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Public Works

DEPARTMENT.

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Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
15th January 1869.*

Read the following papers.—

No 239 From the Superintending Engineer, 8th Division, to the Secretary to Government, Public Works Department, dated Malur, 18th September 1868, No 1,424.

1. I have the honor to forward, for the information of Government, a very interesting report (with sketch plan) on the remains of an ancient lake, situated about twelve miles west of the station of Kodikanel, on the Palney Hills.

1 Report
1 Sketch Plan

2 It was after a conversation with His Excellency Lord Napier that I requested Captain Prendergast to make a survey, and report on this site, where, in event of Government wishing to make a new Hill Station for troops, or a Sanatorium, or place where Europeans might settle down, there is a spot hardly equalled in any of the Hill Stations in India.

3 There are the remains of a bund on the north side, which was about ninety feet high, and all round the hills, where the lake must have been, a clearly defined water line is seen, which has eaten its way in some places several feet into the sides of the hills, and I have no doubt the lake must have contained water for years. The relative height of this water-mark is fifty feet above the bed of the stream at the breached bund.

4 On the south side there is a swamp at fifty-seven feet above the bed of stream at breach, which drains down on both ways. On the south a small stream towards the valley of Bodynaickenoor, and the north side it runs in a very tortuous course towards the bund.

5 I have no doubt that the bund was originally made by the Bodynaickenoor people, to turn the water to the south into their valley, instead of to the north, as it naturally runs. In the next valley of Fort Hamilton, the same thing occurs on a small scale, where there is a bund which sends the water down to the south, and which was cut last year by the inhabitants of Poombarray to turn the water down to their village.

6 As shown by Captain Prendergast, this is a noble site for a Hill Station. Fine undulating grass land, plenty of water, sholals within two and three miles, and an easy system of drainage available down perpendicular cliffs with above 2,000 feet fall on eastern side of the lake into the valley of Bodynaickenoor.

7 There would also be sufficient water should the lake be restored with the object of making a reservoir to irrigate at least 8,000 acres in the Bodynaickenoor valley, which at Rupees 5 an acre would give a yearly revenue of 40,000 Rupees.

From Captain H L PRENDERGAST, R. E., Executive Engineer, to the Superintending Engineer, 8th Division, dated Kodikanel, 14th September 1868.

1 With reference to your letter No 1,162, of the 7th August 1868, I have the honor to forward a sketch plan of the valley of the ancient lake, twelve miles from Kodikanel. There is no record or even current tradition regarding the former existence of this lake, which appears to have been discovered by Colonel D. Hamilton,

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some seven years ago, but the water-line, distinctly conspicuous at many places round the windings of the valley, shows that there was formerly an extensive reservoir.

2 The bund of the lake is at the northern extremity of the valley, its length is about 200 yards, and the breach at top is not quite 100 yards in width. The height of the bund, as taken accurately by the levelling instrument, was $89\frac{1}{2}$ feet above the bank of the stream, or $93\frac{1}{2}$ feet above its rocky bed. Colonel Hamilton considers it probable, that from the water-line not being observable on the unbreachd portion of the spur or bund, the water of the lake sapping into the hill caused a land-slip, and the consequent destruction of the lake. My own impression is, that, judging by the conformation of the valley both above and below the bund, the stream had naturally an exit in its present channel, and that the cavities in the hill side, at each extremity of the bund, point unmistakably to artificial excavations, all the soil having been removed in an irregular manner, till the hard rock was arrived at. I cannot trace any signs of a land-slip so extensive as to have formed the whole of the barrier on either side, and the fact of the water-line not being traceable, does not appear to me to be a proof that the barrier was not standing in support of the water of the lake, for there are many other parts of the border where the water-line is completely effaced. The appearance of the rock on the side of the breach leads me to infer that the spur occupies its original position, there having been a contracted passage for the issue of the stream, and that this passage was closed, and the top raised and levelled for the purpose of forming a lake.

3 As the top of the bund is forty feet above the water-line, the water must, after a time, have undermined the embankment, and swept it away. No sudden accession of water could have caused the lake surface to overtop the bank, for the outlet for surplus water at the southern end of the lake is at present only seven and a half feet above the water-line, and as there is a deposit of black soil at the ridge, the level of escape in former times was possibly several feet lower.

4 The ridge is situated in a narrow valley, within three hundred yards of the precipice into the Bodynaickenoor valley, and a small swamp is found on the short space of flat bed, the one stream thence falls very rapidly to the south, and the other, more gently, towards the bed of the lake. I took levels from this ridge* downwards to the nearest point

* Marked on the plan by a double arrow head. where the water-line was plainly seen, and checked the latter by taking also the water-line on the opposite side of the valley; as these two points agreed, I assumed that similar evidences of the water-mark at other parts of the lake must be on the one uniform level, and thus obtained the water level on the bund, without the trouble of levelling all along the course of the lake.

5. The level of the water-line on the bund is $49\frac{1}{2}$ feet above the bank of the stream: there is, therefore, a fall of fifty-seven feet in the whole distance from the ridge. Again, within a mile from the ridge, the bank is $17\frac{1}{2}$ feet below the water-line, so that the fall from thence to the deepest part of the bed (i. e., at the bund) is thirty-two feet. The point where this difference of level was taken, is at the upper end of the reach that runs from east to west; and the distance to the bund, measured in two lines, first to west and then to north, across the map, is about two and a quarter miles; but the stream takes a very tortuous course through the valley, and the length of its windings between the same points is four and one third miles, so that the average fall is at about seven and a half feet a mile.

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6. The surface area of the lake, when filled to the level of the old water-line, is six and a quarter square miles, and the cubical content is approximately 147 million cubic yards. There is no reliable record of rain-fall on the Pulney Hills, but considering the average fall in other hilly parts, I assume the yearly fall to be seventy-two inches. The catchment basin is about $29\frac{1}{2}$ square-miles, and the volume of water poured down is therefore 184,307,200 cubic yards. The sides of the hills sloping down into the bed of the lake are nowhere precipitous, and are covered with grass, springing from the black soil that, covering the high ground very scantily, increases to a depth of a yard or two yards in the valleys. All the smaller rills run through this soft soil, which low down in their course forms a bog, and they none of them have had erosive force sufficient to wear down to the rock, hence I conclude that the discharge of rain into the valley is not rapid, and as, during the south-west monsoon, there is a great deal of Scotch mist, rather than heavy showers, I take one-half of the rain-fall, or 92,153,600 cubic yards, as the available store of water. Thus the rain-fall of about one year and a half is required to fill the lake to its former height.

7 The period of rain-fall is principally between June and December, there being a break between the two monsoons in September and part of October, the early part of the year is the most dry, and showers fall again in April and May.

Supposing the lake to be filled to the water-line by the north-east monsoon, then, during the six months, January to June inclusive, the evaporation amounts to 24,000,000 cubic yards. at three-fourths of the total evaporation for the year, and the storage by rain is 30,717,866 " at one-third of the year's supply, so that the supply by rain is sufficient to maintain the water-level in the lake. The surface area of the lake is six and a quarter square-miles, and I assume that one-sixth inch is lost by evaporation per day, or about thirty two million cubic yards in the year, then considering that there is usually a great deal of cloudy weather during the seasons of monsoon between July and December, and that there is bright sunshine chiefly in January to March and in June, three-fourths of the total loss by evaporation is calculated as being sustained in the first half of the year.

Again, with regard to the rain-fall, as the north-east monsoon sometimes brings rain late in January, and the south-west monsoon may also commence in June, I reckon that one-third of the rain-fall of the whole year comes down between 1st January and 1st July. In the latter half of the year there is supply of water 61,435,734 cubic yards.

at two-thirds of the whole year's supply, and loss by evaporation 8,000,000 " at one-fourth of the annual loss. Balance of water available 53,435,734 "

Now, with a view to utilizing the water of the lake for cultivation in the Cumbum valley, as well as to maintaining the water-level not much below its full depth, and supposing a sluice at the southern ridge that will lower the water seven and a half feet, the volume of water drained off to that depth will be 33,650,000 cubic yards, this volume being the cubical content of a surface layer cut off by a horizontal section, taken at seven and a half feet depth in the centre, and allowance being made for the

sloping banks at the sides Thus there are fifty-three million cubic yards of supply to make good the discharge of thirty-three millions.

* This flows into the Cauvery

8 The lake stream is one of the small tributaries of the Amaravutty* river, the main source of which is in the Travancore country to the west, and is recognized on the Ordnance Map as passing by Kujee nad, the drainage area of the lake, thirty square-miles, is quite insignificant as compared with the extent of hill country that drains into the Amaravutty, and there is only one small patch of cultivation in the village of Manavanoor, measuring 500* acres, that can be said to be dependent (and in reality but partially so) on the lake stream. If the lake

* The actual measurement has not been received from the Tahsildar, and a round number is taken, probably in excess of the actual figure

were restored, the people of Manavanoor would have a claim to a sluice in the bund for the irrigation of their fields, and allowing them the full share of water for a crop of paddy, at 6,000 cubic yards per acre, provision would be required for the discharge of three million cubic yards in the season, at the northern end of the lake. There is shown above to be fifty-three million cubic yards of water supply, and deducting three millions for Manavanoor, there remains fifty millions available for irrigation in the Cumbum valley, or sufficient for 8,300 acres of paddy land. The level of the lake will, during the cultivating season, never be lowered more than

seven and a half feet, while an excessive influx† of water may either be retained

† i.e., from heavy rains in the lake, or discharged into the valley to the south.

9. The most conspicuous point round the basin of the lake is the Chundanoor hill, (marked on the Atlas Sheet, No 62,) of the south-west extremity, and within a mile, as the crow flies, from the ridge. The summit of this hill is 7,400 feet above the sea, and this being 400 or 500 feet above the valley, the slopes bordering the lake are at an elevation of just about 7,000 feet. About the lake there is certainly a most attractive site for a European settlement, or Military Sanitarium, the small knolls and spurs gradually sloping down to the water-line, are delightfully situated for detached bungalows with gardens in the intervening valleys, while the larger ridges on the east side of the lake would, on the top and slopes, give space for considerable Barrack accommodation. The first essential, to be seen from the lake valley, but on looking down northwards, from the Chundanoor hill, there is seen a large shola close below, and the slopes of the hills are in different directions covered with forest within two or three miles distance. Round the lake itself the air is most invigorating, the west wind, that of greatest prevalence, blowing over miles of grass-covered hills, and there being no deleterious influences from rank vegetation or forest. My tent having been carried by the coolies in a wrong direction, I was benighted, and obliged to pass a night in the open, but without feeling the slightest bad effect. The thermometer at night falls below 50°, in the day-time stands between 60° and 65°.

10 If it were determined to locate a wing of a British Regiment at this place, and to establish also a Convalescent Depôt, the number of troops being, say, 700, and allowing for Officers, casual visitors, &c., 100 more Europeans, or alto-

gether 800, taking further five Natives on average for each European, there would be an aggregate population of 5,000 people. Then, calculating the necessary water-supply at fifty gallons per head, per day, the annual consumption will be within 550,000 cubic yards, which is not one-hundredth part of the rain-fall stored during the year.

For bathing purposes no water need be raised for the soldiers, as floating baths, such as are common on the Rhine and other continental rivers, would afford the recreation of bathing at a much less cost to Government than pukka buildings adjoining the Barracks.

The climate is such that Europeans may be out in the open air all day long, and soldiers could indulge in all the out-door sports of their own country. Cricket, rackets, fives, as played on the plains, as also hockey and foot-ball might give a variety to the amusements of the day, and, with the alternative of workshops and reading-rooms for rainy weather, and gardening, rowing on the lake, with walks of unlimited length and variety over the hills, in fine weather; the station ought to be one affording high enjoyment as well as benefit to the health of the soldier.

11. The site of the lake is known to only a few of the Natives residing on the hills. There is a pass from the head of the Bodynaickenoor valley, which leads to the village of Manavanoor, to the west of the basin, but the trade between Manavanoor and the plains is principally carried on by pack-bullocks and donkeys, along the ghaut from Peracolum through Kodikanel. I have not reconnoitred the pass from Bodynaickenoor to see if that is a favorable line for a road, for the route by Kodikanel is much shorter, and it would be far less expensive to improve the Peracolum Ghaut, than to lay out an entirely new trace on the other line.

MEMORANDUM.

No 97.

1 As the condition of the ancient lake in the Pulney Hills is fully particularized in the foregoing reports, I would propose to confine my remarks to the general results of Captain Prendergast's survey of the locality.

2. The catchment basin of the tank is somewhat under thirty square-miles, and the total volume of water which would be obtained by a fall of seventy-two inches of rain over the whole area, would amount to 184 millions of cubic yards. The former capacity of the tank, which is well defined by a water-line still to be seen on both sides of the valley, is estimated at 147 millions of cubic yards. Captain Prendergast would not count on intercepting more than half the rain fall, or ninety-two millions of cubic yards, so that the capacity of the tank is about one-half more than the quantity which would be likely to be available in the course of twelve months. He proposes to store the water permanently up to a certain level, by reserving a portion of the supply drained into the tank, after it is once filled, to make good the loss by evaporation, and by this arrangement the quantity to be used for irrigation would be reduced to fifty-three millions of cubic yards, of which fifty millions would be turned over the southern extremity of the tank into the Cumbum Valley, and the remaining three millions through the bund in the northern extremity towards the village of Manavanoor. The natural level of the ground at the south extremity is fifty-seven feet above that of the bed of the stream at the site of the old bund at the

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northern end of the basin, the old water-line is forty-nine and a half feet above the same level. The permanent storage line, by Captain Prendergast's arrangement, would be nearly on the former level, and the additional thirty-three and a half millions would be obtained by raising the surface to the fifty-seven feet contour, it may therefore be assumed that the required quantity of fifty-three millions would be obtained at the sixty feet contour, or within a foot or two of it.

3 The object of Captain Prendergast's proposed arrangement for maintaining the water level at the minimum height of nearly fifty feet above the bed of the stream, at the site of the old bund, is two-fold. He could not otherwise obtain the water for the cultivators in the Cumbum Valley, for the tank once emptied, could not be filled again in a single season, and he besides lays stress on the inducement such a lake would offer for the formation of an European settlement in one of the most elevated and attractive sites to be found in Southern India.

4 Looking, however, at the question in connection with the interests of irrigation only, I do not see any valid reason for holding the water up for the benefit of the cultivators of the Cumbum Valley. The natural course of the stream leading through the old tank is towards the Amaravutty, and the cultivators along the latter have the first claim for the use of the water. Moreover, the supply of the numerous channels which are led off from that river is very deficient, and large remissions of revenue have frequently to be made in consequence. There would also be an absolute waste of water by the proposed plan of maintaining the surface at a high minimum level. But whatever decision may be arrived at on these points, the project would appear to be of a sufficiently promising character to justify the preparation of detailed plans and estimates for the restoration of the old bund, and for the construction of masonry works for the distribution and regulation of the water, and I would, therefore, recommend that instructions to that effect may be issued to the Superintending Engineer.

FORT ST GEORGE,
23rd November 1868

(Signed) J. C. ANDERSON, Colonel, R. E.,
Chief Engineer for Irrigation.

No 240 ORDER THEREON, 15th January 1869, No 117.

IRRIGATION, No. 18

Colonel Douglas Hamilton on the Pulney Hills.

1 The Government have perused with much interest Captain Prendergast's report on the ancient lake discovered by

2 In commenting on the results of Captain Prendergast's survey of the locality the Chief Engineer for Irrigation gives it as his opinion that, looking solely to the interests of irrigation, the restoration of the lake to serve as a reservoir for the retention of a large body of water is very desirable, and that, as there is no valid reason for permanently holding the water up to the level at which it seems to have been formerly maintained, the whole of it should be utilized. Colonel Anderson would therefore restore the Lake as a work of irrigation, and so construct its sluices as to be able to discharge, as may be necessary, the whole of its contents, which are estimated at 147 millions of cubic yards, while the rain-fall on the area drained into it is supposed to be only equal to 184 millions of cubic yards.

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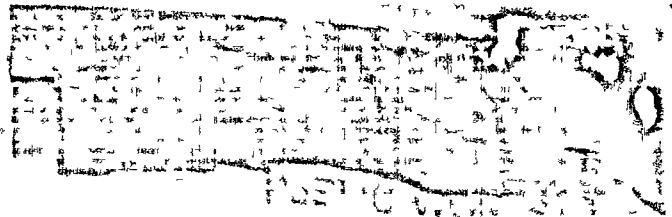
3. The Government do not concur with the Chief Engineer for Irrigation, as they are of opinion that the object of the undertaking should not be confined to the improvement of irrigation by the natural outlet towards the Amaravutty, but that the lake should be restored to its former dimensions, and that the surplus alone should be discharged into the Cumbum valley for the benefit of irrigation through an artificial cutting. His Excellency the Governor in Council accordingly directs that plans and estimates for carrying out the work with this object in view, may be prepared and submitted.

(True Extract)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government

To the Chief Engineer for Irrigation
,, Superintending Engineer, 8th Division
,, Revenue Department

Ed S. T. Angustin



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1 Sketch Plan

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4. On the south side there is a swamp at fifty-seven feet above the bed of stream at breach, which drains down on both ways. On the south a small stream towards the valley of Bodynaickenoor, and the north side it runs in a very tortuous course towards the bund

5. I have no doubt that the bund was originally made by the Bodynaickenoor people, to turn the water to the south into their valley, instead of to the north, as it naturally runs. In the next valley of Fort Hamilton the same thing occurs on a small scale, where there is a bund which sends the water down to the south, and which was cut last year by the inhabitants of Poombarray to turn the water down to their village.

6. As shown by Captain Prendergast, this is a noble site for a Hill Station
Fine undulating grass land, plenty of
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Height above the sea about 7,000 feet
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some seven years ago, but the water-line, distinctly conspicuous at many places round the windings of the valley, shows that there was formerly an extensive reservoir

2. The bund of the lake is at the northern extremity of the valley, its length is about 200 yards, and the breach at top is not quite 100 yards in width. The height of the bund, as taken accurately by the levelling instrument, was 89½ feet above the bank of the stream, or 93½ feet above its rocky bed. Colonel Hamilton considers it probable, that from the water-line not being observable on the breached portion of the spur or bund, the water of the lake sapping on the uncaused a land-slip, and the consequent destruction of the lake. My own impression is, that, judging by the conformation of the valley both above and below the bund, the stream had naturally an exit in its present channel; and that the cavities excavations, all the soil having been removed in an unmistakably to artificial rock was arrived at. I cannot trace any signs of a land-slip so extensive as to have formed the whole of the barrier on either side, and the fact of the water-line not being traceable, does not appear to me to be a proof that the barrier was not standing in support of the water of the lake, for there are many other parts of the border where the water-line is completely effaced. The appearance of the rock on the side of the breach leads me to infer that the spur occupies its original position, there having been a contracted passage for the issue of the stream, and that this passage was closed, and the top raised and levelled for the purpose of forming a lake

3. As the top of the bund is forty feet above the water-line, the water must, after a time, have undermined the embankment and swept it away. No sudden accession of water could have caused the lake surface to overtop the bank, for the outlet for surplus water at the southern end of the lake is at present only seven and a half feet above the water-line, and as there is a deposit of black soil at the ridge, the level of escape in former times was possibly several feet lower

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5. The level of the water-line on the bund is 49½ feet above the bank of the stream there is, therefore, a fall of fifty-seven feet in the whole distance from the ridge. Again, within a mile from the ridge, the bank is 17½ feet below the water-line, so that the fall from thence to the deepest part of the bed (i. e., at the bund) is thirty-two feet. The point where this difference of level was taken, is at the upper end of the reach that runs from east to west; and the distance to the bund, measured in miles, first to west and then to north, across the map, is about two and a quarter miles; but the stream takes a very tortuous course through the valley, and the

length of its windings between the same points is four and one-third miles, so that the average fall is at about seven and a half feet a mile.

6. The surface area of the lake, when filled to the level of the old water-line, is six and a quarter square-miles, and the cubical content is approximately 147 million cubic yards. There is no reliable record of rain-fall on the Pulney Hills, but considering the average fall in other hilly parts, I assume the yearly fall to be seventy-two inches. The catchment basin is about 29½ square-miles, and the volume of water poured down is therefore 184,307,200 cubic yards. The sides of the hills sloping down into the bed of the lake are nowhere precipitous, and are covered with grass, springing from the black soil that, covering the high ground very scantily, increases to a depth of a yard or two yards in the valleys. All the smaller rills run through this soft soil, which low down in their course forms a bog, and they none of them have had erosive force sufficient to wear down to the rock, hence I conclude that the discharge of rain into the valley is not rapid, and as, during the south-west monsoon, there is a great deal of Scotch mist, rather than heavy showers, I take one-half of the rain-fall, or 92,153,600 cubic yards, as the available store of water. Thus the rain-fall of about one year and a half is required to fill the lake to its former height.

7. The period of rain-fall is principally between June and December, there being a break between the two monsoons in September and part of October, the early part of the year is the most dry, and showers fall again in April and May

Supposing the lake to be filled to the water-line by the north east monsoon, then, during the six months, January to June inclusive, the evaporation amounts to 24,000,000 cubic yards at three-fourths of the total evaporation for the year; and the storage by rain is 30,717,866 " at one-third of the year's supply so that the supply by rain is sufficient to maintain the water-level in the lake. The surface area of the lake is six and a quarter square miles, and I assume that one-sixth inch is lost by evaporation per day, or about thirty-two million cubic yards in the year, then considering that there is usually a great deal of cloudy weather during the seasons of monsoon between July and December, and that there is bright sunshine chiefly in January to March and in June, three-fourths of the total loss by evaporation is calculated as being sustained in the first half of the year.

Again, with regard to the rain-fall, as the north-east monsoon sometimes brings rain late in January, and the south-west monsoon may also commence in June, I reckon that one-third of the rain-fall of the whole year comes down between 1st January and 1st July. In the latter half of the year there is supply of water 61,435,734 cubic yards at two-thirds of the whole year's supply, and loss by evaporation 8,000,000 " at one-fourth of the annual loss

Balance of water	available	53,435,734 "
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were restored, the people of Manavanoor would have a claim to a sluice in the bund for the irrigation of their fields; and allowing them the full share of water for a crop of paddy, at 6,000 cubic yards per acre, provision would be required for the discharge of three million cubic yards in the season, at the northern end of the lake. There is shown above to be fifty-three million cubic yards of water supply, and deducting three millions for Manavanoor, there remains fifty millions available for irrigation in the Cumbum valley, or sufficient for 8,300 acres of paddy land. The level of the lake will, during the cultivating season, never be lowered more than seven and a half feet, while an excessive influx† of water may either be retained in the lake, or discharged into the valley to the south.

† i.e., from heavy rains

9. The most conspicuous point round the basin of the lake is the Chundanoor hill, (marked on the Atlas Sheet, No. 62,) at the south-west extremity, and within a mile, as the crow flies, from the ridge. The summit of this hill is 7,400 feet above the sea, and this being 400 or 500 feet above the valley, the slopes bordering the lake are at an elevation of just about 7,000 feet. About the lake there is certainly a most attractive site for a European settlement, or Military Sanitarium, the small knolls and spurs gradually sloping down to the water line, valleys, while the larger ridges on the east side of the lake would, on the top and slopes, give space for considerable Barrack accommodation. The first essential, water, is at hand in abundance, and of the best quality; wood for fuel is scarcely to be seen from the lake valley, but on looking down northwards, from the Chundanoor hill, there is seen a large shola close below, and the slopes of the hills are in different directions covered with forest within two or three miles distance. Round the lake itself the air is most invigorating, the west wind, that of greatest prevalence, blowing over miles of grass-covered hills, and there being no deleterious influences from rank vegetation or forest. My tent having been carried by the coolies in a wrong direction, I was benighted and obliged to pass a night in the open, but without feeling the slightest bad effect. The thermometer at night falls below 50°, and in the day-time stands between 60° and 65°.

10. If it were determined to locate a wing of a British Regiment at this place, and to establish also a Convalescent Depot, the number of troops being, say, 700, and allowing for Officers, casual visitors, &c, 100 more Europeans, or altogether 800, taking further five Natives on average for each European, there would be an aggregate population of 5,000 people. Then, calculating the necessary water-supply at fifty gallons per head, per day, the annual consumption will be within 550,000 cubic yards, which is not one hundredth part of the rain-fall stored during the year.

For bathing purposes no water need be raised for the soldiers, as floating baths, such as are common on the Rhine and other continental rivers, would afford the recreation of bathing at a much less cost to Government than pukka buildings adjoining the Barracks.

The climate is such that Europeans may be out in the open air all day long, and soldiers could indulge in all the out-door-sports of their own country. Cricket, rackets, fives as played on the plains, as also hockey and foot-ball might give a variety to the amusements of the day; and, with the alternative of workshops and reading-rooms for rainy weather, and gardening, rowing on the lake, with walks of unlimited length and variety over the hills, in fine weather, the station ought to be one affording high enjoyment, as well as benefit to the health of the soldier.

11. The site of the lake is known to only a few of the Natives residing on the hills. There is a pass from the head of the Bodynaickenoor valley, which leads to the village of Manavanoor, to the west of the basin, but the trade between Manavanoor and the plains is principally carried on by pack bullocks and donkeys, along the ghaut from Pereacolum through Kodikanel. I have not reconnoitred the pass from Bodynaickenoor to see if that is a favorable line for a road, for the route by Kodikanel is much shorter, and it would be far less expensive to improve the Pareacolum Ghaut, than to lay out an entirely new trace on the other line.

No 11,24

Superintending Engineer's Office.
(Madras 18th September/68

From

Colonel C. V. Wilkinson R.E.
Superintending Engineer
S. (Division)

To

Colonel C. A. Orr R.E.
Secretary to Government
P. W. (S)

Sir,

I have the honor to
forward for the information of
Government a very interesting
report (with sketch plans) on the
remains of an ancient Lake, situated
about 12 miles west of
the Station of Kodukamal on the
Pulney Hills.

It was after a conversation
with His Excellency Lord
Napier that I requested Captain
Bundergast to make a survey

Trans. Secy/19 de 1899.

1899/10/19/11/11/11

and report on this site, where in
event of Government wishing to
make a new hill station for troops,
or a Sanatorium, or place where
Europeans might settle down,
there is a spot hardly equalled
in any of the Hill Stations in
India

3. There are the remains
of a bund on the north side which
was about 90 feet high and all
round the hills, where the lake
must have been, a clearly defined
water line is seen, which has eaten
its way in some places several feet
into the sides of the Hills and -
I have no doubt the lake must
have contained water for years.
(The relative height of this watermark
is 50 feet above the bed of the stream
at the breached bund.

4. On the South side there
is a swamp at 57 feet above the

bed of stream at breach which
drains down on both ways. On the
South a small stream towards the
valley of Bodmaikemoor and the
north side it runs in a very tortuous
course towards the bund.

5. There is no doubt that the
bund was originally made by the
Bodmaikemoor people to turn the
water to the South into their valley
instead of to the North as it natu-
rally runs. In the next valley
of Fort Hamilton the same thing
occurs on a small scale where
there is a bund which sends the
water down to the South and
which was cut last year by the
inhabitants of Poombarray to
turn the water down to their village.

6. As shown by Captain
Prendergast this is a noble site
for a Hill Station: Fine moun-
-taining, grass land, plenty of water,
Sholab within 2 & 3 miles and an

Ample above the
Sea about 7000 feet

every system of drainage available
down perpendicular cliffs with about
2000 feet fall on east side of the
lake into the valley of Bodinnickamoor.

7 There would also be
sufficient water should the lake
be restored with object of making
a reservoir to irrigate at least
8000 acres in the Bodinnickamoor
valley which at Rs 5 an acre
would give a yearly revenue of
40000 Rupees.

(I have seen

Mr Wilson (Colonel R.E.)
Superintending Eng'rs. &c.

11/11/1868
 No 1126
 From Lt. J. C.
 The Superintendent Eng.
 8th Division
 The Secretary to Govt.
 P. W. S.

Dated 18th
 Sept 23rd
 No 25th 1868

The Engineer
 Submits with this
 a report with
 plan from Captain Prendergast
 on an ancient
 lake situated about
 12 miles west of
 Hoda Canal on the
 Pulney Hills.

From 15th Aug 1868 to 22nd

No 97

The Condition of the Ancient lake in
 the Pulney Hills is fully particularized in the
 foregoing reports. I would propose to confine my
 remarks, to the general results of Captain Prendergast's
 Survey of the locality.

2 The catchment basin of the tank is
 somewhat under 30 square-miles, and the total
 volume of water which would be obtained by ex-
 fall of 72 inches of rain over the whole area amounts
 to 181 millions of Cubic yards. The full
 capacity of the Tank, which is well defined
 by a water-line still to be seen on both sides of
 the valley, is estimated at 147 millions of Cubic
 yards. Captain Prendergast would not count
 on intercepting more than half the rain fall, or
 92 millions of Cubic yards, so that the capacity
 of the Tank is about one half more than the
 quantity which would be likely to be available
 in the course of twelve months. He proposes to
 store the water permanently up to a certain level
 by

by reserving a portion of the supply drained into the Tank, after it is once filled, to make good the loss by evaporation, and by this arrangement the quantity to be used for irrigation, would be reduced to 53 millions of Cubic yards; of which 50 millions would be turned over the southern extremity of the Tank into the Cumbar Valley, and the remaining three millions through the bund in the northern extremity towards the village of Manavarn. The natural level of the ground at the south extremity is 57 feet above that of the bed of the stream at the site of the old bund at the northern end of the basin, the old water-line is $49\frac{1}{2}$ feet above the same level. The permanent storage line, by Captain Pringle's arrangement would be nearly on the former level, and the additional $33\frac{1}{2}$ millions would be obtained by raising the surface to the 57 feet contour, it may therefore be assumed that the required quantity of 53 millions would be obtained at the 60 feet contour; or within a foot or two of it.

3. The object of Captain Pringle's proposed

72
proposed arrangement for maintaining the water level, at the minimum height of nearly 50 feet above the bed of the stream at the site of the old bund, is twofold. It could not otherwise obtain the water for the Cultivators in the Cumbar valley; for the Tank once emptied, could not be filled again in a single season; and he lays stress on the inducement such a lake would offer for the formation of a European Settlement, in one of the most elevated and attractive sites to be found in Southern India.

Looking however at the question in connection with the interests of irrigation only, I do not see any valid reason for holding the water up for the benefit of the Cultivators of the Cumbar valley. The natural course of the stream leading through the old Tank, is towards the Amaravathi, and the Cultivators along the latter have the first claim for the use of the water. Moreover the supply of the numerous Channels which are led off from that river is very deficient, and large remissions of Revenue have frequently to be made in consequence.

There

There would also be an absolute waste of water
by the proposed plan of maintaining the surface
at a high minimum level. But whatever decision
may be arrived at on these points, the project
would appear to be of a sufficiently promising
character to justify the preparation of detailed
plans and estimates, for the restoration of the
old land and for the construction of masonry
works for the distribution and regulation of
the water and I would therefore recommend
that instructions to that effect may be issued
to the Superintending Engineer

For S^t George
22nd November 1865

Wm. Lemp Colonel R.E.
Chief Engineer for Irrigation

The Secretary to Government
Public Works Department

2. Limited to 1568 Q. 14

20. The first of these is the
 little of the great river, which
 is the only one of the
 kind in the world. It is a small
 stream, but it is very beautiful
 and it is very pure. It is
 the only one of the kind in the
 world. It is a small stream, but
 it is very beautiful and it is very
 pure. It is the only one of the
 kind in the world. It is a small
 stream, but it is very beautiful
 and it is very pure. It is the
 only one of the kind in the world.

of polished, then about the middle
run rapidly to the south, and re-
turning, they, to reach the end of the river
flock by tens from this side, down the river.

* Afford him the
 pleasure of doing
 our best.

by taking over the water has a V effect
out of the water as it is the fountain of
Sapientia. I consider it as a V
mark of other parts of the
world in the air. I am sure, and I
believe it is a V mark of the
the world of the world, and it is a V mark
of the world.

5. The West of the entrance on the
 beach is high & the tide runs
 down. Then as it is full of eggs
 in the water it is open the water comes
 within a mile from the water. It back is not
 full to the water line, so that it falls from
 the top to the deepest part of the bed, i.e. at
 the bottom, is 32 feet. The sand when this
 is the case is very fine.

[illegible]

About 10 feet above the water the
 is down to a depth of a yard or 2 yards
 in the water. All the animals which run
 through it is soft red, when you down in
 their course forms a bog, and the water of
 them has had rising for many years to be
 down to the rock. I concluded that a
 discharge of air into the water, is not
 needed, and is doing the same. I remember
 there is a great deal of water in the
 bog, but it is very shallow. It is in fact of the
 same, but it is 98.165 feet high, and it is
 available for the purpose. Thus the water is
 of the 112 feet is required to fill the water
 to the same height.

Effluvia is said to be filled to the water.

[illegible]

1. *Quercus* 100

[illegible]

Public Works Department

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No 117.

Proceedings of the Madras Government
Under date the 15th Jan'y 1869
Read the following

From The Chief Engineer for Irrigation
A.E. 1297 dated 23rd Nov/68

The Government
have perused with much
interest Capt. Prendergast's
report on the ancient Lake
discovered by Col Douglas
Kinnaird on the Palney
Hills.

In commenting
on the results of Capt. Prender-
gast's survey of the locality,
the Chief Engineer for Irriga-
tion gives it as his opinion
that, looking solely to the
interests of irrigation, the
restoration of the Lake

to

Enclosure in a
letter No 1426 dated
13th September 1868

From

The Deputy Engineer
8th Division

The Secretary to Govt
P.M. G

M. S. 118

Copy of a report from
Capt. Prendergast
on an ancient lake
situated about 12
miles west of St. John's
found on the Palney
Hills.
Series length L. 239.

to serve as a reservoir
for the retention of a large
body of water is very de-
sirable, and that as there
is no valid reason for
permanently holding
the water up to the level
at which it seems to have
been formerly maintained,
the whole of it should be
utilized. Col. Anderson
would therefore restore the
Lake as a work of irrigation,
and so construct its sluices
as to be able to discharge,
as may be necessary, the
whole of its contents, which
are estimated at 47 millions
of cubic yards, while the
rain fall on the area drained
into it is supposed to be
only

only equal to 184 millions
of cubic yards.

The Govt do not con-
cur with the Chief Engineer
for irrigation, as they are
of opinion that the success
of the undertaking should
not be confined to the im-
provement of irrigation by
the natural outlet towards
the Ambarnatty, but that
the Lake should be restored
to its former dimensions
and that the surplus water
should be discharged into
the Cambam valley for the
benefit of irrigation through
an artificial cutting.

His Excellency the Governor
in Council accordingly
directs that plans
and estimates for
Car-

Carrying out the work
with this Dept in view,
may be prepared and
submitted.

W. H. L.

Immediately for
detailed plans and
estimated cost of
however to a partially
for the project in
its larger form
with provision for
the diversion of the
water to the
Cuncheon valley
by an artificial
cut. I incline
only a primary
conclusion that the
importance of the
irrigation by the
natural water to
towards the
marathon

For Orders.

In forwarding
the accompanying report
by Captain Pendergast
on the ancient Lake dis-
covered by Colonel Douglas
Hamilton on the Pulney
Hills, the Chief Engineer
for Irrigation gives it
as his opinion that,
looking solely to the in-
terests of irrigation, the
reservoir of the Lake
to serve as a reservoir

To
The Chief Eng. for Irrigation
Sup. Eng. S. J.
21. Dec. 1869
Dec 16th 1869

For
A. J.

For the retention of a large
 reserve of water is very
 desirable, and that as
 there is no valid reason
 for permanently holding
 the water up to the level
 at which it seems to have
 been formerly maintained,
 the whole of it should be
 utilized. The natural
 outfall is towards the
 Anshavatty, and the cul-
 tivators holding land
 under the, at present
 far from fully supplied
 channels from that river,
 appear to have the first
 claim to the water. Col.
 Anderson would therefore
 re-

The Govt. should, I think,
 adopt the view taken by
 Colonel Anderson who
 favors what seems to me
 to be the natural rights of
 the cultivators on the an-
 nuality side. I don't
 whether, compared with the
 probable cost of conveying the
 water into the Ceylonian
 valley, and since substantial
 benefits are every likely to be
 realized from such a scheme
 take for the benefit of cul-
 tivators in that direction
 W.D.

restore the Lake as a work
 of Irrigation, and so con-
 struct its sluices as to be
 able to discharge, as may
 be necessary, the whole of
 its contents, which are esti-
 mated at 147 millions
 of cubic yards, while the
 run fall on the area drained
 since it is supposed to be
 only equal to 184 millions
 of cubic yards.

W.D.

C. L. Moore 1868 2. 115

Nov. 11 {1868} 24/10/68.

PUBLIC WORKS.

Wm. Lloyd Garrison

h, do, &c.

Disten

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Refusing orders on papers
sent to the Ancient Lake
used by Col. Douglas
on the Pulney Hills,
1842.