TOPOGRAPHY AND MORPHOMETRY

XII TOPOGRAPHY AND MORPHOMETRY -

'Motitalav ' in situated at the centre of the historic town from south konkan i.e.'Sawantwadi' , This picturesque tank has gained its name 'Moti (pearl) in marathi language from its shape and brillient appearence amidst the thick palm groves surrounding it. According to the local belief the name was given after discovering a pearl oyster on the site of the tank during its construction in 1874, When a 204 meter long stone wall was built across this natural water body to increase its water storage capacity.

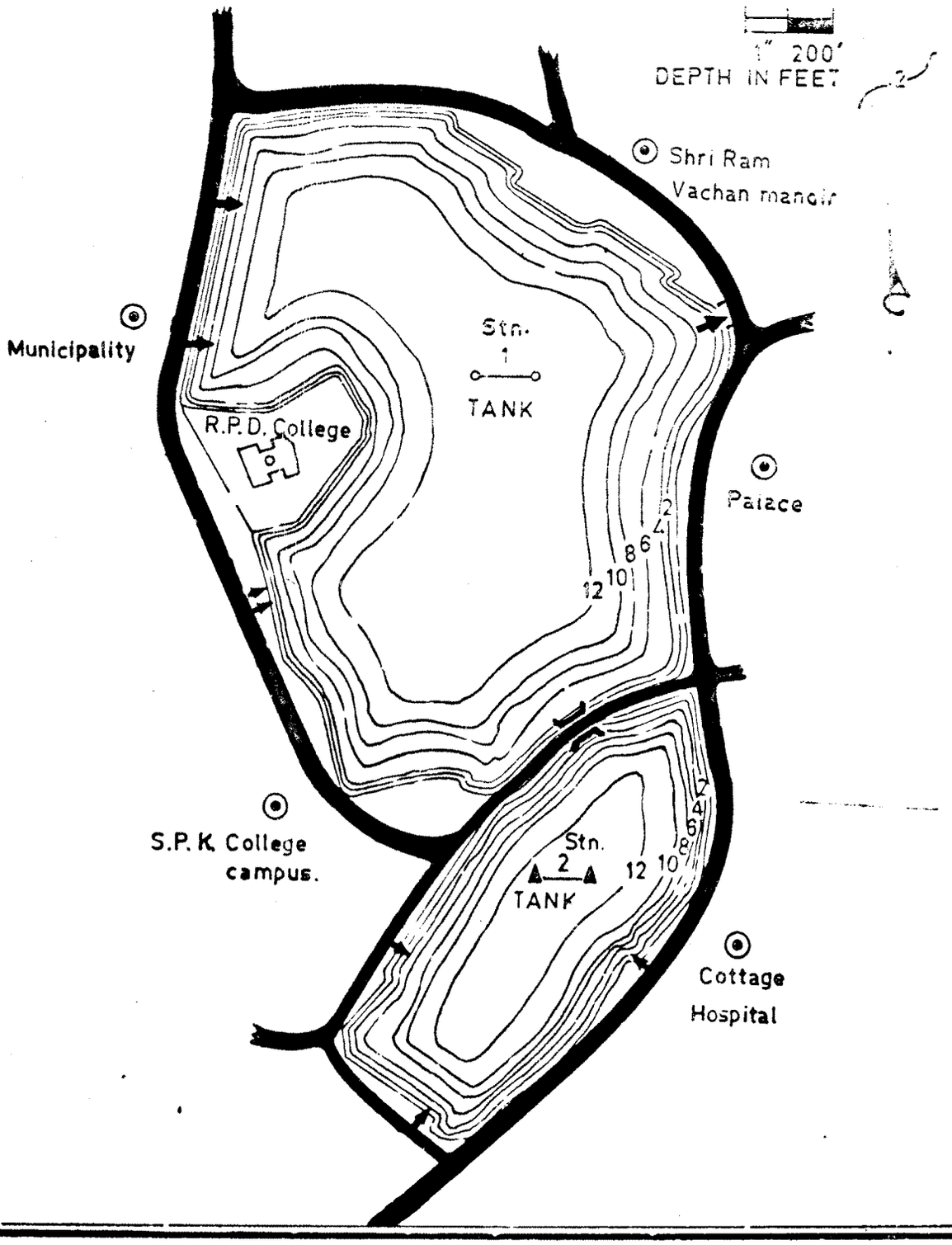
The sub-tropical tank is located at longitude 73° 45' East and latitude 16° 20' North. It is situated on 367 feet above mean sea level and is about 15 miles (21 kms) east of the weastern coast. The tank is surrounded by many small hills from all sides. The tallest peak being 'Vadipeak' of the Narendra Hill on the west rising 1,200 feet above mean sea level.

This beautiful tank is at the heart of the Sawantwadi town and is surrounded by well wooded hills with mango, jackfruit, palm trees, guava, Cashewnut trees dominating the vegetation. Roughly the catchment area of 2 Sq.km. consists of about 80% of wooded non aggricultural land and 20% agriculture land and urban area.

The maximum water spread area of the tank is 31 acres. The tank is divided in to two parts by a footpath, but the water masses are connected to each other under the small bridge.

MOTI - TALAV, SAWANTWADI

LOG. 73° 45'E, LAT 16° 20'N



'OUR MAP OF MOTITALAV AT SAW

The part I and part II have a water spread area of 25 and 6 acres respectively (Fig No.1) .

The maximum depth of water when the tank overflows during monsoon is 13 feet. During summer months the maximum height of water in the deepest portion of the large tank No.1 is 8 feet. However,the mean depth is 6 feet.

Many inlets bring in rain water and drainage water im the tank. There are 9 drainages and other inlets in tank No.1 they are on south-5, north-1, west-2, and the main drainage coming from north. Whereas in the tank no.2, there are 3 inlets, 2 on south and one on east side. The only supply of water to the tank is through rains during monsoon,drainage water and perhaps very limited ground water.

During heavy showers in monsoon months the tank overflows. There are iron gates which work on rack and penion arrangement. The excess water with much force is discharged out by these gates in the north side from the large tank.

Because of its ideal location and shear beauty all the important buidlings, in earlier Sawantwadi state, like palace, College, hospital,municipality etc. have been constructed around the tank. A nice circular road forms the periphery of the entire tank.Earlier the overflown water from the tank was used for irrigating paddy fields on the south east and south-west boundry of the town. Besides irrigation,the water from the tank has been used for cattle washing,cloath washing etc. water from this tank was never used for drinking purpose. But it is belived that the tank acts as a percolation tank and therefore

the subsoil water level in the town is maintained and the wells are not of short of fresh water. Now a days cloaths from the nearby cottage hospital are washed in the tank No.2 and the tank water is no more used for irrigation of paddy fields.

Many foreign workers like Newman (1959), Buttler (1962), Fish (1959), Walker (1973) ,Richardson (1975) etc. have studied the different morphometric Characteristics of large and small fresh water bodies. In India Sreenivasan (1969) has studied exclusively the morphometric features of 17 small and medium fresh water bodies in Tamilnadu.

The following morphometric parametres of the Motitalav were determined during the course of investigations.

i) Maximum length -

This is the distance in straight line between the two most distant points on the shore of the reservoir, lake or tank. This length is maximum effective length for the wind to interact on the waterbody without land interruption.

The maximum length in Motitalav was estimated to be 425 meters in the large tank,along its north south margin.

ii) Shore development -

According to Wetzel (1975) the term shore development refers to the ratio of the actual length of shore line of a lake or tank to the length of the circumference of a circle the area of which is equal to that of the water body. Shore line development is of considerable importance because it reflects the potential for greator development of littoral

communities in proporation to the volume of a lake or tank. The shore development can be estimated by using the following formula .

$$\text{Shore development} = \frac{S}{2\sqrt{a \times \pi}}$$

where

S = length of the shore line,

a = area of the water body.

Therefore the shore development in Motitalav was,

Shore development = 1.2497

The shore development shows that the tank has much less irregular periphery.

iii) Volume development -

The volume development is used to express the form of a reservoir or tank basin. This expression represents the ratio of the total volume of the water body to the volume of a cone whose area of base is equal to the surface area of the water body and whose height is equal to the maximum depth of the lake or the reservoir.

The formula commonly used for volume development

$$\text{Volume development} = \frac{3\ (\text{Md})}{m \times d}$$

Where md = mean depth of the tank = 6 feet

m x d = maximum depth of the tank = 13 feet

$$\therefore \text{Volume development} = \frac{3(6)}{13} = 1.385$$

Such an Index greator than unity is according to Welch (1948) an indication that the walls of the reservoir

basin are concave toward the water.

iv) Rainfall -

Sawantwadi being very close to the west coast (21 km) and comes in the western rain zone of the Sahyadri tract of the Western Ghats, the average annual precipitation at this place is as high as 4103 mm (last 15 years average). Though the major source of rain is south west monson phenomenon, occassionally the post monsoon showers take place because of the north east monsoon.

Rain water is the major source of incoming water for the tank.The tank gets filled in completely in the month of July - August and than it overflows for some time. The rainfall from June '81 till the end of August '81 was recorded to be 3967 mm. This gives an idea of the heavy rainfall in the catchment area of the tank during short period.

The tank is usually emptied before begaining of monsoon every year by the Sawantwadi municipality. This is perhaps done to remove the excess growth of the aquatic weeds from the tank namely Hydrilla verticellata. When there are heavy showers in the catchment of the tank it overflows in very short time, the surplus water is discharged out through the out let on the North side.

There are strong pre monsoon winds in the North west - South east direction on tank. In monsoon months also the winds blow in the same direction and the velocity of the wind is considerable. This wind force causes wave action on the water surface which helps in the free circulation of water in the

shallow tank. When the wind blows along the length of the tank (Maximum length), the wooded hills around Motitalav offer very little protection to reduce its force.