LOCAL MEETING.

PAPER No. 2.

Some Notes on Anicut Well Foundations in the E. P., Ceylon.

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The author proposes to give a description of the Anicut works under Rugam Tank, Eastern Province, with details of the Weerakaddu Anicut more particularly, and with special reference to the cylinder sinking for the foundation and detailed cost of same, and also a few figures showing cost of sinking cylinders under pressure, at Vakaneri, Eastern Province.

Although not strictly coming under the heading of this paper which has been called “Notes on Cylinder Sinking for Anicut Works,” the author considers it would possibly interest members, if he roughly described the Rugam Tank Irrigation Scheme, of which the anicuts form a part.

Rugam Tank with an area of 2,500 acres is at present the third largest in the Eastern Province (Kauthalai and Allai being the two largest) and is situated close to the Mundini Aru or Maha-Oya about 16 miles in a direct line west of Batticaloa, and like a number of the tanks in this Island is not formed by a bund thrown across the main river, but by a bund 2 miles long, running almost parallel to the river about 1 mile from it, joining into a small spur, and from this, at right angles in the direction opposite to the river, a masonry wall 960 feet long has been built, butting to the rock slope on the other side of the small stream which runs through the bed of the tank. This wall forms the spill, which is thus probably the largest in the Island. A portion of this is raised, one foot above the other and in this
higher spill the sluices are built. The spill wall has been breached on more than one occasion, consequently the question of increasing the width has been, and is being still, occasionally raised by people who are not aware of the peculiarity of the tank, which when a large flood comes down and about two or three feet depth of water passes over the lower spill, the tank spills into the river, or rather the river and tank form with the intervening land one sheet of water.

With a view probably of presenting damage to the outer slopes of the bund during these floods, a spur bund has been constructed from the extremity of the main bund to the river, a distance of ½ mile; but as a matter of fact, although possibly preventing some of the direct scour while the flood is small, it, of course, fails to prevent the water reaching the bund slopes with a flood of any magnitude, for the reason above stated, namely: that the whole of the land is one sheet of water in a large flood.

The failures of the spill wall must be attributed to other causes, being probably due to either defective masonry work, or the fact that the section of the wall originally built was not of a sufficiently heavy profile to resist the overturning moment of the water during a big flood; and in support of this latter theory it may be said, that to this day in the spill channel may be seen large portions of masonry still held firmly together by the cement mortar in which they were built, and which have never been broken up.

Speaking from memory, the big flood of January, 1904, was measured by the author to be over 5’6” on spill.

The water for cultivation purposes is let down the spill channel till it runs into the Mundini, some little distance below the tank, and the river soon after splits into 2 or 3 branches, which fork out and join one another again in several places before the river empties itself into the Northern head of the Batticaloa Lake.

The cultivators had been accustomed each year to build wattle and earth anicuts for purposes of distributing the water, with the consequence that each freshet down the river washed these away and they had to be rebuilt. During some seasons they had been rebuilt as many as nine times.
In consequence of this, the cultivators approached Government with a view of obtaining permanent anicuts and willingly offered to pay over a series of years whatever may be the cost of these works.

An estimate was accordingly sanctioned in September, 1900, for Rs. 88,000, for the construction of 4 anicuts. Three of them, namely, Sankulam, Kidavadipalum and Kumukkaddu were built of masonry and concrete on a solid foundation without the necessity of wells, but more than half the estimate for works, was for the construction of the Vekkakaddu anicut, for which wells had to be sunk as a foundation, and it is this work which the author proposes to describe in some detail.

The anicut, which is of the type introduced into the Island, the author believes, by Captain Woodward, R. E. of the Indian P. W. D., about the middle of last century, and which has practically remained the standard type ever since, and is still largely used in India, is 299 feet between abutment walls, being made up of 16 bays, each 14 feet wide, the fifteen piers being each 10 feet long over cutwaters and 5 feet wide.

The abutments and piers are built of brickwork in cement 2 to 1, with a chase cut to receive planks which are strengthened in the centre by a timber bank strutted.

The piers are built to 5 feet above invert level and the abutments to 9 feet 3 inches.

The floor of the anicut 14 feet wide is formed of pitching set on the concrete foundation, which is formed on and round the wells sunk into the river bed.

This flooring is further protected from scour by rough pitching being laid on the river bed behind the anicut for a width of 15 feet. The banks of the river are protected by rough sloped pitching for a length of 15 feet on the upstream side and 30 feet on the downstream side of the abutments.

The concrete flooring is 4 feet thick under the pitching, but taken up (one foot higher) to the level of the invert under the piers.

The cylinders which are of 4' 6" external diameter are placed in three rows, about 6 inches apart. Under the floorings, the line of the outside of the brickwork of the upper row of cylinders, coincides with the upstream line of the cutwaters; and the lower row of
cylinders and the floor above them consequently run out to about 4 feet beyond the line of the downstream cutwaters of the piers. The number of cylinders between the abutments was 3 rows of 57 each and under each abutment two rows (the centre row being left out) of 3 each, or a total of 189 wells.

The tops of the cylinders come up to within one foot of the underside of the pitching, so that the concrete floor goes round and down all the cylinders for 3 feet.

The cylinders are sunk to a depth varying from 9 feet to 12 feet below invert level, or 4 and 7 feet respectively; below the underside of the concrete.

The cylinders are built of a single row of radial bricks with an outside diameter of 4 feet 6 inches and an inside diameter of 3 feet.

A wooden curb made of 2 inch Koombook planks 9 inches wide, with practically nothing in the way of a cutting edge, was laid on the levelled sand in the proper position and a few rings of brickwork built on it, the sand was then taken out, the top 3 or 4 feet of course being very simple work; as the cylinder sunk (as a rule its own weight was sufficient, but if not iron and stone weights were laid on the top) the rings of brickwork were built up, always keeping the brickwork well above the surface of the river bed and thus allowing the cement to dry. This process was continued until the cylinder had sunk to its required level.

The excavation of the lower 4 or 5 feet was of course the most troublesome of the whole work, a very common method of sinking similar wells, being by employing native divers, who go down and scrape the sand into baskets. This method was tried and continued for some time on this work, but owing to the great difficulty in obtaining divers and the small diameter of the cylinders for the men to work in, the excavation was afterwards done by means of grabs.

The grabs were made of sheet iron very similar on a small scale to the ordinary grabs on a dredger.

For the use of these grabs, a tripod of jungle poles was put up over the cylinder and a double pulley block fixed under the apex, through which ran on one wheel the hoisting chain which was worked on a crab winch, and on the other wheel of the block was run the light rope which closed the toothed halves of the grab when in the sand, and which on being
released allowed the grab to open, when it was swung out of the cylinder, and thus allowed the sand to fall in the dumping place, which was anywhere a few feet removed.

The grabs took up about 5 cubic feet at a time if full, and when they had been got into good working order and the small detachment of pioneers which was fortunately on the works had been trained to the work, they did very good work. The time taken to sink a cylinder when the work was in full progress was about one day, the advantage of this way of sinking being that practically no plant other than a grab winch and a grab is required on the works, but it is doubtful whether it has any other merits, while it certainly has several disadvantages, a great one being the slowness of the work, which being practically always in river beds, can only be carried on at certain seasons of the year. In the case of this anicut, practically only 5 months in each year could be taken advantage of.

Occasionally logs were met with, but fortunately not very often, when these were fairly near the surface they were excavated round and drawn out by the elephant which was employed on the works; if they were any considerable depth, the cylinder was sunk no further, but was filled in to that level. When the cylinders had been sunk, cement concrete 3 to 1 was let down in bags, which were opened in situ and the concrete allowed to harden. In some of the cylinders after 2 feet depth had been put in the bottom as a plug, the cylinder up to the under-side of the floor level was filled in with wet sand. When about 15 to 24 cylinders adjoining one another had been sunk to the required level, the sand was excavated to 3 feet below the cylinder tops and levelled off and the concrete floor put in to a depth as before stated of 4 feet, being of course well rammed, especially in the small spaces between the cylinders.

The bricks for the cylinders which as before mentioned were radial, were moulded to the following size:—9 inches long, 3 inches thick and 5 inches wide on larger end, and 3½ inches on smaller end, about 110 of them being required per lineal foot of cylinder; and possibly it would be of interest to the members if the method of brick making on the works
(which is practically the same as the method employed over the whole of the Eastern Province,) was briefly described.

The clay being decided upon, it is most important that the correct proportion of sand be mixed to make the material of the correct consistency, otherwise, if the proportion of sand be too high, the bricks are light and absorb too much water, whereas if the sand be not sufficient, the bricks are liable to crack in burning and be brittle. After the proportions are decided upon, the material is dumped in a heap, flattened out, a stake fixed in the middle, water applied as required and buffaloes about 4 or 5 yoked together and to the pivot stake, are driven round and round, trampling the materials for some time, until it is considered that the clay is properly mixed. This is then taken out and is cut up by coolies, worked by hand or feet, adding water if required, until exactly the right stiffness is obtained. It is then cut into portions a little more than is necessary for each brick, and is placed on the brickmaker's table. The brickmaker places his wooden mould on the table, throws a little sand in the bottom, dashes the lump of clay into the mould sufficiently hard to squeeze it into the corners, and takes off the superfluous stuff with a roller which he rubs on the top of the mould. He then places a piece of wood on top, throws the brick out of the mould on to this piece of wood by a sudden flip upwards, and places the soft brick on the table. The bricks are taken by coolies between two other flat pieces of wood and carried to the drying ground where they are placed in rows on top of one another, and if they have been twisted in the carriage or throwing out of the mould, the cooly after placing them in the row, smooths and reshapes them between his two pieces of wood.

The bricks are allowed to dry for about 12 to 15 days according to weather and are then placed in the kiln, usually 12 to 20 thousand being kilned at a time.

After the bricks have been stacked in the kiln, a slow fire should be lighted for a couple of days, as this allows any moisture which may have remained to be driven out, then the fires are made as furious as possible (the entrances all sealed with clay) and left to burn and smoulder for 5 or 6 days, when the vents are opened and the bricks allowed to cool off;
about 10 per cent. is a usual quantity of wasters; an expert brickmaker will mould over 2,000 a day, but to be able to do this he must have a man who forms the lumps of clay for the moulds as expert as himself, as they must be just large enough to allow of very little surplus, otherwise delay is caused.

The cost of the bricks when purchased from a contractor was Rs. 10 per thousand, excluding transport, but the greater number were made on O. Roll, and cost a little more, but on the other hand the bricks were of rather better quality.

The cost of transporting for about 1½ miles and stacking was Rs. 1.50 to Rs. 2 per thousand, some of this being done by Government carts, but by far the greater quantity being carried in hired carts.

It is quite probable that this method is the common one used all over the Island, but the author has had no opportunity of seeing it except in the Eastern Province.

The cement concrete used in the walls and flooring was specified at 3 to 1, which in the author's opinion is quite unnecessarily rich in cement for this class of work, but as a general rule in Ceylon, cement is specified in quantities which would be considered superfluous at home; undoubtedly cement in barrels does deteriorate if kept in this climate any time, and could not be made into briquettes which would stand the strain to which some are broken in England, but even allowing for this, the proportion of cement might be in many cases reduced.

Perhaps in this connection a case may be quoted which came under the author's supervision when engaged as Resident Engineer on works in England some 8 to 10 years ago.

A foundation was required as a base for a battery of cylindrical patent water filters, and it was originally intended to place stone packed and ballasted. The Engineer in charge of the works decided however to put in concrete in the proportions of 12 stone to 1 cement and either 3 or 4 of sand, I am not quite certain which.

Two years after some of this foundation had to be removed under the supervision of the author, and the amount of wedging, sledging and drilling, necessary before the concrete was removed gave the author a great deal of respect for even weak proportioned cement concrete.
Cement is undoubtedly a source of weakness in concrete, that is to say, it is weaker than the stone, and provided even a thin layer of good quality cement is round each particle of metal, the necessary binding will be obtained. The most important item of all in the author’s opinion being in the thorough mixing of the ingredients.

The metal for the anicuts was broken to 1½ inches, or rather was supposed to be; probably it might really be classed as 2 inch metal and had to be transported for 4 miles over paddy fields, sandy beds of streams, &c., so that the local transport rates were very high.

**Cost.**

The all important question of cost of the work will next be considered, the cement being excluded in all instances, as this is at a price fixed in Colombo, fluctuates considerably, but is the same for all stations in the Island at a given time, and the author has considered that estimates might be framed without the cost of cement entered at all, seeing what a great part the price takes in some estimates, and over the control of which a Government Engineer has no voice. On the Ragam Anicut Estimate e. g., chiefly built of concrete at 3 to 1, the cement cost as much as Rs. 10·25 per barrel excluding transport, whereas the price is now down to Rs. 7·50.

The timber work in the planks and struts of the bays which was chiefly of Koombuk, and including iron hooks fixed, &c., cost about Rs. 2·25 per cubic-foot. Sawing only costing Rs. 5 a square in the Batticaloa District, which is certainly a very great difference to the rates demanded in this district.

The total estimate of the anicut was Rs. 36,000 which the author has reason to believe was exceeded, owing to the cost of experiments which were carried out, and to loss owing to materials carried away by flood, but roughly speaking, for the anicut with a length over abutments of 338 feet, the cost works out at Rs. 125 per foot run completed work, with planks, &c., included.

**Details of Cost.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost (Rs)</th>
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<tbody>
<tr>
<td>4 ft. 6 ins. Cylinder. Area = 15·9 sq. ft.</td>
<td></td>
</tr>
<tr>
<td>Curb area 9 sq. ft. 2 ins. Koombuk planks</td>
<td>Rs. Gka.</td>
</tr>
<tr>
<td>Timber and labour = Rs. 7·50 per lin. ft.</td>
<td>0 83</td>
</tr>
<tr>
<td>Sinking by grabs</td>
<td>2 00</td>
</tr>
</tbody>
</table>

**Total cost of Sinking per lin. ft.** 2 33
<table>
<thead>
<tr>
<th><strong>Brickwork</strong> 9 ins. thick (exclusive of cement.)</th>
<th>Per ft. run.</th>
<th>Rs. Cts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area = 8.8 sq. ft.—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>110 bricks at Rs. 13 (including transport)</td>
<td>1 43</td>
<td></td>
</tr>
<tr>
<td>Building, mixing mortar, &amp;c., at Rs. 10 per cube</td>
<td>0 90</td>
<td></td>
</tr>
<tr>
<td>Total cost of Brickwork per lin. ft.</td>
<td>2 33</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cement Concrete (3 to 1.)</strong></th>
<th>Per lin. ft.</th>
<th>Rs. Cts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area = 7.71 sq. ft.—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal (including steel, &amp;c.)</td>
<td>Rs. 7.00</td>
<td></td>
</tr>
<tr>
<td>Rs. 7.00 Transport 4 miles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loc. = 14.00</td>
<td>1 00</td>
<td></td>
</tr>
<tr>
<td>Mixing into bags, running, &amp;c.,</td>
<td>0 78</td>
<td></td>
</tr>
<tr>
<td>Rs. 11 per cube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cost (exclusive of cement)</td>
<td>1 78</td>
<td></td>
</tr>
</tbody>
</table>

Total cost (exclusive of cement) of sinking and building up cylinder.

| Sinking | 2 83 |
| Brickwork | 2 33 |
| Cement Concrete | 1 78 |
| **Total** | **6 94** |

Or say Rs. 7.00 per lin. ft.

The detailed rates given above for labour are the ordinary rates at which work was done when in going order, and do not include contingencies during slack months, or damage by floods, but the total expenditure and the cost per foot run include these items. The concrete for the flooring and under abutments although not costing so much for mixing and depositing as in the cylinders, cost a little more in the end owing to the amount of baling necessary to keep the foundation clear of running sand.

The brickwork in the abutments and piers cost very little less than in the cylinder.

While this anicut was in progress, the largest flood known in the district for over 20 years was experienced, and the Kumukaddu anicut which had been previously completed and handed over to the Velvidane was found to have withstood it (with slight damage to pitched slopes on downstream side) with all the planks in, although of course during flood time the planks are never supposed to be left in, but it serves to show how useless it is to depend on native subordinates removing the planks when required, and that consequently the work should always be designed to withstand floods as though the planks were fixed in.
The question of sinking cylinders as foundations for anicuts, if of shallow work, is, in the author’s opinion, open to debate, as in most instances it would save money and certainly time if the river bed was sheet piled, the sand and water pumped out and the foundation laid in solid; to be able to do this however, large and efficient pumps are an absolute necessity, and the author’s experience in the Island up to now has been, that it is a most difficult matter to persuade the authorities to supply up-to-date plant in a sufficient quantity.

The author’s impression is that the Batticaloa District must be considered a fairly economical district for work generally, and the figures just put before the members, will, he thinks, bear comparison with similar work in other parts of the Island and although the presence on the works of a small detachment of pioneers and an elephant, was of advantage, it could not be said that the work done by these was cheaper than local work, in fact rather the reverse, excepting the moving of heavy stones and pitching in the river bed, for which work the elephant was invaluable, as in the sand, ordinary bullocks are quite useless; but even the rates in this work will not bear comparison with those which Mr. Harward, the Irrigation Engineer, in charge of Vakanceri, has kindly given for the cylinders which he is sinking under pressure and which are as follows:

<table>
<thead>
<tr>
<th>Diameter (3 ft. 6 ins.)</th>
<th>Area (9.6 sq. ft.)</th>
<th>Sinking including all charges (Rs.)</th>
<th>Concreting (Labour only) (Cts.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>9.6</td>
<td>Rs. 1.83 for 16 sq. ft.</td>
<td>Cts. 56 against Cts. 90</td>
</tr>
<tr>
<td>78</td>
<td>9.6</td>
<td>Rs. 1.68 for 16 sq. ft.</td>
<td>Cts. 78</td>
</tr>
</tbody>
</table>

In conclusion the author would like to mention that for a considerable amount of the information given he has had to rely on memory, and also the paper owing to various circumstances has been hurriedly prepared and begs that any discrepancies may be judged lightly.

DISCUSSION.

Mr. Zanetti. Mr. Zanetti was of opinion that the proportion of cement used in the concrete described by the author was extremely high and he had not heard of any work on which it was so high; personally the highest proportion he had occasion to use was 5, 2, 1 where it was laid to some arches.
Mr. Frühling agreed with Mr. Zanetti in considering that the proportion of cement used was extravagantly high; he further considered that the usual Ceylon practice of using cement direct from the barrel was a mistake, and the standard practice of turning out the cement on to a covered boarded floor for some time previous to use, should be adhered to.

In connection with the subject, a few remarks on well sinking for bridges through sand and stiff clay might be interesting. Such foundations may consist of single wells and of various diameters.

The well-curb for a breadth of 3 feet, splays inwards at an angle of about 45°.

The steining may be increased inwards by offsets every 1 foot course until the wall attains the required thickness, leaving a dredging chamber in the centre as may be desired. As much difficulty is often experienced in sinking through clay, the offsets should be reduced and chamfered to a smooth inward batter of say 1 in 4. The weight of stone employed, of course varies, and on foundations for some of the bridges in India for the Bengal Nagpur Railway for single wells 26 feet in diameter, stone weighing 143 lbs. per cubic foot was used. This produced about 25 tons per lineal foot of wall. Good dredgers, such as Bruce three-bladed machines often fail to make any impression on hard blue clay, which, under water is like leather, so it may be found necessary to employ diggers. These can be made by rivetting together double headed rails. The two outer rails should splay outwards like a trident and be sharpened. This is worked up and down by the steam hoist and being top heavy when driven in it tends to fall over, thus digging up the clay. When a hole is dug some distance below the level of the curb, the weight of the well generally forces the cutting edge a few feet into the clay, but it is often found impossible to undercut the steining.

Trouble is therefore usually experienced in sinking such wells further.

Digging the whole deeper produces, as a rule, no better effect, in some cases a depth of 40 feet being attained without effect.
Four methods are available to under-cut the steining.

1. Baling out water.
2. Blasting inside the well.
3. Blasting in bore-holes sunk just outside the well.
4. Artificially adding weight, if no more masonry can be built.

Baling out water helps to sink it in two ways, 1st by lowering the water level in the inside, flotation is diminished, and 2nd by the difference of pressure inside and outside, the clay is forced inwards, the flow of water under the curb breaking the clay away, in its passage under the cutting edge. If the foregoing method fails, blasting by dynamite may be tried. It is only advisable to use small charges at first. The dynamite should be made up in cartridges containing say about 2½ ozs., and it is advisable not to blast nearer the well-curb than 1 foot vertically. The charges may be let down by strings just inside the steining. The charges generally explode simultaneously, as the shocks of one explosion set off the others. The loose clay is then dredged out clean and the operation gone through again. Should the well not go down, it may be left alone for a time, while the steam hoist is worked on another well. It will be found that in a good many cases the well will sink itself without anyone working on it.

Another method sometimes employed is that of putting down bore-holes outside the well about 3 or 4 inches clear of the masonry and blasting dynamite in those.

The boring tool may work down say 12 or 15 feet below the cutting edge of the curb. This method however is not often resorted to.

Mr. De Kreter said he had not been brought into contact with any such description of work as described in the paper, but he would give a short description of a 15 inch diameter, C. I. outfall sewer laid on timber piles, which work was done in connection with an outfall sewer for the Kilpatrick Drainage Works (near Glasgow).

This outfall was into the river Clyde and the original plan was to lay the pipes in the beach in the ordinary way, and surrounded by cement concrete.
Owing, however, to the constant wash and wave caused by frequent passing steamers, this was not found practicable and therefore the following plan was adopted with success. A series of double pile trestles driven into the sand was formed—each pair of piles having a cross piece bolted to at the proper gradient and slightly shaped out to receive the C. I. pipes. The latter were laid on these cross pieces and secured by a W. I. strap bolted to same. Mr. De Kretser also briefly mentioned the method of pile driving by water jet.

Mr. Rothwell

Mr. Rothwell said, this paper was the first of a descriptive nature they had had, and was an example of the value of having such details recorded for the use of members, as in this particular case an actual inspection of the work would be of little value when the bulk of it was below ground level and not visible. Mr. Morris's introductory remarks too were interesting and made the relative matter more clear. He agreed with the former speakers in regarding the proportions of cement used in the well concrete as high.

The author had laid stress on the value of getting the right proportions of sand and clay for the making of bricks and he wished to know what proportion the author considered correct. With regard to Mr. De Kretser's remarks on the use of water jet for sinking piles the speaker had seen this system in operation in England but considered it only suitable for use in situations where the foundation was practically wholly in sand.

Mr. Bingham

Mr. Bingham said, that the question of river anicuts was closely allied to that of causeways, of which latter the speaker had some considerable experience in the Kelani Valley. There, the completion of the Kelani Valley Railway brought the subject of cheap feeder roads to the fore, and where the road trace crossed large rivers, to bridge which, would have cost enormous sums, it was decided to lay down causeways.

The following causeways came under the speaker's notice, viz.:

(a) The Algoile causeway over the Sittawaka river,
(b) The We-oya causeway over the We-oya,
(c) The Rite-goya causeway over the Ritigarna-oya.
Of these three the last was considerably damaged in the abnormal flood of 1904, which reached a height of 10 feet above all known previous floods.

The general average cost of causeways worked out to approximately Rs. 135 per foot run and this compares favourably with the cost of the anicut, viz., Rs. 125 per lineal foot as given by Mr. Morris.

The amount Rs. 10 per lineal foot given by the author for sinking the cylinders, coincides almost exactly with the general rate for sinking ordinary concrete cylinders as used by the Public Works Department.

The Author agreed with the various members in considering the proportions of cement used extravagant, and in this connection would like to draw attention to the fact that where cement is used direct from the barrel, the amount expended is often found to be far more than the proportions would figure out to be correct. The overseer or contractor is probably blamed for this waste but it is possibly not his fault, as when capacity measures are used, as is practically invariable, cement taken from a barrel has only about 70 per cent. of its normal bulk, which can however be remedied by passing through a sieve before using.

Mr. Fruehling's remark brought to the author's recollection a clause in the specification for the works on which he was engaged prior to coming to Ceylon and which was to the effect "that all cement should be laid on boarded floors, (having a free passage for air beneath) in layers not exceeding 6 inches and to be turned over on alternate days while lying in the shed." No cement was used until it had been in the shed some time.

With reference to Mr. Rothwell's question, it was impossible to lay down a hard and fast rule for the correct proportions of clay and sand for bricks, as the clay differed so much in various districts and the material was used in some instances, as cut out of the ground. This was a matter for decision by practical knowledge or experiment.
Some Notes on Anical Well Foundations in E.P. Ceylon

Sectional Elevation

Concrete floor level

Pitching

Briockwork

Scale 10 Feet = 1 Inch