

THE ANCIENT MADURU OYA DAM

A major re-design of the proposed new irrigation outlet structures of the Maduru Oya project became necessary when the presence of an ancient "horowwa" (sluice) was discovered directly on the original alignment of the Right Bank Outlet Works. Preservation of this archaeologically important structure has necessitated driving a 180 metre (590 ft) long tunnel.

When the Maduru Oya was designed by the Engineering Studies Organization of the MDB, according to the usual practice the engineers used the topographical survey maps for the first location of the proposed headworks. Detailed engineering surveys are done around the site of the proposed headworks thereafter, and detailed designs

are based on the engineering surveys. When construction work is started bulldozers are used to clear the jungle at the site after which the structures to be constructed are set out during which further work with survey instruments are involved.

At Maduru Oya the bulldozers were put to work at the site of the proposed new dam with no one aware that an ancient dam had existed at this very site. Any surveyors who had worked in the area had apparently mistaken the remains of the massive earth dam at the site for a natural hill formation, covered as it was with dense jungle. After the breached ancient bund was discovered in this dramatic fashion engineers wondered whether there were further surprises in store because a headworks with such a massive embankment had to have other appurtenant structure, namely, one or more sluices, and a siphway. In due course a massive sluice was unearthed. It's construction in brick work of extremely good and consistent quality, bonded with resin made it one of the most remarkable discoveries in the treasure house of rare archaeological finds in the country in recent times. Some samples were sent for carbon dating in USA and it was found that these bricks are about 1,600 years old. The identification of this ancient structure has not yet been firmly established. The references presently available for such an identification include the following:

R. L. Brohier had investigated the inter-relationship of canals and reservoirs in the river basins to the west of the main Mahaweli Ganga namely the Kala Oya, Malwatu Oya, Aruvi Aru, Moderagam Aru etc. His paper presented at a Royal Asiatic Society meeting in 1937 chaired by the then Governor of Ceylon, remains the definitive work on the subject to this date.

However, in regard to the eastern side of the Mahaweli Ganga which includes the main river, its chief tributary the Amban Ganga, its principal distributory the Verugal Aru and the adjacent Maduru Oya there is less evidence for proper identification of the ancient projects.

However, the evidence today suggests that the Kandakady Ela is man made and the Verugal Aru is a natural river. The off-take the Verugal from the main Mahaweli Ganga is only about 30 feet above sea level and the Verugal Aru meanders in the manner of an ancient river. The Kandakady Ela on the other hand takes off from the Mahaweli Ganga at a higher elevation from a point further upstream of the Verugal Aru at a location just about the Verugal Anicut which diverts water into the Inlet Channel to the ancient tank. The Allai tank is important because the Seruwila

Dagoba stands on its eastern side and is known to have been built by Kakavanna Tissa around 170 B. C.

The Mahavamsa described construction work done by Kakavanna Tissa's great grandson Kutakanna Tissa who reigned at Anuradhapura from 44 B. C. as follows "In the region between the rivers (he made) a great canal called Vannaka and the great Ambadugga Tank".

There is also an inscription found at Minvila which reads "the canal of Putakhanna Abhaya son of Macudila of the family of Devanampiyatissa". Paranavitane has identified this Putakhanna Abhaya with Kutakhanna Tissa.

Finally the Molahitiyavelegala inscriptions state "Hail! King Abhaya eldest son of King Kutakhanna and grandson of the great King Devanampiyatissa, dedicated with the golden pitcher the canal of Ganataka in the Ataragaga, to the priests residing in the Pilipavata Monastery", Paranavitane says "As regards the place names mentioned in the record, Ataragaga is equivalent to the Pali Antaraganga and means 'the land between two rivers'. The Mahavamsa tells us that Kutakanna Tissa the father of the donor in the present record, founded in this region a monastery named Pelagama Vihare, and a canal named Vannakka. The Pilipavata of one inscription is most probably identical with this Pelagama. As it is natural to expect that the record was set up near the monastery which was intended to be benefited by it, we may venture to suggest that the ruins at Molapitiyavelegala marks the site of the Pilipavata or Pelagama monastery, and that the tract of country named Ataragaga has to be sought for in that narrow strip of land between the Mahaweli Ganga and the Maduru Oya, and not between the former and the Amban-ganga as suggested by Professor Geiger. Unfortunately, the name of the canal is partly obliterated, but it is not Vannaka, that which, as seen above, was founded by Kutakhanna Tissa".

The accurate carbon dating of the bricks from the newly discovered ancient Maduru Oya Headworks seems to indicate that his structure dates back to about the first century B. C. It would appear that Paranavitane's identification of Ataragaga as the land between the Mahaweli Ganga and the Maduru Oya is correct and that the ancient Maduru Oya Headworks had been built by King Kuttakhanna Tissa or Puttakhanna Abhaya.

Continued on page 10

THE MADURU OYA DAM — MAIN FEATURES

Dam

The dam is situated 40 km South of Manampitiya and has a maximum height of 41 metres with a crest elevation 101 metres above M. S. L. and length along the crest 1,090 metres. The upstream face has a slope of 1.8 horizontal to 1.0 vertical, while the downstream has slope of 1.5 horizontal to 1.0 vertical.

The storage of Maduru Oya Reservoir is 596 x 10⁶ cu. m (483,730 ac. ft) of which the dead storage is about 15 percent.

Spillway

A 150 metre wide chute free-flow spillway, excavated in rock with a free overflow concrete section about ½ m. high is provided on the Left Bank of the dam, capable of discharging 1,610 cumecs (56,480 cusecs) with a flood lift of 1.9 m.

Sluices

The Right Bank Sluice (4.0 m dia.) has a capacity of 32.5 cumecs (1,150 cusecs) and the Left Bank sluice (4.5 m dia) a capacity of 56.2 cumecs (1,985 cusecs). Provision was made for one Kaplan turbine unit of about 2.5 MW capacity under the Right Bank sluice and 2 Kaplan units of 2.5 MW each under the Left Bank sluice—under a rated head of 13 metres, and the turbines to be installed under each of these sluices.

Increasing the Storage

It was proposed to raise the dam by 2 metres and increase the storage of Maduru Oya Reservoir by 20 percent (ie. to 710 x 10⁶ cu. m) to be done on the same contract with only about 1½ percent additional quantities. The spillway to be raised by 2 metres by the provision of gates, to get additional head.

There are two saddle dams, one on the left Bank 520 m and 20 m to be of earth fill and rock fill. The saddle dam on the Right Bank of earth 60 m long and 12 m high.

Link Tunnel

The catchment area of Maduru Oya Reservoir is only 453 sq. km. (175 sq. ml.) yielding about 260,000 ac. ft. annually from its own catchment. It is therefore to be augmented by 680,000 ac. ft. per year from Victoria Reservoir through the Minipe Right Bank Canal and Link Tunnel from Ratkinda Reservoir.

The link tunnel is 5.6 km. long (3.5 miles) with a diameter of 4.7 m (14.7 ft.) in the unlined sections, 4.2 m in the concrete lined sections and 4.4 m in shotcreted sections with a capacity of 34 m³/sec. The inlet channel leading to the tunnel from Ratkinda is 920 m long 6 m. wide and the outlet channel is 140 m. (4600 ft.) long.

The main parameters of the reservoir dam appurtenant structures and the link tunnel are as follows:

Reservoir

Catchment Area	453.0 sq. km. (175 sq. miles)
Full supply level	96.0 m (314.98 ft.)
Gross storage upto FSL	596.6 x 10 ⁶ cu. m (483,470 acre. ft)
Dead storage	111.5 x 10 ⁶ cu. m (90,350 acre ft.)
Live storage capacity	485.0 x 10 ⁶ cu. m (393,000 acre ft.)

Dam

Maximum height above foundation	43.0 m (141.08 ft.)
Crest Elevation	103.0 m MSL (337.93 ft.)
Length along crest	1,008 m (3,306 ft.)
Spillway	
Length of Spillway	150.0 m (492 ft)
Discharge capacity	1600 cumecs (56,460 cusecs)

Outlet Works

Capacity of Right Irrigation Outlet	28.0 cumecs (988 cusecs)
Irrigation conduit diameter	4.0 m (13.12 ft.)
LB Irrigation Conduit diameter	3.5 m (11.48 ft.)

Link Tunnel

Length of Link Tunnel	5,728 m (3.58 miles)
Diameter of Link Tunnel	4.5 m (14.7 ft.)
Capacity	34 cumecs (1200 cusecs)