V O L U M E   I

INTRODUCTION, METHODOLOGY,

FLORISTIC ANALYSIS, VEGETATION

AND

ENUMERATION OF PLANTS

(RANUNCULACEAE TO PUNICACEAE)

1. INTRODUCTION

1.1. Objectives of the Present Work :

Surat, a fast developing city and a University centre, needs a flora of its own, which can be used by a variety of clientele. Inspite of the availability of a number of floristic works on the forests of Gujarat, the urban flora and the stresses under which it is put by the forces of industrialization and urbanization are not properly studied.

The candidate has been associated with one of the educational institutions of the city which caters to the needs of undergraduate and postgraduate students in Botany along with other subjects. His presence on the spot could enable him to observe the flora and vegetation for a number of years. The object of this work is restricted and is entirely practical. The flora is intended for graduate and postgraduate students of South Gujarat University and others who may desire to make themselves acquainted with the immense variety of plant species growing in and around Surat. This is very much in keeping with the suggestions made by Mukerji (1953) and Santapau (1958). Floristic works on limited areas like university towns, according to them, tend to be intensive and inexpensive.

1.2. Previous work done :

From available literature, it appears that the flora of Surat has been neglected by the botanists, although Cooke

(1901-1908) and Shah (1980) have cited the localities Surat, Dumas and Hajira in their floras. Sedgwick (1914) has compiled a list of grasses of Ahmedabad and Surat. Solanky et al. (1972) made a floristic survey of Rander and environs. Although there are a number of accounts on the floristics of South Gujarat forests (Inamdar et al., 1968, 1971; More, 1972 and Joshi, 1974), there is hardly any good floristic work dealing with the urban areas. It is, therefore, necessary to work out the details of the flora and to add to our knowledge of the distribution of species within these urban areas. The informations, gathered in this work, will not only supplement the Flora of Gujarat but will be of immense value to potential users of this flora namely the students, the horticulturists, the town-planners and the Ayurvedic practitioners.

1.3. Brief description of the area :

1.3.1 Location : Surat is one of the oldest and biggest cities of Gujarat State, situated on the southern bank of the river Tapi at the height of 13 m above MSL. It lies on 21°.12' north latitude and 72° 52' east longitude. It is one of the most important stations of Western Railway on Bombay-Ahmedabad section, about 263 km north of Bombay central and 229 km south of Ahmedabad. It is also connected with central India by Surat-Nandurbar-Bhusaval railway line. Surat is also accessible by State Transport buses which regularly ply between Surat and important towns of Gujarat. It is district headquarter and seat of South Gujarat University.

The area studied is about 150 sq. km distributed among the Surat Municipal Corporation (Map 1) and the Chorasi Taluka (Map 2). The localities like Abhava, Bhimpor, Dumas, Magdalla, Udhana, Bhestan, Ichhapor, Hajira, Bhatha and Variav fall in Chorasi Taluka.

1.3.2 Physiography : The district has two main physiographic sub-divisions (i) the eastern hilly tract and (ii) the western alluvial plain. The area studied is located in latter sub-division.

1.3.3 Soil : Most of the area is composed of black alluvial, light soil, which is highly fertile, except in the coastal region. The coast-line shows saline-sandy and alluvial soils. Outside the limit of tidal action, sand dunes and drifting sand dominate the area. Behind the sand dunes lies the alluvial belt.

1.3.4 Geology : The Geology of South Gujarat comprises the Deccan Lava flows of Lower Eocene age which are however not exposed anywhere in the study area. They are covered by a thick alluvial sequence of Holocene period which have been brought down by the major rivers and their tributaries flowing through the region. The riverine tract comprises the vast areas of detached tidal mud flats, tidal creeks, abandoned river channels and other Fluvio-marine feature.

1.3.5 Climate : It is by and large sub-tropical, which is characterised by hot summer, humid monsoon and mild winter. The cycle of seasons may be divided broadly into :

GUJARAT
TALUKA CHORASI
DIST. SURAT

MAP-2
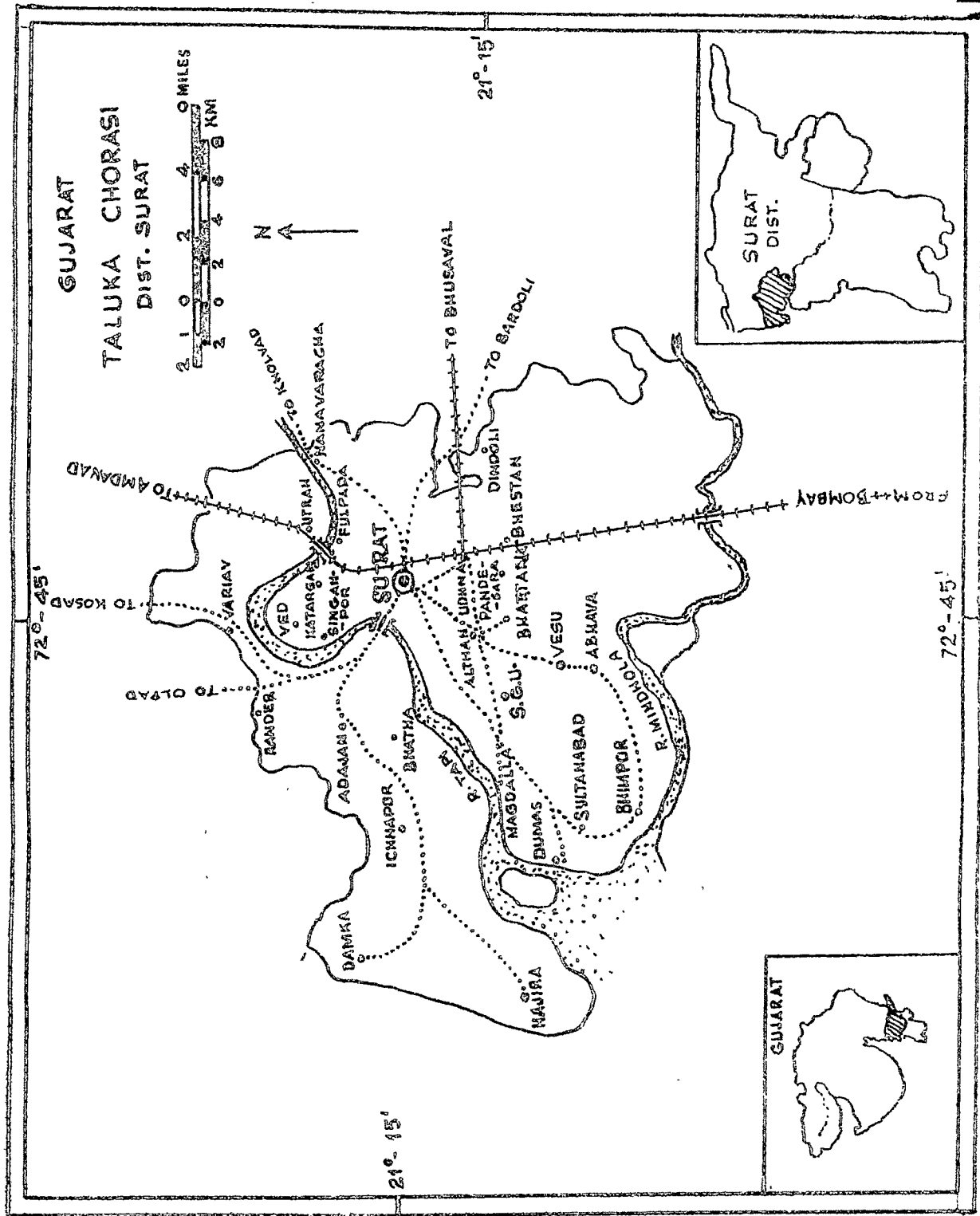
i) the winter season : November to February,

  ii) the summer season : March to May, and

 iii) the monsoon season : June to September.

1.3.6 <u>Rainfall</u> : The monsoon generally sets in the second week
of June and lasts upto September. Premonsoon and postmonsoon
showers are also occasionally recorded. The average annual
rainfall of Surat is 1273 mm. The monsoon is generally accompanied
by gusty winds. Details regarding the rainfall are given in the
Table I.

1.3.7 <u>Temperature</u> : The climate is hot in summer. The temperature
rises in the months of March, April and May, when the maximum
temperature varies between 34°C and 37°C. It declines gradually
between the months of June and August. Again it rises in the
months of October and November. The minimum temperature varies
between 12°C and 15°C. December, January and February are the
coldest months of the year. The mean maximum and minimum
temperatures recorded monthwise from 1970 to 1979 of Surat are
given in the Tables II and III.

1.3.8 <u>Relative Humidity</u> : It is maximum in the early morning,
decreases with the advance of the day, attaining its minimum
during the hottest period in the afternoon. It again increases
towards evening. The lowest humidity is recorded during winter
and summer months (i.e. November to April). The morning average
is 60% and afternoon 30%. On individual days it may be as low as

TABLE - 1.

Rainfall in mm.

SURAT

Year	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL RAINFALL
1970	0.0	0.0	0.0	0.0	0.0	324.4	324.1	480.6	429.1	0.0	0.0	0.0	1558.2
1971	0.0	0.0	0.0	0.0	4.0	221.1	207.5	157.3	307.1	0.0	0.0	0.0	897.0
1972	0.0	0.0	0.0	0.0	0.0	315.0	289.2	157.8	29.7	0.0	0.0	0.0	791.7
1973	0.0	1.2	0.0	0.0	0.0	42.9	442.3	199.4	383.0	0.0	0.0	0.0	1068.8
1974	0.0	0.0	0.0	0.0	90.8	1.3	327.8	87.9	71.0	8.3	0.0	0.0	587.1
1975	0.0	0.0	0.0	0.0	0.0	414.1	218.6	459.1	344.3	173.3	0.0	0.0	1609.4
1976	0.0	0.0	0.0	0.0	0.0	1049.6	830.6	209.1	254.6	0.0	44.0	0.0	2387.9
1977	0.0	0.0	0.0	0.0	2.1	463.4	406.4	140.6	164.8	0.0	22.1	0.0	1199.4
1978	0.0	0.0	0.0	0.0	0.0	594.2	156.7	208.6	31.4	22.2	39.8	25.4	1078.3
1979	0.0	6.4	0.0	0.0	0.0	249.3	197.2	790.2	142.9	0.0	169.3	0.0	1555.3
Mean	0.0	0.76	0.0	0.0	9.69	367.4	340.0	289.1	215.8	20.4	27.5	2.5	1273.1

SURAT

TABLE - II

Maximum Temperature °C

Year	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1970	29.9	31.2	35.4	37.3	36.2	32.4	31.0	29.8	30.6	35.5	33.3	30.8
1971	29.4	31.8	36.0	36.5	35.2	31.9	30.8	30.4	32.6	32.4	32.7	30.5
1972	31.0	29.0	36.7	37.1	36.2	34.1	31.5	31.0	33.8	36.0	33.6	31.1
1973	28.7	32.9	35.5	38.4	34.9	34.5	30.6	30.8	29.7	34.3	33.3	30.8
1974	30.7	31.6	36.3	36.4	36.3	34.6	31.1	31.4	33.6	33.8	33.0	30.5
1975	29.7	31.7	34.4	38.3	34.7	33.5	31.5	30.1	32.9	32.7	32.4	29.8
1976	29.6	31.8	41.8	35.6	33.7	32.3	31.0	30.4	31.0	36.7	33.6	31.0
1977	29.3	31.9	31.3	35.4	35.1	33.9	30.5	30.4	31.9	36.2	33.6	31.3
1978	29.2	31.3	33.1	36.2	36.2	32.9	31.5	30.4	31.8	34.9	33.1	30.8
1979	30.1	30.1	34.2	36.5	36.2	34.5	31.1	30.3	32.7	34.4	32.3	31.2
Mean	29.8	31.3	35.5	37.0	35.5	33.5	31.1	30.5	32.1	34.7	33.1	30.8

TABLE - III

SURAT

Minimum Temperature ° C

Year	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1970	12.2	14.7	17.5	22.8	26.5	25.9	24.9	25.1	24.2	22.4	15.3	12.1
1971	12.5	14.0	18.1	23.4	26.1	26.0	25.1	24.8	23.9	20.8	14.5	12.8
1972	12.0	13.5	17.6	22.5	26.0	26.9	25.6	24.9	23.1	21.3	15.6	15.0
1973	13.4	16.0	18.3	22.6	26.7	26.9	24.6	24.4	23.8	21.5	15.3	15.7
1974	12.4	13.8	20.2	23.5	25.6	27.1	25.6	25.4	24.3	22.8	13.7	13.8
1975	12.0	15.1	16.7	22.2	26.0	26.7	25.5	24.7	24.8	22.6	15.2	12.3
1976	13.5	15.3	19.1	21.5	25.3	25.3	25.1	24.5	23.4	21.4	21.0	16.8
1977	13.4	15.6	19.7	23.2	26.3	26.5	21.9	25.1	23.9	21.6	21.3	15.1
1978	12.6	16.2	17.3	22.8	25.6	26.4	25.7	25.2	24.0	21.5	19.6	16.1
1979	12.1	12.8	17.7	22.2	24.8	26.1	25.4	25.2	24.0	22.9	27.3	11.6
Mean	12.6	14.7	18.2	22.7	25.9	26.4	24.9	24.9	23.9	21.9	17.9	14.1

SURAT

TABLE - IV

Relative Humidity %

Year	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC.
1970	78	75	76	84	84	92	89	94	91	87	70	69
1971	68	81	69	88	83	91	91	93	90	90	79	76
1972	77	78	75	79	85	91	89	92	89	82	79	78
1973	73	80	75	79	89	83	91	87	92	84	78	78
1974	81	70	74	75	86	81	89	90	90	93	80	81
1975	73	68	74	74	81	86	87	90	89	85	79	81
1976	85	80	71	85	82	86	88	87	90	83	85	87
1977	80	79	87	86	87	87	95	90	91	81	79	72
1978	86	84	85	82	85	93	93	94	89	79	77	81
1979	88	82	85	81	83	90	94	94	91	87	91	93
Mean	79	78	77	81	85	88	91	91	90	85	80	80

OMBROTHERMIC DIAGRAM FOR SURAT (1970 – 1979 MEAN)

GRAPH – 1
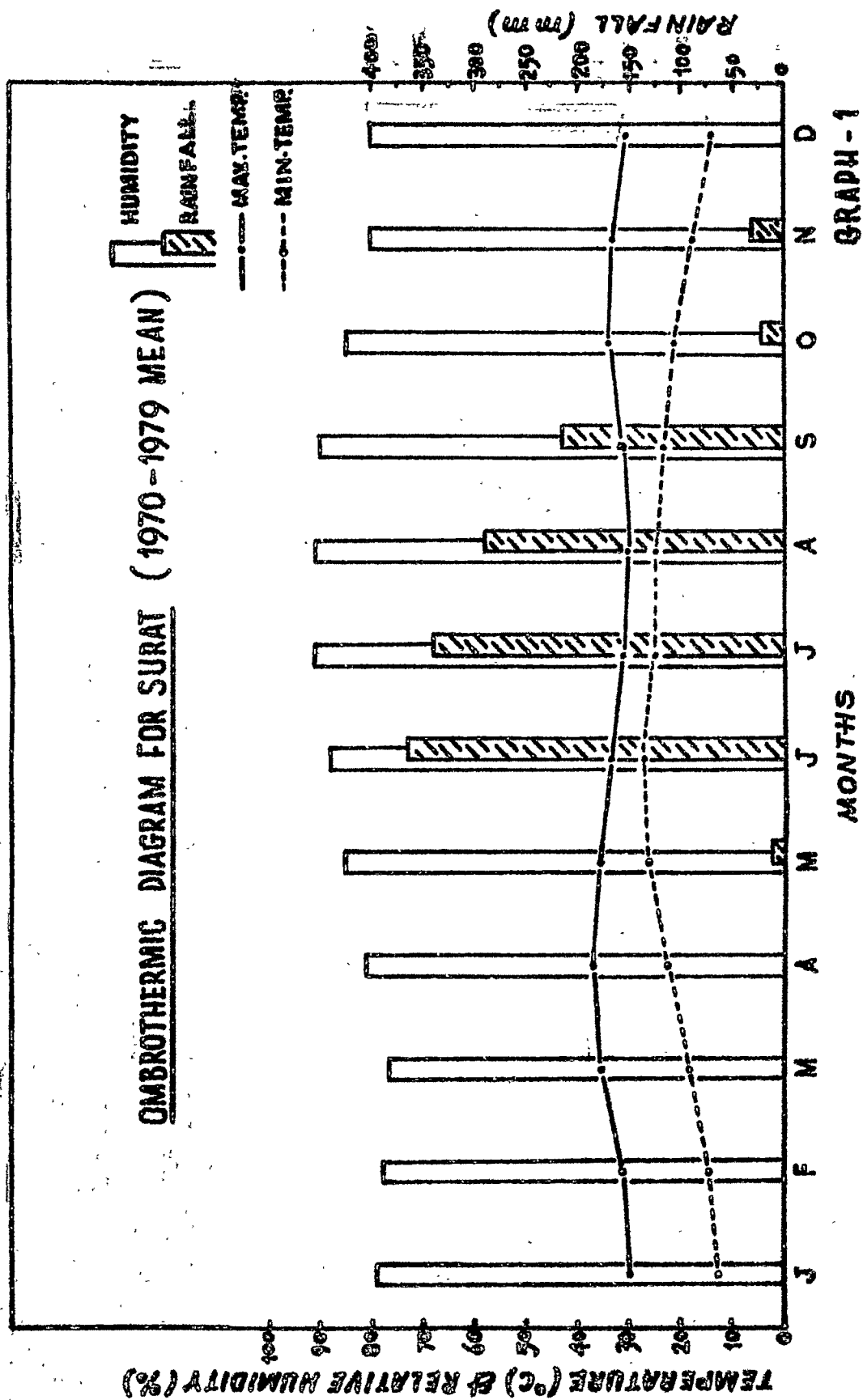
10% in the noon hours. It is highest in the monsoon months.
The average relative humidity is 80% to 85% in the morning and
70% to 75% in the afternoon. On individual days of June and
August, humidity may be as high as 100%. Table IV shows the
percentage of relative humidity of different months during the
period of 1970-1979. The ombrothermic diagram for Surat for the
period 1970-1979 is given in Graph I.

1.3.9 <u>Rivers</u> : The Tapi and the Mindhola are two principal
rivers. Tapi has a total course of about 752 km and flows through
Madhya Pradesh and Maharashtra before entering Gujarat State. It
enters Surat near Nana Varachha and terminates into the Arabian
Sea. It bifurcates leaving a island at the mouth of the estuary.

Mindhola flows from east to west and terminates near
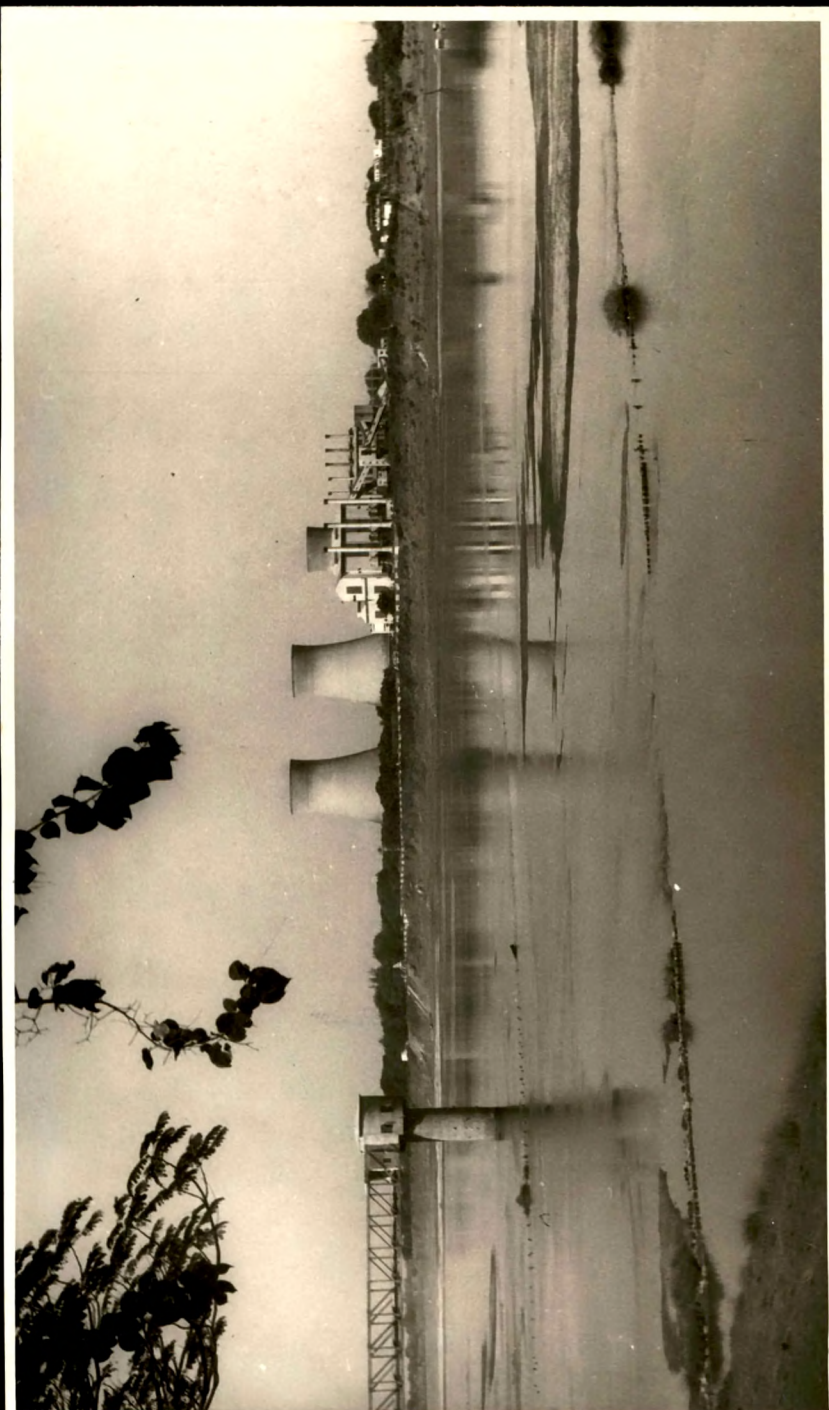Bhimpor, about 6 km south of Tapi. It forms a boundary between
Surat and Valsad districts.

PLATE - 2. THE RIVER TAPI - NEAR NANA VARACHHA.