

PHYSICAL STUDIES

IV

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The effect of air and water temperatures and their fluctuations in shallow water bodies like tanks in the subtropical conditions are decisive to the life of the flora and fauna and to the various biological processes in the water body. Therefore an attempt had been made to study this important aspect. Also water transparency and humidity were studied as the important physical factors those influence the water body.

1) Air temperature -

The temperature readings were taken during morning hours. The monthly averages of air temperature are shown in the fig. no.1. and the weekly air temperature readings for both the stations are given in the table no.1.

The highest air temperature on both the stations i.e. station 1 and 2 was recorded on 4-10-81, to be 35°c . The lowest air temperature during the investigations was recorded to be 25°c on 7-3-1982. Therefore it was evident that the difference in the extreme air temperature conditions recorded during the investigations was 10°c only, which reflects on the moderate climatic condition in the tank region.

The Fig 1. shows uniform pattern of the air temperature at both the stations throughout the period of investigations. Maximum average temperature was in October 32.4°c , and the lowest average temperature was noticed in March (26.9°c)

**Table No.1: Weekly readings of Air Temperature in °c
for September 1981 - April 1982.**

| <u>Date</u> | <u>Station No.1</u> <u>Readings.</u> | <u>Station No.2</u> <u>Readings.</u> |
|-------------|-----------------------------------------|-----------------------------------------|
| 13.9.81 | 32 | 31.5 |
| 20.9.81 | 27 | 27 |
| 27.9.81 | 28.5 | 31 |
| 4.10.81 | 35 | 35 |
| 11.10.81 | 30.5 | 30.5 |
| 18.10.81 | 32.5 | 32.5 |
| 25.10.81 | 31.5 | 32 |
| 15.11.81 | 33.5 | 32.5 |
| 22.11.81 | 28 | 28 |
| 29.11.81 | 30 | 30 |
| 6.12.81 | 33 | 33 |
| 13.12.81 | 27 | 27 |
| 20.12.81 | 29 | 29 |
| 3.1.82 | 27.5 | 27.5 |
| 10.1.82 | 27.0 | 27 |
| 17.1.82 | 29.0 | 29 |
| 21.1.82 | 28 | 28 |
| 31.1.82 | 25.5 | 25.5 |
| 14.2.82 | 28 | 26 |

| <u>Date</u> | <u>Station No.1</u> <u>Readings.</u> | <u>Station No.2</u> <u>Readings.</u> |
|-------------|-----------------------------------------|-----------------------------------------|
| 21.2.82 | 26 | 27 |
| 28.2.82 | 27 | |
| 7.3.82 | 25 | 25 |
| 14.3.82 | 27 | 27 |
| 21.3.82 | 27 | 27 |
| 28.3.82 | 28.5 | 28.5 |
| 4.4.82 | 28 | 28 |
| 11.4.82 | 28 | 28 |
| 18.4.82 | 29 | 29 |
| 25.4.82 | 29 | 29 |

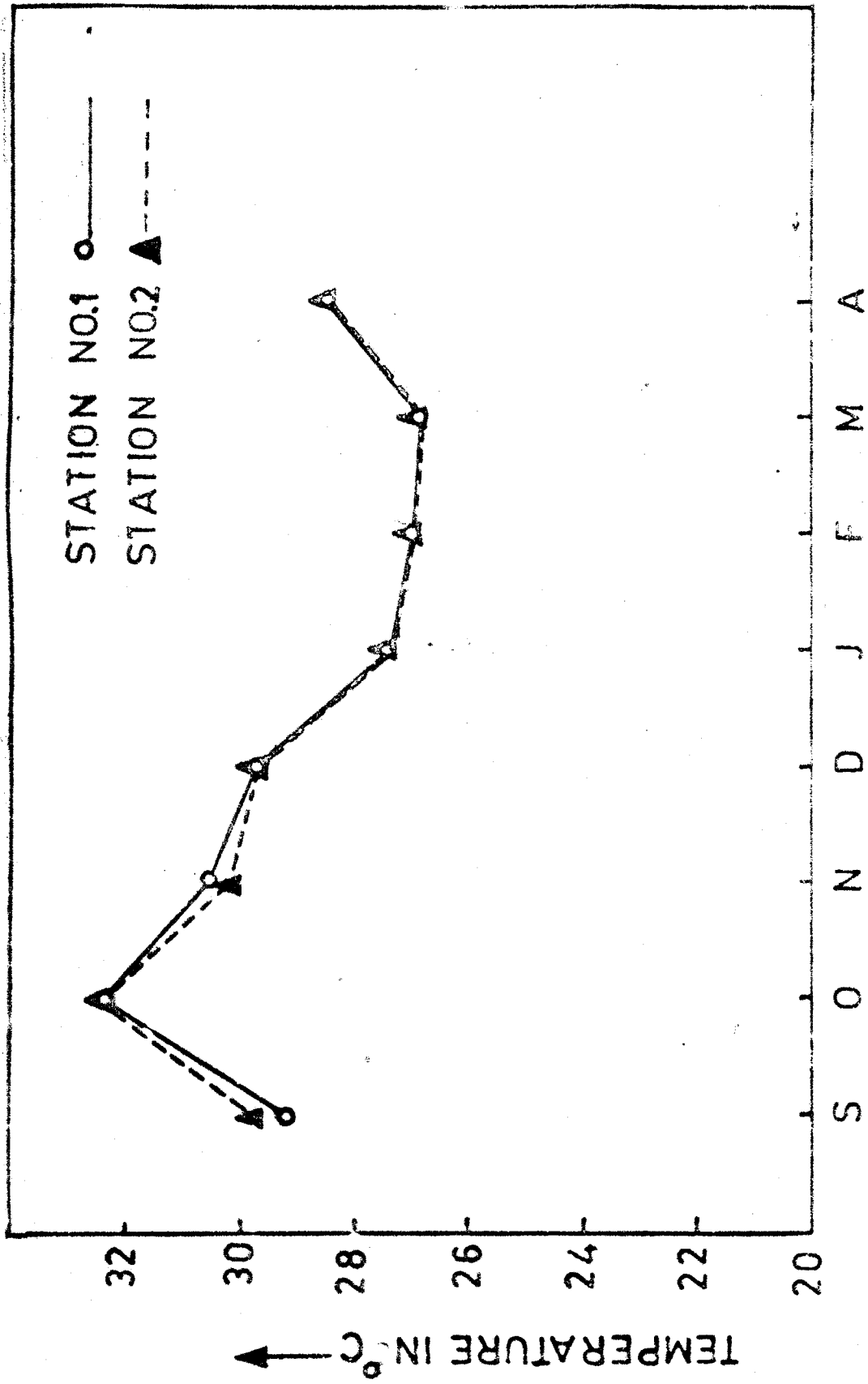


Fig No 1 - The graph showing monthly average of Air Temperature at water surface in °c for the period of September 1981-April 1982.

ii) Water temperature -

The weekly water temperature readings from the surface water of both the stations are given in the table no.2. At station 1, maximum value of 31.5°C was recorded on 18-10-81 where as the lowest value of 23.5°C was recorded on 13-12-81. Station 2 showed the highest value i.e. 31.5°C on 25-10-81 and the lowest of 24°C on 13-12-81.

The graph shown is fig.no,2 expresses uniform pattern of average surface water temperatures at both the stations. The highest values being in the month of September i.e. 30°C and 29.8°C at stns. 1 and 2 respectively and lowest being 25.8°C at both the stations in January.

iii) Water Transparency -

Water transparency or depth of light penetration was recorded with the help of standard Secchidisc in centimeters. The weekly readings were carried out at both the stations and are given in the table no.3. The monthly average values are expressed in a graphic form and are shown in the fig no.3.

The Sacchidise readings^{at} both the stations have shown almost uniform fluctuation pattern with minor differences at two stations.

The average monthly values at station no.1. show the maximum value in October to be 150^{cm} and the lowest value was recorded in September i.e. 60 cms. The second lowest was

**Table No. 2. Weekly readings of Surface Water Temperature
in °c for September 1981 - April 1982.**

| <u>Date</u> | <u>Station No. 1.</u> <u>Readings.</u> | <u>Station No. 2.</u> <u>Readings.</u> |
|-------------|-------------------------------------------|-------------------------------------------|
| 13.9.81 | 31 | 31 |
| 20.9.81 | 29.5 | 29.5 |
| 27.7.81 | 29.5 | 29 |
| 4.11.81 | 30 | 30 |
| 11.11.81 | 27 | 28 |
| 18.10.81 | 31.5 | 31 |
| 25.10.81 | 31.0 | 31.5 |
| 15.11.81 | 30.5 | 30 |
| 22.11.81 | 26 | 26 |
| 29. 11.81 | 25 | 25 |
| 6.12.81 | 29 | 29 |
| 13.12.81 | 23.5 | 24 |
| 20.12.81 | 26 | 26 |
| 3.1.82 | 25 | 25 |
| 10.1.82 | 26.5 | 26 |
| 17.1.82 | 25.5 | 25.5 |
| 24.1.82 | 26.5 | 26.5 |
| 31.1 .82 | 25.5 | 26 |

| <u>Date</u> | <u>Station No. 1.</u> <u>Readings.</u> | <u>Station No. 2.</u> <u>Readings.</u> |
|-------------|-------------------------------------------|-------------------------------------------|
| 14.2.82 | 26.5 | 27 |
| 21.2.82 | 25.5 | 26 |
| 28.2.82 | 27 | 27 |
| 7.3.82 | 25 | 25.5 |
| 14.3.82 | 26 | 27 |
| 21.3.82 | 27.5 | 28 |
| 28.3.82 | 27.5 | 27 |
| 4.4.82 | 28 | 29 |
| 11.4.82 | 28 | 29 |
| 18.4.82 | 27 | 28 |
| 25.4.82 | 28.5 | 28 |

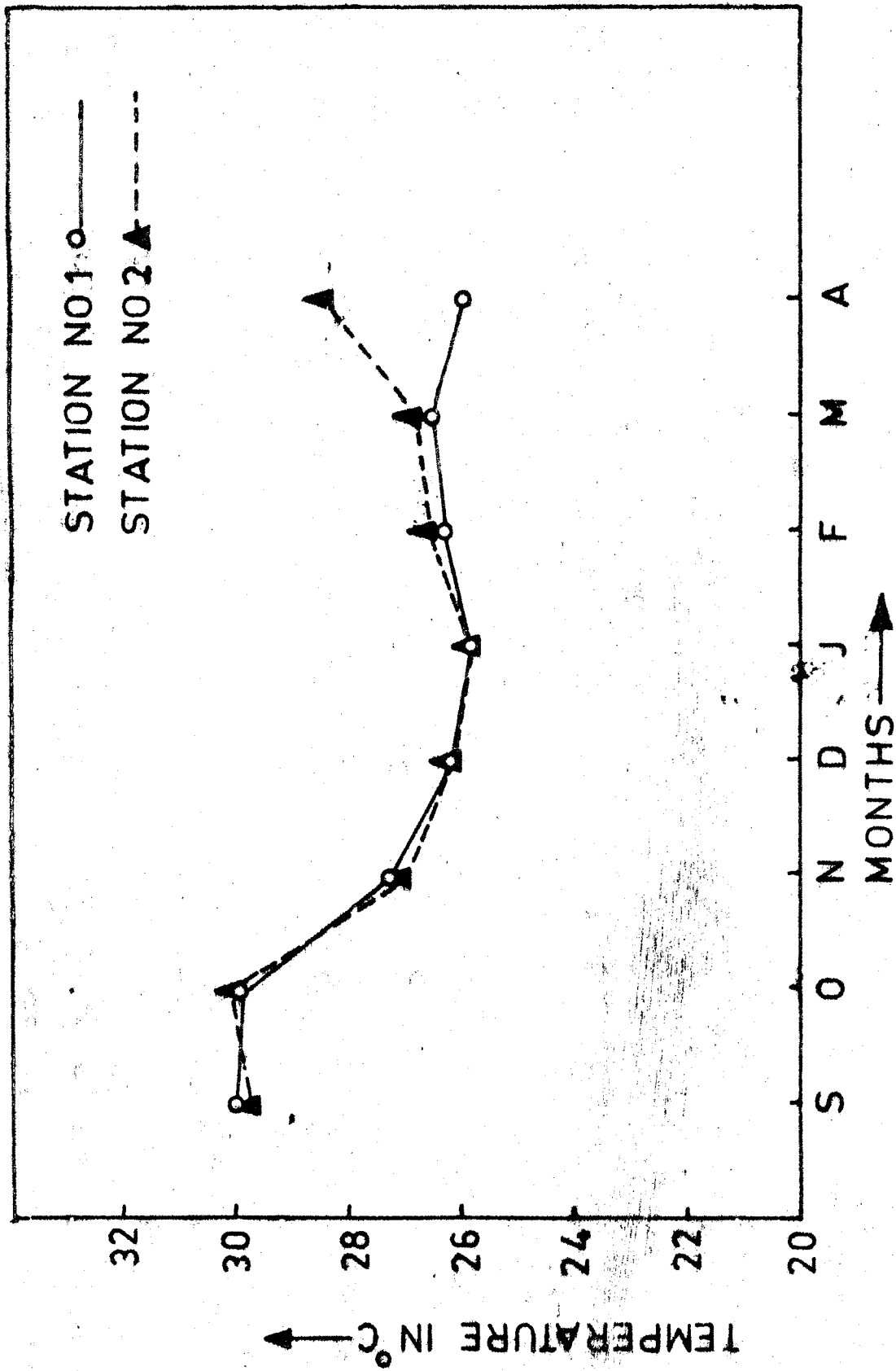


Fig No 2. The graph showing monthly average values of surface water Temperature in °C for the period of September 1981-April 1982.

**Table No. 3: Weekly readings of Secchi disc transparency
in cms for september 1981 - April 1982.**

| <u>Date:</u> | <u>Station No.1.</u> <u>Readings.</u> | <u>Station No.2.</u> <u>Readings.</u> |
|--------------|------------------------------------------|------------------------------------------|
| 13.9.81 | 58.0 | 44.1 |
| 20.9.81 | 54.5 | 75.0 |
| 27.9.81 | 69.5 | 84.5 |
| 4.10.81 | 115.5 | 145.0 |
| 11.10.81 | 169.0 | 167.0 |
| 18.10.81 | 157.0 | 135.0 |
| 25.10.81 | 162.5 | 172.5 |
| 15.11.81 | 144.5 | 144.5 |
| 22.11.81 | 78.3 | 92.3 |
| 29.11.81 | 75.2 | 98.0 |
| 6.12.81 | 133.0 | 135.0 |
| 13.12.81 | 88.5 | 91.5 |
| 20.12.81 | 201.0 | 188.5 |
| 3.1.82 | 98.5 | 119.0 |
| 10.1.82 | 142.0 | 142.0 |
| 17.1.82 | 145.0 | 136.0 |
| 24.1.82 | 122.5 | 122.5 |
| 3.1.82 | 143.5 | 138.5 |

| <u>Date</u> | <u>Station No.1.</u> <u>Readings</u> | <u>Station No.2.</u> <u>Readings</u> |
|-------------|-----------------------------------------|-----------------------------------------|
| 14.2.82 | 94.0 | 107.0 |
| 21.2.82 | 83.0 | 85.0 |
| 28.2.82 | 97.0 | 106.0 |
| 7.3.82 | 66.0 | 75.5 |
| 14.3.82 | 87.5 | 81.0 |
| 21.3.82 | 93.5 | 82.5 |
| 28.3.82 | 98.5 | 64.5 |
| 4.4.82 | 80.0 | 62.5 |
| 11.4.82 | 68.0 | 57.0 |
| 18.4.82 | 58.5 | 58.5 |
| 25.4.82 | 48.0 | 42.5 |

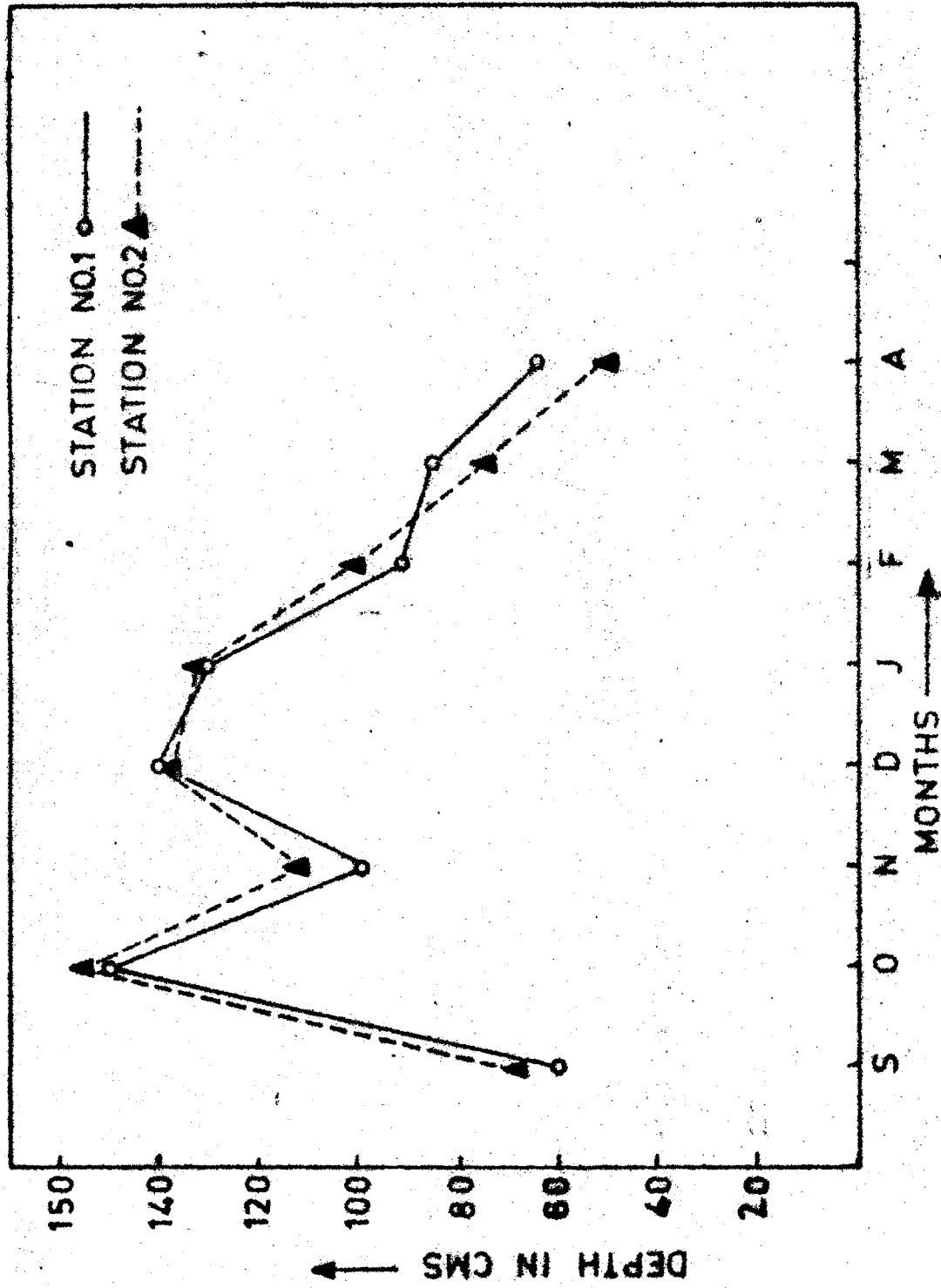


Fig No 4. The graph showing monthly average values of Water transparency in terms of visibility of Sacchi disc in Cms for the period of September 1981-April 1982

recorded in the month of April (64 cms.) .

At the station no.2, The maximum monthly value was noticed in October 155 cms and the lowest was recorded in April i.e. 50 cms.

The weekly readings show the maximum and the minimum values of light penetration to be on the same days at both stations. Maximum value on 20-12-81 being 201 cm and 188.5 cm at stations no 1 and 2 respectively. The lowest values were recorded on 25-4-1982, and they were 48 cms and 42.5 cms at station no 1, and no 2 respectively.

iv) Humidity -

Humidity measurements were made with the help of dry and wet bulb thermometer. Since Sawantwadi is very close (21 kms) to the sea coast and at much lower height i.e.367 feet only above mean sea level , The weather of this region always showed more relative humidity.

The humidity readings for every week are given in the table no.4 and the monthly averages of the percentage relative humidity are plotted in the fig no.4 .

The maximum average relative humidity i.e.(88.5) was recorded in the month of March 1982. at sta.2, and the lowest average reading i.e.(74) was also recorded at the same station in the month of November'81. The readings at both the stations show almost uniform fluctuation pattern as expected.

The maximum relative humidity i.e.96 % was recorded twice during the weekly investigations on 20.9.81 and 21.3.82 at

**Table No.4: Weekly readings of the percentage of Humidity
Relative Humidity for September 1981 - April 82.**

| <u>Date</u> | <u>Station No.1.</u> <u>Readings</u> | <u>Station No.2.</u> <u>Readings</u> |
|-------------|-----------------------------------------|-----------------------------------------|
| 13.9.81 | 74 | 74 |
| 20.9.81 | 96 | 96 |
| 27.9.81 | 66 | 68 |
| 4.10.81 | 72 | 72 |
| 11.10.81 | 79 | 76 |
| 18.10.81 | 75 | 75 |
| 25.10.81 | 74 | 74 |
| 15.11.81 | 69 | 65 |
| 22.11.81 | 71 | 71 |
| 29.11.81 | 86 | 86 |
| 6.12.81 | 81 | 81 |
| 13.12.81 | 71 | 71 |
| 20.12.81 | 83 | 83 |
| 3.11.82 | 85 | 85 |
| 10.1.82 | 85 | 85 |
| 17.1.82 | 86 | 86 |
| 24.1.82 | 71 | 71 |
| 31.1.82 | 88 | 88 |

| <u>Date</u> | <u>Station No.1.</u> <u>Readings</u> | <u>Station No.2.</u> <u>Readings</u> |
|-------------|-----------------------------------------|-----------------------------------------|
| 14.2.82 | 78 | 78 |
| 21.2.82 | 77 | 77 |
| 28.2.82 | 85 | 85 |
| 7.3.82 | 84 | 84 |
| 14.3.82 | 85 | 85 |
| 21.3.82 | 96 | 96 |
| 28.3.82 | 89 | 89 |
| 4.4.82 | 85 | 85 |
| 11.4.82 | 88 | 88 |
| 18.4.82 | 79 | 79 |
| 25.4.82 | 86 | 86 |

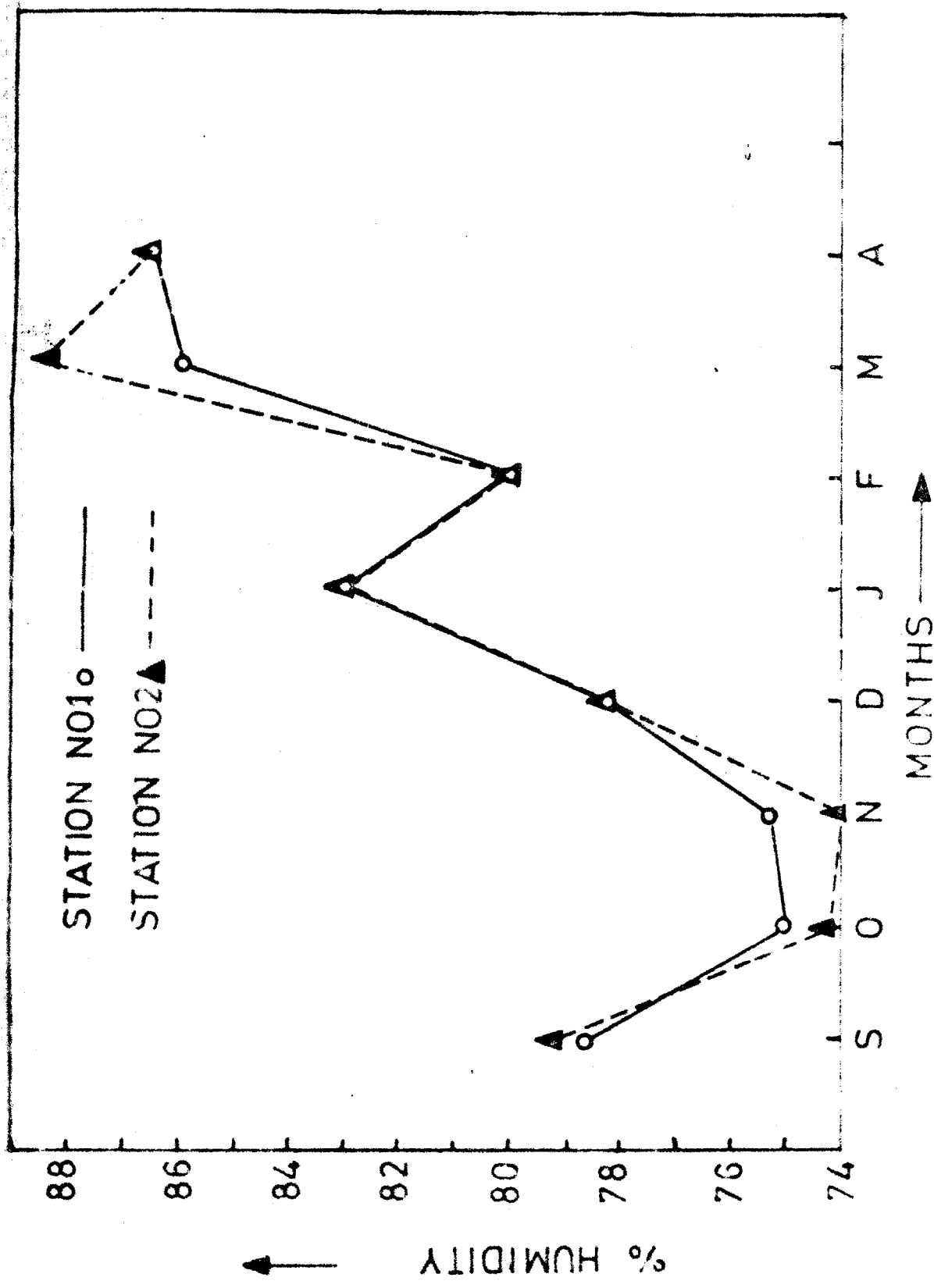


Fig No3. The graph showing monthly average values of Air Humidity % for the period of September 1981-April 1982

both the stations. These dates are very close to the famous "October heat" season of this area when usually very high percentage of relative humidity is recorded. The lowest weekly values of relative humidity were recorded on 15.11.81 at both the stations and they were 69% and 65% at stations no 1 and no.2, respectively.

The knowledge of changes in the percentage of relative humidity is always important in the case of small water bodies like tanks, especially since rise in the temperature and wind speed in summer, together with prevailing percentages of low humidity considerably increases the rate of evaporation from the water surface, thus causing great water level fluctuations.