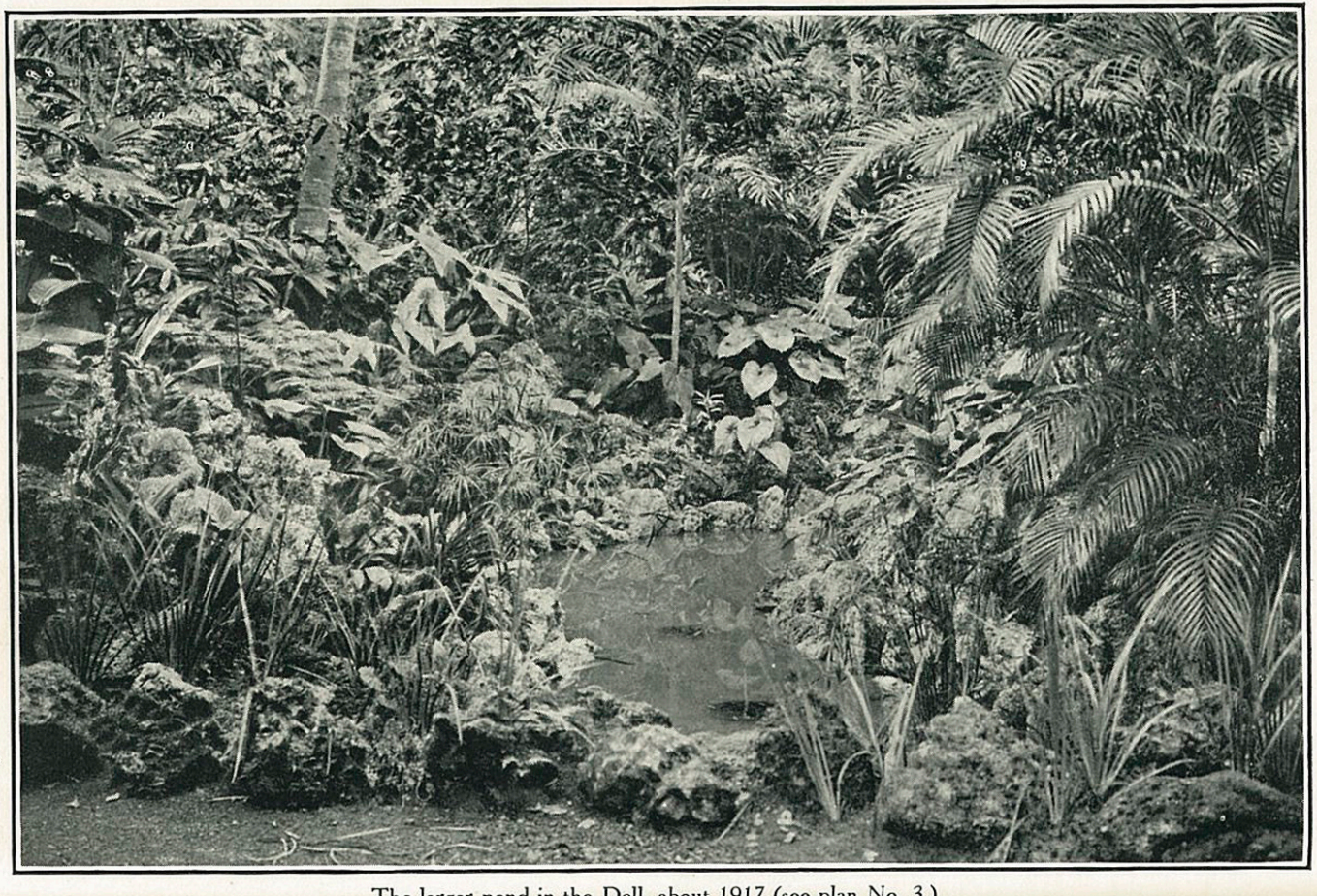


The larger pond in the Dell, about 1917 (see plan No. 3.)

15435). Bonaparte has referred the specimen first quoted to *Dennstaedtia moluccana* Bl. (Notes Pteridologiques. Fasc. XIV, 55, 1923). I have recently compared the Peninsula specimens with the original in the Buitenzorg Herbarium and find that they agree exactly.

This species grows in tangled masses in open places, and is covered throughout with small thorns; it has apparently the same habit and almost exactly the same appearance as *Dennstaestia moluccana*. It would be interesting to make a careful comparative study of these species. It seems likely that *Hypolepis Brooksiae* is derived from one of the scandent Dennstaedtias by loss of the inner portion of the indusial cup, the outer part only remaining as a small growth at the base of the sinus below which the sorus is situated. In dried mature fronds it is impossible to detect any trace of the inner side of the cup, but in young fronds it might be found to exist.

It is interesting to observe that *Odontosoris aculata* (L.) from the West Indies appears to have a closely similar appearance and habit of growth.

15. **Polypodium Féei** (Bory) Mett. and **P. heterocarpum** (Bl.) Mett.

There is a common fern in the Malay Peninsula which has usually been called *P. Féei*. On comparing it with specimens of *P. Féei* from Java, and with descriptions, I have come to the conclusion that it should be called *P. heterocarpum*, and that the true *P. Féei* has not yet been found in the Malay Peninsula. The Peninsula fern is often small, the fronds frequently being only 7 to 10 cm. in length; the sori are much broken, rather distant, and distinctly embedded; the rhizome scales are very narrow, almost hair-like. *Polypodium Féei* from Java has usually larger fronds; the sori are much more regular, closer, and not immersed; the rhizome scales are broad. I have seen both plants in the field, and have examined a number of specimens of each in the herbaria at Buitenzorg and Singapore.

R. E. Holttum.

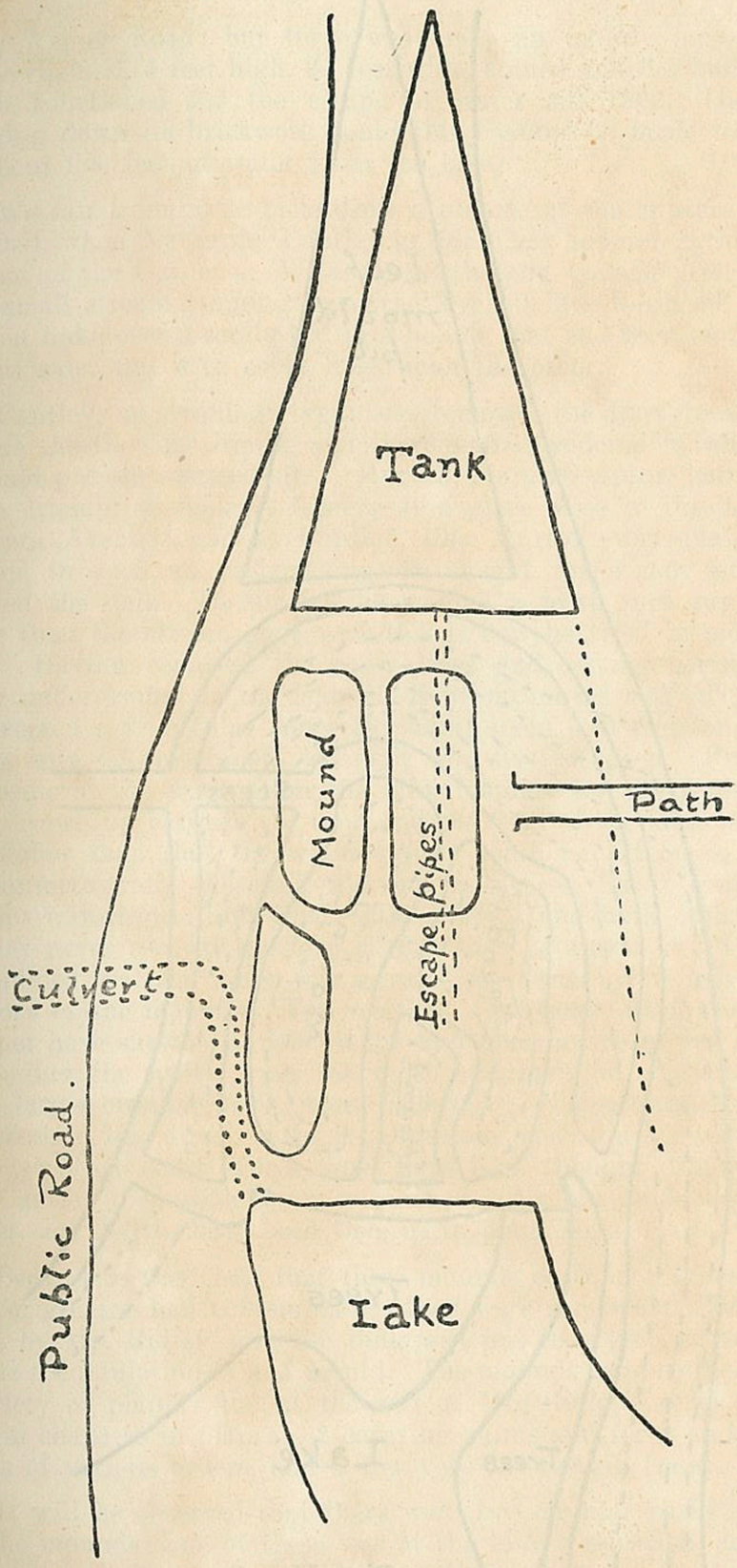
A Note Relating to the History of the Dell in the Gardens

The Botanic Gardens were founded in 1859. In that year the four and a half acres, now occupied by the Gardens Lake, made a swamp, down the middle of which ran the boundary between two properties—on the one side the Kerr property (newly sold to Hoo Ah Kay, better known by his trade name of Whampoa, and then acquired by Government for the Gardens) and on the other, the western side, the Napier property. On the Napier property stood the first house called Tyersal—a house which William Napier had built in 1854 and sold in 1857. When the house was sold the Tyersal property was broken up and went into several different hands, the house which the Temenggong of Johore

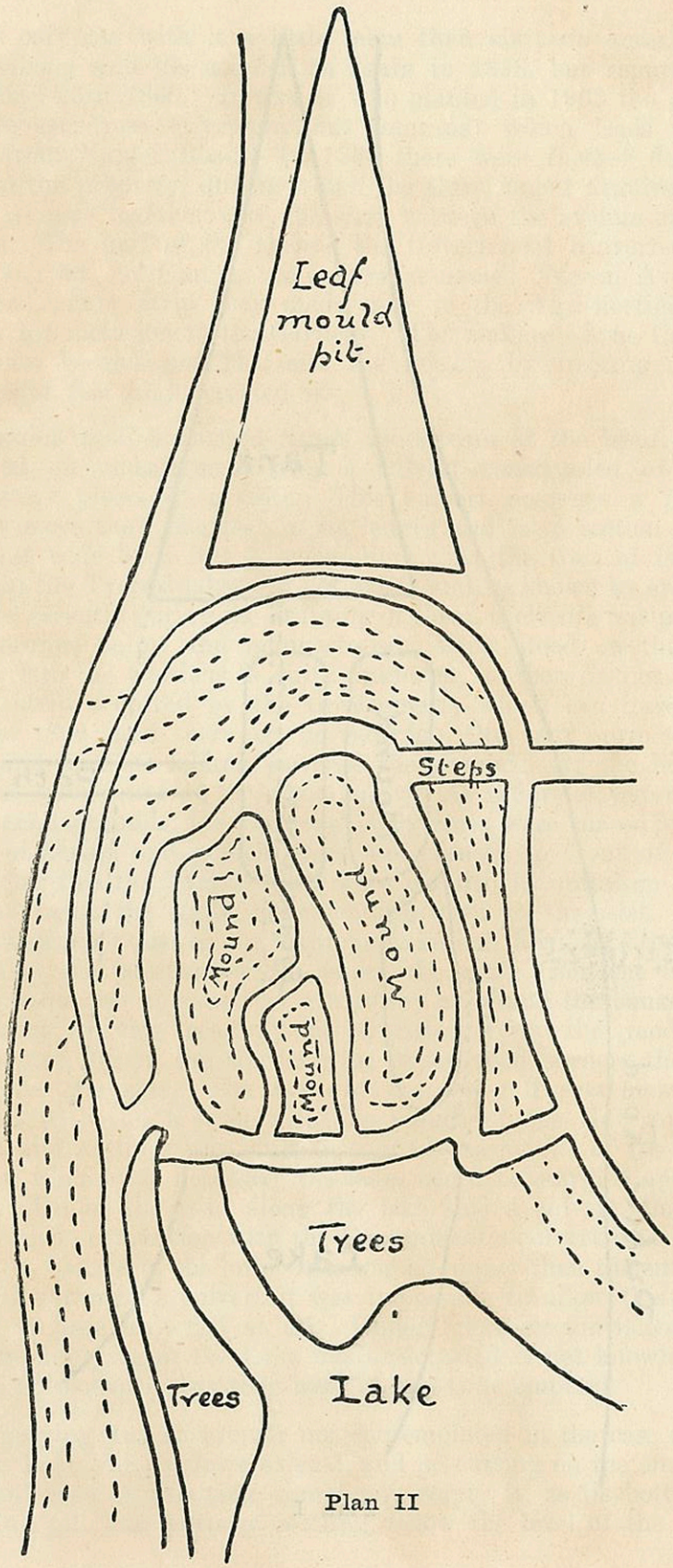
bought carrying with it a little more than sixty-six acres. The Temenggong sold his acquisition again in 1858, but repurchased it on May 23rd 1860. It was he who planted in 1862 the avenue of Tembusu trees (Cyrtophyllum fragrans) which leads to the house from Napier Road. In 1866 there were further deals in parts of the property, during which the Government acquired half of the Avenue together with the strip between the avenue and the swamp. The half of the avenue the Government converted into a public road, i.e. Garden road (now re-named Tyersal Avenue), and the narrow strip they made over to the Agri-horticultural Society for inclusion in the Gardens. The making of the Gardens Lake now became possible; and the Society by erecting a dam some eight feet high, created it.

Garden road is carried across the stream at the head of the Lake on an embankment over a culvert constructed of large rectangular pieces of granite. This culvert possesses a fall of slightly more than two feet in its length and is in section 3 feet 10 inches wide by 2 feet 7 inches high. At the time of its construction the Tyersal lakes did not exist; and, as shown by evidence obtained recently during the draining of them, their site was planted with coconut palms and mangosteens. What stood on the land thrown into the Gardens is quite unknown, as there is not a tree on the strip acquired by the Government, which can have been there in 1866; and there are no records. One may surmise that grass, and perhaps lallang, covered the ground. At the head of the lake, on account of the advantage of the inflow of water from the Tyersal grounds, the Gardens' cooly lines were placed; and a screen of kenari and pomelo trees was planted in front of them. Soon after this the Tyersal lakes were planned in imitation of the Gardens Lake, the imitation extending even to the islet. They were constructed just as the Gardens Lake had been, by deepening the hollow and steepening the banks, the earth from the bottom going in this case to construct a roadway all round the banks. In the extent of this roadway he departed from the model in the Gardens, for in the Gardens the raised road borders the lake only upon one side. The floor of the lower Tyersal lake was arranged to be on a level with the mouth of the Government's culvert, and a sluice was built to control the height of the water above it, whereby if necessary the lakes could be emptied approximately. Under the road along the lake side a culvert, small in section, made connection with the Government's culvert in a sump, and as the bottom of the lower lake was no higher than the entrance to the Government's culvert it was impossible to allow this small culvert to have any fall at all. Under what circumstances the complete emptying of the Lake was anticipated is not known: and there is no evidence that they were at any time emptied.

Emptying was apparently not contemplated in the case of the Gardens Lake, for no sluice existed, and no cutting on the embankment will even at this time completely empty it, as its bottom is still, after all these years of settling, below the level of the drain



Plan I



Plan II

along Napier Road: but there was made an unduly large brick escape channel, 4 feet high, 2½ feet wide, domed and flat bottomed, which functioned for the escape of water till 1922. Only by breaking down its brickwork could this channel be made to carry off about five feet of water from the lake.

We can from these facts draw a picture of the appearance of the Dell, when Nathaniel Cantley in 1882 was appointed Superintendent of the Gardens. We see a gentle, and (except after rain) very small stream running from the Tyersal into the head of the Garden Lake over a sandy bed in a hollow that had been embanked on one side, and with cooly lines upon the other.

Cantley, an excellent organiser, removed the lines to a place outside the Gardens limits, and thereupon considered to what use he could put the vacated site. Murton, his predecessor, had failed in an attempt to make a fernery at a place close to the head of Maranta Avenue: and as Cantley, like Murton, was anxious to succeed in such an undertaking, he sought for a new site and selected the dell. To succeed he wanted a more sure supply of water than the stream gave, and this is how he tried to meet the need. Having removed the cooly lines and having carried the water underground to the lake (it is by no means clear why), he constructed a triangular concreted tank, about 140 feet long, and at the base 65 feet broad, where it was six feet deep. Probably by means of the earth from the tank mounds for the ferns were then thrown up between the tank and the head of the lake, mounds not higher than that the water supply could be led on to them. But unfortunately the tank was not a success, for it could not be kept watertight: and what with illnesses and with other work Cantley never created the fern garden that he aimed at. It is to be assumed that the water was to reach the ferns by runnels along the tops of the mounds. For overflow, (as recent observations on the spot have shewn) he laid in the first place a line of gas piping to conduct the water from the tank, and then he constructed a much larger circular brick channel above it. These escapes passed in a straight line direct to the lake, and obviously did not water the mounds; other contrivances must have been thought of for that. But Cantley died with them unfinished. An old guide book indicates the Dell to have been then as in plan No. 1.

Because it was clear that these mounds could not function as their originator had contemplated, they were somewhat altered in shape by Mr. Ridley, and the tank was put to a new service, i.e. for the accumulation of leaf mould. The mounds were clothed with a variety of plants: and at the end of Mr. Ridley's service they were in shape as in plan no. 2 carrying palms and ferns and shade plants of various orders, and a few very interesting trees.

It will be observed that there were two circular paths enclosing the mounds: one of these was at the lowest elevation, and the other above it by six feet. These paths were narrow, and it was impossible in the morning to pass along them with comfort by

reason of the dew-laden foliage arching into them. Moreover the lower paths could not be kept free of mud. It was obvious that changes had to be made as soon as possible: and alterations were commenced in 1914 when by means of dredgings from the lake the lower paths were raised.

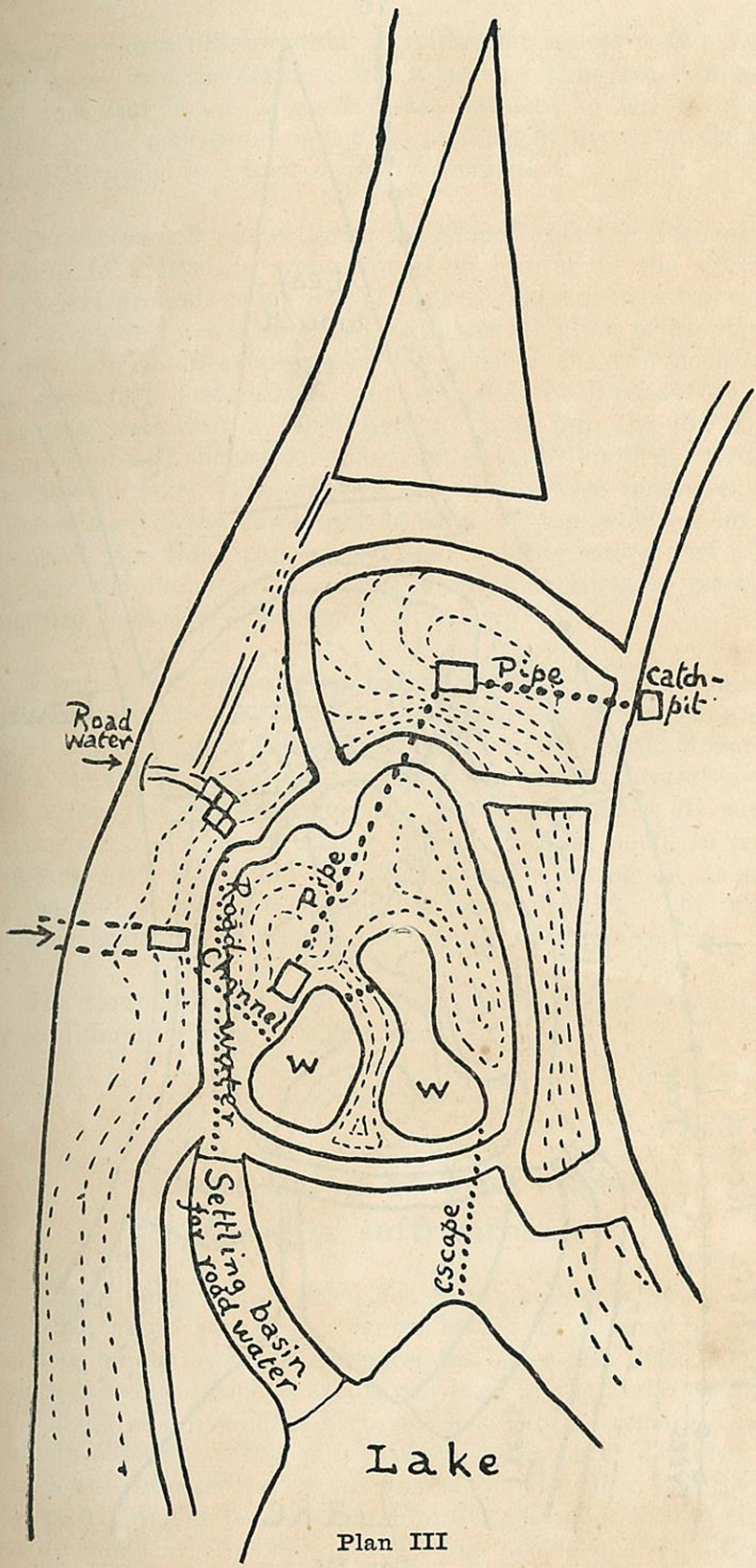
In 1915 the upper circular path was closed, and a new and much wider path with a greater diameter was made within the lower end of the cistern. This involved the erection of a mound along it to hide the leaf-mould pit. The drainage from the leaf mould was provided for at the same time by a channel behind a coral wall towards the public road. The silt off that road had been a source of annoyance in the garden for a long time, though the Municipality had done their best by steps and baffles in the road-side drain to abate it. The better to deal with it four catch pits were constructed in the Gardens where the road enters. The paths above the dell were changed likewise as the plan no. 3 indicates.

In 1916 the appearance of the dell were further improved by the creation of two pools in them, one oval and the other dumb-bell shaped: and those who saw them will remember that they were very pretty. Their surface was about 18 inches above the level of the water in the lake—a necessity to get the best appearance from the adjoining walks—which walks, as said, had been raised to keep them dry. One of these pools is shewn in the accompanying plate.

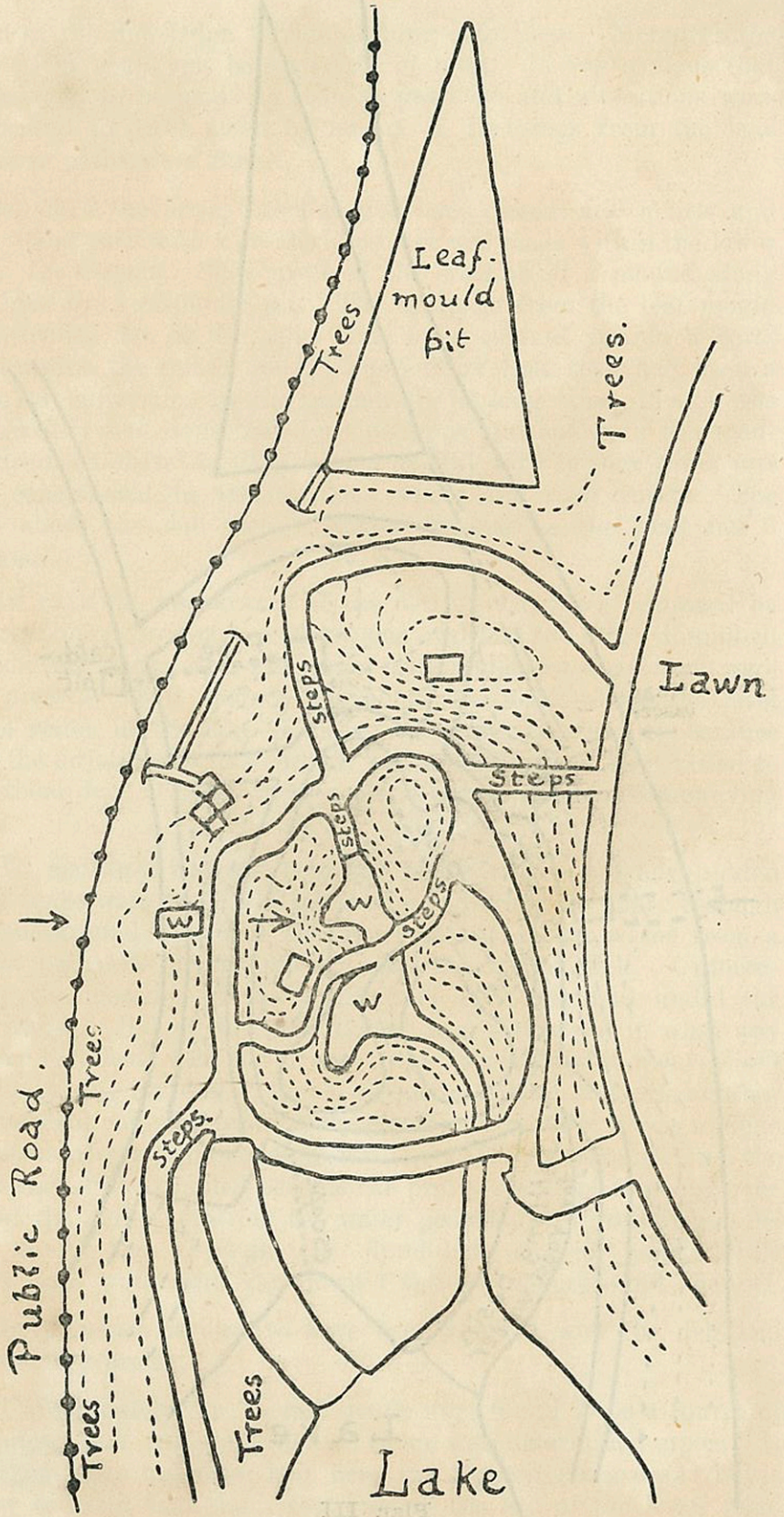
To maintain the water in the ponds two completely hidden bricks tanks were made, the lower supplied from the upper through an underground pipe and the upper receiving rain-water from a certain path-side drains towards the Bandstand Hill. Unfortunately the masonry of the upper tank gave way and undid the contrivance. But at that time it had been discovered in what way Cantley had dealt with the stream from Tyersal, and it was realised that by raising its level so that it filled the culvert and rose another few inches it could be fed into the ponds; accordingly it was so done by means of a simple concrete wall in Cantley's channel, and the bared end of the channel became the pretty rectangular pool at the side of the dell wherefrom the water passed underground into the oval pond, and through the dumb-bell shaped pond, while excess flood water still ran down Cantley's underground channel.

Permanence seemed to have been reached, and the dell had become very pretty.

Unfortunately the Tyersal ponds were found to be a source of mosquitos, and the emptying of them was determined upon. It was then quite unknown how deep the Tyersal lakes were: but a survey revealed that the lowest part of the bed of the lower pond was on a level with the bottom of the Tyersal sluice, and that


Road water
Pipe
catch-pit
Pipe
Road water Channel
W
W
Settling basin for road water
Escape
Lake

Plan III


Leaf-
mould
pit
Trees
Trees.
Lawn
Steps
Steps
Steps
Steps
Steps.
Public Road.
Trees
Trees
Trees
Lake

Plan IV

drainage without filling would be impossible unless a free escape of the water into the Gardens was allowed. This free escape was asked for: and it was a great disappointment to feel obliged to concede it, for concession meant the undoing of the water channels in the dell which had been so newly completed.

The concession was made on the ground that the Gardens had no claim to a head of water found to be due to the sluice in the Tyersal grounds being out of order. Thereupon a rearrangement of the dell was commenced, with the intention of keeping its features. In the rearrangement the beds of the two pools were sunk about two feet, united into one, and the Tyersal drainage water was conducted by an "Armco" pipe into the top of the former dumb-bell shaped pond, and out again by another "Armco" pipe into the lake. The sides of both ponds were concreted. By the lowering of the level and because of the wideness of the "Armco" pipe these ponds were thereby made into a part of the lake; and the abundant fish of the lake, which allow no mosquitos to mature, have access to them.

Now a great part of the beauty of the oval and dumb-bell ponds was that they lay open at the visitor's foot, not being sunk at all. The new pond however, being of necessity sunk, threatened to lack beauty in this respect. There was made therefore a path right across the dell bridging the water close against its surface and skirting the edge of what is left of the oval pond, in reality occupying part of the old bed of that pond, having on its north side the wall of one of the irrigating tanks of 1916. This wall is becoming beautiful by reason of a coating of Ficus repens.

The mounds, which now lie as in plan no. 4, are given severally to different forms of vegetation.

I. H. Burkill.

Tulang Daing or Sisik Puyuh
Carallia suffruticosa

Tulang daing means dried fish bones, and sisik puyuh means puyuh-fish skin: both these names belong to a small tree with serrations on the leaves that suggest the bones of a dried fish seen through the skin, which is exclusively used by the Malays of Perak and Pahang as a medicinal herb, but has hitherto remained rather strangely obscure. After much search it has been identified with *Carallia suffruticosa* Ridley (in Journ. Str. Br. Roy. As. Soc. 61, 1912, p. 6): and it is clear that *Carallia spinulosa* Ridley (in the same Journal, no. 82, 1920, p. 184) does not adequately differ.