in sixty different offices. And while the superintendent affirms that the signallers generally are expert and capable of accurate manipulation, yet, in respect of steadiness and other requisite qualities, he records that there is both room and need for great improvement.

<sup>\*</sup> Report, 9th Feb. 1856, para. 74. + Ibid. para. 76. ‡ Ibid. para. 100.

"I could myself bear testimony to the accuracy and rapidity with which the telegraph is worked, but I prefer to quote the recorded statements of the superintendent.

"Referring to allegations of inaccuracy in the Telegraph Department, the superintendent observes-'I can further establish by facts and official records beyond dispute, that the Indian lines have already accomplished performances of rapidity in the transmission of intelligence, which equal that achieved on the American lines. We have repeatedly sent the first bulletin of overland news in forty minutes from Bombay to Calcutta, 1,600 miles. We have delivered despatches from Calcutta to the Governor-General at Ootacamund, during the rainy season, in three hours, the distance being 200 miles greater than from London to Sebastopol. We have never failed for a whole year in delivering the mail news from England via Bombay within twelve hours.'\* The superintendent states that the 'monthly cash receipts have, even in the first year, very largely exceeded the sum anticipated (namely, Rs. 10,000), and that they exhibit a steady and constant increase from month to month.' +

"The political and the military advantages which the Government of the country derives from the possession of such an engine of power are too obvious to call for notice. But two remarkable instances of its efficacy, which have fallen within my own immediate knowledge, will afford an illustration of its political value, which will not be without interest.

"When Her Majesty's 10th Hussars were ordered with all speed from Poona to the Crimea, a message requesting

Report, 9th Feb. 1856. + Ibid.

instructions regarding their despatch was one day received by me at Calcutta from the Government of Bombay, about nine o'clock in the morning. Instructions were forthwith sent off by the telegraph in reply; and an answer to that reply was again received at Calcutta from Bombay in the evening of the same day. A year before, the same communications for the despatch of speedy reinforcements to the seat of war, which occupied by the telegraph no more than twelve hours, could not have been made in less than thirty days.

"The other instance was of a similar character.

"When it was resolved to send Her Majesty's 12th Lancers from Bangalore to the Crimea, instead of Her Majesty's 14th Dragoons from Meerut, orders were forthwith despatched by telegraph direct to the regiment at Bangalore.

"The corps was immediately got ready for service. It marched 200 miles, to Mangalore, and was there before the transports were ready to receive it.

"In both cases the effect was the same. The electric telegraph enabled the authorities in India to give to Her Majesty's Government, in its hour of need, two magnificent cavalry corps of not less than 1,300 sabres, and to dispatch them to the Crimea with a promptitude and timely alacrity which exceeded all expectations; and which, in the circumstances of the previous year, would have been utterly impracticable.

"On the 7th of February, as soon as the administration of Oude was assumed by the British Government, a branch electric telegraph from Cawnpore to Lucknow was forthwith commenced. In eighteen working days it was completed, including the laying of a cable, 6,000 feet in length, across the river Ganges. General Outram was

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asked by telegraph, 'Is all well in Oude ?' The answer, 'All is well in Oude,' was received soon after noon, and greeted Lord Canning on his first arrival."

While these sheets are in the press it has been announced, that the home authorities have sanctioned the extension of the telegraph lines 3,000 miles farther, and that Sir W. B. O'Shaughnessy has been empowered to select a number of competent young men in England to accompany him to India for the purpose of working the new lines.

# CHAPTER VI.

## PART I.-GENERAL EDUCATION.

THE Marquis Wellesly was the first of the Governors-General in India who took part in the question of education. He was not ignorant of the literary treasures contained in the classical languages of India, but on inquiry he found the scholastic institutions which existed both under the Hindu and Mahomedan princes, whose places we were fast occupying, were in a great measure neglected, and that under our Government they had met with no encouragement, and must soon fall into decay. Independently of Native education, he perceived one of the greatest defects of our own Government was, that few among the European civil functionaries fulfilling the most important duties which can fall to the lot of man, knew enough of the language of the people over whom they were called on to rule, to enable them clearly to understand what they

heard, much less to converse with fluency. Accordingly, in conjunction with the authority of the Court of Directors, in the first year of the present century, he established a college for the reception of all young civilians on their arrival at Calcutta, to afford them an opportunity of learning the language of business. This was accompanied by a regulation which required every newly-arrived civilian, whether of the Bengal, Madras, or Bombay establishment, to proceed to Calcutta and remain in college till he had acquired a certain amount of proficiency in certain of the Native languages. This plan afterwards underwent great modification, and it was found most expedient that the Calcutta college should be commed to the civilians of the Bengal Presidency; that they should no longer live within college walls, but that they should be required to attend the professors daily, and be subject to periodical examinations. It was decreed also that public employment and increase of salary should depend entirely on the certificates obtained.

The only college which had been previously established was the Mahomedan Madrasa, or college founded by Mr. Warren Hastings, in 1782, for the study of Moslem literature, comprising Arabic and Persiau, to which was afterwards superadded classes for the study of English and Bengali.

The Madrasa is thus constituted

### The English Department.

One English head-master. Two second-masters (Hindus). One Bengali master (Hindu). One English librarian. One Hindu sub-assistant surgeon.

Statement exhibiting the Number and the Religion of the Pupils on the 30th April, 1854.

Departments	Number of Pupils	Christians	Mahomedans	Hındus.	Remarks.
Arabic Department English Department Bengali Department	173 91 47	-	173 . 94 47		The whole of these Students learn Persian as well as Arabic.

It has 12 senior scholarships at from £24 to £18 a year, and 16 junior scholarships at from £9 to £12 a year.

At a subsequent period in the year 1823, a Sanscrit college was founded in Calcutta, in which were professors of Sanscrit; English, Arabic, and Persian, as also Urdu and Bengali, the two latter being vernacular dialects of the lower Bengal provinces.

It is divided into the following classes :--

Philosophy	7				•	16
Law .						12
Rhetoric						19
Literature						33
Grammar					•••	219
Juniors un	der	the tuitio	n of n	nonitors		87
		Total		•••		386

The study of mathematics, hitherto taught in Sanscrit, is now confined to English.

There are thirty scholarships, receiving, according to classification, from £12 to £48 per annum.

The impetus thus given was rapidly followed by the establishment of English schools by the Natives themselves. Of the three classical Oriental languages taught in the colleges, the

Persian attracted most attention, because it was that in which all correspondence with the Native princes was maintained, as well as being the language in which the Native accounts and the records of the courts of justice were kept. It was to the Mahomedans what French was once to the English; but the good sense of the people in the latter, and that of the Government in the former case, has abolished both. This change, however, only took place in India as late as 1835.

In the year 1819, the Hon. Mount Stuart Elphinstone succeeded to the office of Governor of Bombay. He had passed twenty-three years in India, and had during that period fulfilled some of the highest duties of Government. His early attention as Governor was drawn to the state of education of the inhabitants, and he instituted a college, in which the vernacular language was taught grammatically, preparatory to the study of English. The object of the former being to lay the foundation of a rigid form of literature, and of the latter to enable the Natives to translate, for the purpose of publication and diffusion throughout the country, useful works for the improvement of the moral condition and the expansion of the minds of the people. The scheme has been extremely successful. A college at Bombay, and another at Poona, have furnished a great number of well-trained masters; and there are now 235 schools, and 12,384 scholars, maintained at the public expense. Assuming that each pupil is four years at school (and they seldom remain longer), and we take two-thirds of this number as the average of the last thirty-five years, we should have had useful education imparted to about 70,000 Natives, substantially educated at the sole expense of the Government, independent of private tuition, or that which is acquired in the parish schools, purely for commercial purposes.

While these measures were in contemplation, Sir Thomas Munro, another distinguished public servant, of a longer standing even than Mr. Elphinstone, was appointed Governor of Madras, and proceeded to his office by the route of Bombay, where he had an opportunity of discussing this important measure of education with his friend Governor Elphinstone. Shortly after his arrival at the seat of Government, he took steps to ascertain the condition of education in the Madras Provinces.

The Reports received from the eight principal divisions were as follows :---

Collectorates of from 800,009 to 1,000,000 of Inhabitants.	Colleges.	Students.
Rajahmundry	272	1,454
Masulipatam	49	199
Chingleput, or Southern Division of Arcot	51	398
North Division of Arcot	69	) Number ( not given
Tanjore	109	769
Tritchinopoly	9	131
Coimbatore ,	173	724
Malabar	1	75
Total Colleges	733	3,750

These colleges are described as institutions " consisting of buildings and a number of professors supported by endowments of land or money, from the ruling kings, or some wealthy Pagoda.

"The alumni were young men of advanced scholarship, chiefly Brahmins, and often devoted to a religious life, in some one of the many forms prescribed in Hinduism. The professors were of course Brahmins, each giving himself up to that science in which he most excelled. The subjects most commonly studied were, theology, law, and astronomy.

"How far the colleges returned as such in the documents forwarded answered to this description does not clearly appear. At all events, they were of a different character from those institutions known as village schools."

Independently of the above description, no special inquiry seems to have been required or made.

The population at Madras in 1822, according to a census made about that period, amounted to 12,850,941, among which there were reported to be the following number of colleges, schools of all descriptions, and students of both sexes :---

Colleges and	STUDENTS.			
Schools.	Boys.	Girls.		
12,498	188,650	1,548		

Of the girls, many were the daughters of Brahmins, and some of the dancers and singers,

attendants on temples and at Hindu religious and domestic festivals.

Of the number of boys between five and twelve, fit to be at school, according to the calculation made of that portion of the population, about one-third were receiving education at colleges or schools, independently of private tuition, of which no return was made.\*

Sir Thomas Munro seems to have taken the same view of education for the Natives as Mr. Elphinstone. This involved a better description of moral teaching in the vernacular languages, to be effected through the means of Native students at a college to be founded at the Presidency for the purpose of forming normal schoolmasters. These were required in the first instance to be thoroughly grounded in their vernacular languages, with a competent knowledge of Sanscrit, and subsequently to be taught English, so as to be able to read, write,

The return states that the male pupils were as follows :--

Brahmins	•••	• • •	•••	•••	 42,502
Mercantile	class				 19,690
Agricultur	al and	l oth	ner cl	asses	 126,458
	To	tal			 188,650
					нЗ

and translate correctly. This done, it was proposed that the proficients should be sent as teachers to the several collectorates, and establish at the head-quarters of each a school for normal tuition. As the students became competent to teach, they were to be spread through the districts in the principal towns, carrying with them the well-grounded knowledge they had acquired, and diffusing through the country the books, whether of their own literature or translated from the English, which were from time to time printed at the Government press of the Presidency : the whole to be regulated by a Council of Education at Madras, consisting partly of Europeans and partly of Natives of education.

According to this plan there were to have been eventually distributed in the districts, 340 schoolmasters,—forty of whom, at the capitals of collectorates, were to receive £18 per annum, and 300 into towns at £10.16s. per annum.

\* I believe this plan has not been carried out, and that a collegiate institution, which has only educated 160 pupils, is the only public school as vet established in the Madras territory.