RAJASTHAN STATE GAZETTEER

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LAND AND PEOPLE

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PREFACE

The work of preparation of State Gazetteer was initiated in 1979-80. Eminent scholars, subject matter specialists and departmental officers were requested to contribute on assigned topics. The write-ups were edited by Sectional Editors.

A State Level Advisory Board was constituted in 1982 under the Chairmanship of the Chief Minister, in his capacity as the Planning Minister. Four subject committees were formed in 1987, from among the members of the Advisory Board, to finalise the draft chapters. The changes suggested by them were incorporated in the chapters wherever possible.

The Advisory Board was reconstituted in 1993 with the Chief Secretary as its Chairman. The Board suggested that some portions of the draft be updated. It also desired that the State Gazetteer be brought out in several volumes. Accordingly, it was decided to divide the draft in five volumes.

The material contained in the volumes conforms to the base year 1977-78 unless otherwise indicated. Since Rajasthan has an international border, approval of the draft chapters was also obtained from the relevant Ministries and departments of the Central and State Governments.

I take this opportunity to express my gratitude to the Hon'ble Chief Minister and the Chief Secretary, the Chairman of the Advisory Board, for their valuable inputs in finalisation of the study. I am also thankful to the members of the Advisory Board, the Sectional Editors and the contributors.

The officers and staff of the Gazetteers Department deserve a special word of thanks for their hard work. Various Ministries, departments and organisations of the Central and State Governments who co-operated in the work also deserve our gratitude.

Jaipur,
February 1995.

M.K. KHANNA, I.A.S.
Secretary to Government,
Planning Department.
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CHAPTER I
GENERAL
INTRODUCTION

Origin of the name

The State of Rajasthan, before its formation consisted of 15 princely States, the centrally administered territory of Ajmer-Merwara and two chiefships. The entire territory was then known as Rajputana. After integration, the territory came to be known as Rajasthan.

Location

It extends from 23° 03' 30" to 30° 11' 54" north latitudes and from 69° 29' 05" to 78° 16' 24" east longitudes. The Tropic of Cancer passes through its southern tips in Banswara and Dungarpur districts. It has an area of about 3.42 lakh sq. km. It is bounded on the west and north-west by Pakistan, on the north and north-east by Punjab, Haryana and Uttar Pradesh, on the east and south-east by Uttar Pradesh and Madhya Pradesh and on the south-west by Gujarat. Its total population in 1971 was 2,57,65,806; in 1981 it was 3,42,61,862 which rose to 4,40,05,990 (2,30,42,780 males and 2,09,63,210 females) in 1991.

The administration of the integrating States was run under different rules and regulations prevalent in those States but after integration in 1950, a uniform pattern of administration was evolved with Jaipur as the capital of the State. The territory was divided into 25 revenue districts. After the merger of Ajmer in 1956 in Rajasthan, the number of districts rose to 26. On 15th April, 1982, a new district, Dhaulpur, was carved out of Bharatpur. On April 10, 1991, three more districts - Rajsamand, Baran and Dausa were carved out of the then existing districts of Udaipur, Kota and Jaipur respectively. Thus at present (1992-93), there are six Divisions and 30 revenue districts in the State. These are further sub-divided into 90 sub-divisions, 213 tahsils and 87 sub-tahsils.

TOPOGRAPHY

The Aravali hills form a linear tract across the State running roughly from north Gujarat to Delhi Ridge. In Rajasthan, these are confined between Mount Abu (1158 m. high) in the south-west and Khetri in the north-east. About three-fifth of the State lies north-west of this tract, leaving two-fifth in the south-east. There are two natural divisions of Rajasthan. The north-west tract is sandy and unproductive with little water, but improves gradually from desert land in the far west and north-west
to comparatively fertile and habitable land towards the east. The area includes the Thar (Great Indian) Desert. The south-eastern area is higher (100 to 350 m. above sea level) with several patches of highly dissected plateau. In the south lies the hilly tract of Mewar. To the north-east of this there is a rugged region following the direction of the Chambal River course. Further north the country levels out; the flat plains of Bharatpur district form part of the alluvial plain of the Yamuna River. It is more fertile and very diversified in character.

Natural Divisions

Physiographically Rajasthan can be divided into four main divisions. Each one of them is further divided into two sub-divisions as follows:

1. Western Sandy Plains:
   (a) Sandy Arid Plains (Marusthali)
   (b) Semi-Arid Transitional Plains (Rajasthan Bagar)

2. Aravali Range and Hilly Region:
   (a) Aravali Range and Bhorat Plateau
   (b) North-eastern Hilly Region

3. Eastern Plains:
   (a) Banas Basin
   (b) Chappan Plains

4. South-eastern Rajasthan - Pathar (Harauti Plateau):
   (a) Vindhyan Scarpland
   (b) Deccan Lava Trap

The geographical environment in terms of physical and economic elements is so varied in different parts of the State that it may be divided into the following seven regions:

1. Western Arid Region
2. Semi-Arid Region
3. Canal Region
4. Aravali Region
5. Eastern Agro-Industrial Region
6. Southern Agricultural Region
7. Chambal Ravine Region

Hills

The Aravali range has been considered to be perhaps the oldest mountain range of the world. This has been ascertained by the absence
of any fossiliferous rock in this range. It intersects the State diagonally from one end to the other. Their average height ranges from 400 metres to 900 metres with Guru Shikhar (1722 m.) being the highest peak in Mount Abu and the highest point between the Himalayas and the Nilgiris. They have a steeper gradient to the west sloping down from 750 m to 450 m within a short distance of 100 kilometers. The Aravalis are broader in the southwest with their confused extensive ranges in Sirohi, Udaipur and Chittaurgarh districts but become narrower in the north upto Ringas. As the Aravalis approach Ajmer the continuous chain breaks up into separate hills in the midst of which is located city of Ajmer on an open table-land, which slopes gently in all directions. From Ajmer the Aravalis’ trend changes to north - northeast and gradually the ranges get lower in elevation represented by some low residual hills. The ranges other than the Aravalis, though numerous, are comparatively insignificant. However, they surround many of the cities in Jaipur and Alwar districts and do not provide any formidable barrier to influence the climate, transport or the economy of the State.

In Bharatpur there is a range of local importance. Its highest peak Alipur is 414 m above mean sea level. South of these are the Karauli Hills, the highest of which nowhere reaches 490 m and to the southwest is a low but very well defined range, running from Mandalgarh towards northeast across Bundi to near Indergarh in Kota. These hills present a clear scarp for about 50 kilometres on their southeastern face and give very few openings for roads.

The best pass is that, in which lies the town of Bundi. From there, they are called the Bundi hills or Arabala range (620 m) of Vindhyan formations. This range runs in double line of hills and divides Bundi district in almost two equal parts. In its northeastern extension it is cut by the Mej river near Khatkar. Beyond Indergarh it disappears for a short distance and reappears at Balwan to enter into Sawai Madhopur district. It is through this gap that the Western Railway (Kota-Sawai Madhopur) gets a natural pass in this complex area.

The Mukandara range of over 500 m in height runs across the southwestern part of Kota district to beyond Jhalrapatan. Like the Arabala range it also has a curious double formation of two separate ridges. It forms the western boundary of the Harauti region. At Tolanpur it is cut across by the Chambal River and further south by the Kali Sindh. Between these two cuts there are two gaps, the Ghatoli gap and the Mukandara gap, only 13 kilometres apart. The latter was considered to be the most strategic and vulnerable point in historic times. All the southern districts are more or less hilly specially, Banswara and Dungarpur.
Most of these hills have provided natural sites for innumerable forts and fortresses built by the rulers through the ages. The Chittaurgarh fort built at the top of a flat and long hill range is of historic importance. These monuments are now attracting large number of tourists from all over the world.

Plateaus

HARAUTI PLATEAU — This plateau in Rajasthan covers the eastern part along the Chambal River including Kota-Bundi section. It is bounded in the northwest by the Great Boundary Fault of the Aravalis and extends eastward across the Rajasthan border till one comes across the sharply defined scarp overlooking Bundelkhand. Its height varies from 320 m to 420 m above mean sea level. The Chambal flows through this plateau and has carved out a gorge from Chaurasigarh to Kota for about 100 kilometres. It is an extension of the Vindhyan Plateau of Madhya Pradesh westward into Rajasthan as a triple plateau of three concentric scarps formed by the outcrops of three strong sandstones with intervening shales which render transportsations in this region difficult. This area is of deep black soil derived from the Deccan Trap lava. Because of its elevation and stony character the area is also called 'Pathar' or 'Upramal'.

The Bhorat Plateau with an average elevation of 1225 m lies northwest of Udaipur between Kumbhalgarh and Gogunda.

Plains

There are several plains in Rajasthan and unlike the Great Plain of India, each one of them varies in physical characteristics. They are: 1. Sandy Arid Plain or Marusthali, 2. Luni Basin or Godwar Tract, 3. Plain of Interior Drainage or Shekhawati Tract (Bagar), 4. Banas Plain, 5. Bharatpur Plain, 6. Harauti Plain, 7. Chappan Plain, and 8. Ghaggar Plain. The plains mentioned at serial number 1, 2 and 3 above, form parts of Thar desert.

BANAS PLAIN — The Banas Plain also termed as Mewar Plain, is a dissected plain on Acchaean gneiss and covers the eastern part of Udaipur, western Chittaurgarh, Bhilwara, Tonk, Jaipur, western Sawai Madhopur and southern part of Alwar. This area from a maximum height of 582 m in Deogarh, slopes gradually towards the east and northeast from the eastern foot of the Aravalis Range and is drained by the Banas and its tributaries. The alluvial deposits are scanty towards the west and thick in the east covering large parts of Kishangarh burying most of the gneissic rocks of which the plain is made.
Bharatpur Plain — This is a saucer like plain akin to the Yamuna plain, Bharatpur city being at its centre. Possibly it is the lowest part of the State. Through the landset imageries and the aerial photographs it has been recently discovered that the old channel of the Yamuna passes through Bharatpur district. Thus it is an alluvial flat plain deeply silted by both the present and past rivers. During the monsoon period if the rains persist for more than 3-4 days, the lower parts of the plain are flooded. However, the floods spread new alluvium over the cultivated areas and provide fertility to the plain. Since these floods are created by the waters flowing from Haryana and the Uttar Pradesh streams, besides the rivers of Rajasthan and there is colossal loss from year to year, large number of tanks have been built by damming the channels, and the rivers are being drained and diversion canals are being built by the Governments of the three concerned States.

Harauti Plain — A triangular alluvial plain made by the Chambal River and its tributaries covers large part of Kota and about one-third of Bundi district. It is a very good example of homogenous topography. It is the heart land of Harauti a rich granary and is named as Harauti Plain. The whole area is a perfect plain except for one small ridge lying parallel to the river Parwan and a circular hill of Ramgarh (506 m). For hundreds of kilometres, the surficial features are characterised by flood plains, river bluffs, deep and well developed ravines and interfluves.

Chhapar Plain — This plain lies south of the great Indian watershed in southeastern Udaipur, Banswara and southern part of the Chittaurgarh district. The area is drained by the tributaries of the Mahi river which have a steeper gradient, about 8 m to 12 m per kilometre. This has resulted in greater erosion of the gneissic plain and presents an entirely different set of landforms as compared to the plain of Mewar. This deeply dissected area is locally called ‘Bangar’ and includes the hilly tracts of Banswara and Dungarpur.

Ghaggar Plain — The Ghaggar plain is formed by the silt brought by the river originating from the Siwalik hills and entering into Rajasthan through the sands of Ganganagar district. This river, which is of seasonal nature, enters Rajasthan with all its fury during monsoons and since it has not cut any distinct channel, spreads over and creates flood problem.

Desert

Rajasthan is the only state in India which has within its territory a true hot desert. There are arid and semi-arid regions covering eleven western districts of the state characterised by preponderance of evaporation over precipitation, sparsed and restricted vegetational growth, extremes of
daily and seasonal temperatures, prevalence of meagre inland drainage leading to salt basins and playas and dominance of brackish/saline conditions in the ground water regime and soils. Physiography is marked by vast stretches of sand dunes of various kinds - longitudinal dunes, barchans, transverse dunes. In fact, the Great Indian Desert covering Barmer, Jaisalmer, Jalore, Jodhpur, Bikaner, Ganganagar, Churu, Jhunjhunu, Sikar, Nagaur and Pali districts, is a part of the Thar Desert extending into Pakistan. The total area of the arid tract is 233,100 square kilometres or roughly three-fifth of the State of Rajasthan. The greater part of this tract is covered by vast stretches of sand, both shifting and stable, the monotony being broken by occasional protrusion of hard rocks. In the Thar area the rock exposures are mainly of Aravali gneiss and schist, Malani granites and Vindhyan which confirm that the Thar is part of the western extension of the peninsular block. The rock exposures in Barmer-Jaisalmer-Bikaner tract to the extreme west and north belong to jurassic and Eocene marine formations, whereas those in Jalore-Siwana-Jodhpur-Khinsonar tract in the central region are of igneous rocks, at times overlain by Vindhyan sediments.

There is also evidence of great civilization which had flourished there in the past. The deep seated formations, such as the Lathis of Jaisalmer, are restricted zones of potable waters with local recharge facilities. Vast stretches of alluvium contributed by ancient rivers in their buried channels are superimposed by blown sand. Water table is relatively higher in those valleys, otherwise it goes as deep as 125 m and is often brackish.

Recurring aridity at various stages of geological times, has endowed this tract with products like gypsum, potash, common salt, bentonitic and ceramic clays, and phosphorites, etc.

Ravines

Ravines form a significant topographical feature of the Chambal valley and the most serious surficial problem of the area. It is felt that unscientific land practices and dissection of the older river terraces by gullyng process, perhaps due to neo-tectonic upliftment, contribute simultaneously to the formation of ravines which are present in the whole of the Chambal belt. The intensively affected areas are found along the main rivers in the districts of Kota and Bundi. About a hundred thousand hectares of land in the Chambal valley in Rajasthan falls under ravines. It ranges from 10,000 to 50,000 hectares along its tributaries. Districtwise, Kota has 124,600 hectares of land under ravines, Bundi has 86,000 hectares and Jhala 6,900 hectares. Their depth varies from about a metre to four metres. Very deep ravines are completely useless for cultivation.
RIVER SYSTEM AND WATER RESOURCES

River System

The drainage system of the northern sub-continent of India has been divided by the Aravali range, one flowing towards the Bay of Bengal and the other towards the Arabian sea. In Rajasthan, the Aravalis form the important watershed. They also provide effective catchment for the rivers originating from them. Some of the rivers in the state flow for some distance and then disappear before entering into any of the seas. Thus the rivers of Rajasthan may be classified into three systems: (i) the northeast flowing river system, (ii) the southwest flowing river system and (iii) the inland drainage system.

NORTHEAST FLOWING RIVER SYSTEM

THE CHAMBAL — The Chambal or the ancient Charmavathi is the only large and perennial river of the northeast flowing system and forms the largest river basin in Rajasthan. It takes its birth at an elevation of about 850 m above mean sea level in the heart of India near Manpur among the Vindhyas in Madhya Pradesh. Running north for about 257 km the bludgeoning waterway enters Rajasthan through some awesome gorge near the historic fort of Chauasigarg. A little beyond, the river turns north-east, flows past Kota and receives its three major tributaries, the Kali Sindh near Nonera village, the Parbati about 48 km downstream and then the Banas river. Keeping up a straight course for 212 km it bends towards south-east at Pinahat and makes for the Yamuna to join it near Muradganj. The first 274 km. of the Chambal lie entirely in Madhya Pradesh, the next 153 km. entirely in Rajasthan. Beyond Palk up to Pinahat for about 241 km. the river forms the boundary between Rajasthan and Madhya Pradesh. In its last lap of 105 km. a little before it pays final tribute to the Yamuna, it constitutes the border line between Madhya Pradesh and Uttar Pradesh, the last 40 km. lying entirely in U.P. Till the construction of the Gandhi Sagar storage project, the total run-off of 4,193 mil. cu. m from its large catchment of 141,000 sq. km. was going waste. In its total course it drops through nearly 731 m of which 244 m lies in the first few km. and another 122 m in a distance of 80 km.

THE BANAS — Next in importance to Chambal is the Banas river in this State. It is the river of Rajasthan as it originates in the Aravalis near the fort of Kumbhalgarh and collects all the drainage of the south-east slopes of those hills as well as of the Mewar Plateau and flows throughout its length of 480 km. through the heart of the Mewar Plains. Its principal tributaries are Berach, Kothari, Khari, Mashi, Dhand and Morel. It originates
from the catchment lying between Kankroli and Nathdwara and flows towards east as far as Mandalgarh, beyond which it flows towards northeast up to Tonk where it again takes an easterly course and finally this river turns at right angles and flows south to join the river Chambal.

**THE GAMBHIR** — The Gambhir originating from the Karauli hills flows for 80 km in the Sawai Madhopur district before entering into the Bharatpur district through the plains of Bayana and Rupbas tahsils and then enters into U.P. by the name of Utangan to join the Yamuna. It brings large quantities of silt which is deposited along the entire course of the river. As a result of this, the river has become quite shallow and subjected to recurring floods. To arrest the fury of these floods, the erstwhile rulers of the Bharatpur state as well as the present government built many tanks and several off-take channels.

In spite of these checks, in the 1972 flood which was more severe than that of 1924, about 500 villages were submerged and 5,000 houses were washed away besides damages to many irrigation works. The flood water surrounded the city of Bharatpur from all sides. In the 1975 flood, even the road-rail traffic was badly dislocated.

**SOUTH-WEST FLOWING RIVER SYSTEM**

**THE LUNI** — The Luni, the lifeline of the Indian Desert tract, is the only river system with an integrated drainage. It rises in the Ajmer Hills and releases into the Rann of Kachchh. Its prominent tributaries are Guhiya, Khari, Bandi, Sukri and Jawai. In its channels, choking of stream courses by moving sands can be noticed, a manifestation of desertification. It drains only a small area in the southern part of the desert.

The Luni river, though the only major river in the desert of Rajasthan, has a relatively small catchment in the western Aravalis. The water discharged through the Luni system of rivers is not sufficient to maintain well defined channels from their headwaters to the Rann of Kachchh. The Luni itself becomes narrower and shallower below Pachapadra, where it takes a sharp bend to the south. Moreover its tributaries like the Jawai, Bandi, Sagri etc. cannot even maintain their own channels upto their confluences with the Luni. Observations from the year 1960 onwards show that although there have been several years of high rainfall in the Luni catchment, which caused extensive sheet floods, several breaches and devastations, such extreme discharges of water through the Luni system could not widen or deepen its so called valley segment from Pachpadra to the Rann of Kachchh.

**THE MAHI** — Mahi is one of the important rivers which flows to the southwest. It rises from the Vindhyan Range in Madhya Pradesh and
running a total length of some 580 km., joins the Gulf of Kambhat. In Rajasthan it may be called the river of Banswara district, where it first flows to the north-west and north and then taking an acute curve flows to the southwest along the border of Dungarpur and Banswara districts, before entering into Gujarat. Mythologically the credit of bringing the Mahi to the earth goes to Raja Indradayama, like Bhagirath in respect of the Ganga. It is said that with each offering to the great Yajna during hard Tapasya on the Amarkantak, the land rose by four fingers and from the resultant droppings of water the Mahi took its birth. In the Skand Purana this land is called ‘Kumarika Khand’ and in other scripts it is known as Vaguri or Vagwar Sthali Mandal, while Ganpat Rai Shastri has mentioned it as Lat Pradesh. In the ‘Kaliyug’ period its significance is stated to be equal to the Ganga. Its tributary Som with its own branch Jakham meets it from the north.

Sabarmati and the West Banas are the other two rivers which rise in the Aravali Range and drain to the southwest and independently meet the Gulf of Kambhat and the Gulf of Kachchh respectively. Since greater parts of these rivers lie in Gujarat, they are not important for Rajasthan.

Inland Drainage Basin

Besides the aforesaid rivers, there are, however, other small rivers flowing according to the natural slopes in the rest of the state and get absorbed by the sand beds and after heavy downpour their waters get flooded. North of Ringas, the main trend of the streams is towards the north. Thus the drainage in the Jhunjhunu and Alwar districts is internal. The streams Kantli, Sota, Sabi (Sahibi) flow into the desert tracts and disappear. However the Sahibi waters, when in spate, pass into Haryana and create troubles in areas bordering Delhi.

Some small ephemeral streams from the low ridges between Ajmer and Ringas such as the Mandha and the Rupnagar - Nadi, drain into the Sambhar Lake which lies astride the Aravali ridge. But no stream flows either to the east or to the west from the Aravali Range in this part.

The Ruparail — The Ruparail river originates from the Thanagazi hills, flows through the Alwar district and terminates at Sikri Bund, though its channel disappears a little beyond within the district boundary. Before its diversion into the Siriska (Siliserh lake) wild life sanctuary, its unutilized water used to go waste and created flood problems in Alwar and Bharatpur districts.

The Banganga — Banganga is a non-perennial river which originates in Jaipur district about 64 kilometres upstream of the Jamuwa Ramgarh bund and disappears before crossing the State boundary in the east. After
flowing 241.5 km in Jaipur, Alwar, Sawai Madhopur and Bharatpur districts, it terminates at Nekpur headworks, from where the entire water of the river is diverted into Unchain canal. It enters Bharatpur district near the village Kamalpura and flows for about 56 km in the district. The important tributaries of this river are Gomti and Suri.

The construction of dams on the Gambhiri, Ruparail and Banganga has deprived the Keoladeo National Park of their waters to the detriments of the birds.¹

THE LOST SARASWATI — The Saraswati is described in the Rigveda as a mighty Himalayan river originating from the Simla Hills in the Siwaliks. It flows between the Yamuna and the Satluj south-wards down past Patiala to lose itself in the northern part of the desert of Rajasthan at some distance from Sirsa. Joined by the Markands, the Saraswati ultimately joins the Ghaggar. The Mahabharata records its disappearance at Binasana near the present town of Sirsa. For about a century, several authors have been writing that this river used to flow through the eastern Nara and Hakra in the Sindh Province of Pakistan to the Rann of Kachchh. But several scientists have recently discovered from landscape imagers the abandoned course of the Saraswati through the present extreme desert terrain of Jaisalmer before the river shifted westward in stages to the Sindh Province.² This also explains the existence of the alluvium in the extreme western part of the desert as well as the existence of sweet subsurface water in this part mainly derived from precipitation in the Himalayas and flowing subterraneously through the former courses of the Saraswati. Aeolian sand, aridity and mild tectonic movements during the late quaternary period are ascribed as the possible causes of this westward shift of the river. Alongwith the Saraswati one of its major Himalayan tributaries, the Drishadvati (or Chautang) did also flow through the Rajasthan desert. Originally it used to meet the Saraswati perhaps around the present site of Surajansar and thus helped much in the quaternary alleviation of this part of the desert. The presence of the thick alluvium and old sand dunes at the southward bend of the river below Pachpadra suggests that the Luni might have been a tributary of the lost Saraswati.

Lakes

SAMBHAR SALT LAKE — In Rajasthan there are two types of lakes, salt water and sweet water. All the salt water lakes are in the natural low lying areas whereas sweet water lakes are artificial. The biggest salt water lake is the Sambhar Salt Lake, besides Deedwana and Pachpadra lakes. Sambhar Lake is the largest inland salt source in the country and its salt deposits are inexhaustible with large annual production and the salt produced is also of good quality. The floods in recent years have affected the
production work. It is located about 60 km west of Jaipur on Jaipur-Jodhpur railway line and occupies a depression in the Aravali schists and gneisses at a height of about 360 m above mean sea level.

In the Bikaner division, salt is prepared from Lukkaransar lake. There are many small salt water lakes in the district of Nagaur, Jodhpur and Bikaner.

There are a large number of fresh water lakes in Rajasthan built by the then rulers by damming the rivers in their territories for beautifying the landscape, recreation and supply of drinking water. Later on, these were used for irrigational purposes. Amongst these, the Dhebar Lake (Jaisamand) in Udaipur district was the largest man made lake in the world in those days. It is 14.5 km in length and 8 km in width. Other important lakes are Udaisagar, Rajasmand, Pichola and Fatehsagar in Udaipur district, Pushkar, Anasagar and Narainsagar in Ajmer district Janwa Ramgarh, Kalakhsagar and Maota in Jaipur district, Meja, Sere, Arwar, Naharasagar in Bhilwara district and Gambhiri in Chittaurgarh. Parbati and Baretha in Bharatpur, Jaswantsagar in Jodhpur and Jawai in Pali district are also important. In Alwar two reservoirs, Siliserh and Jaisamand with storage capacity of 13.93 m cu m and 25.54 m cu m respectively, were constructed on a tributary of the Ruparail river. Since the local catchment of Jaisamand is not sufficient, Barah weir was constructed on the main river about 20 km upstream from Alwar, from which a feeder channel takes off to feed the Jaisamand tank.

GHANA BIRD SANCTUARY – In Bharatpur there is a lake called Ghana where birds from as far as Siberia, Finland, etc. visit during the winters. It has become a famous bird sanctuary and is visited by tourists and ornithologists from all over the world for scientific investigations on the biological aspects of the water birds. It is an extensive area of about 2,832 hectares submerged under water and developed into water birds sanctuary at a distance of about five kilometres southwest of Bharatpur city. It has acquired the name of Ghana Keoladeo Birds Sanctuary because of the existence of a temple Keoladeo or Lord Shiva within a dense forest. Ghana is synonym for dense forest. The Unesco declared it a World Heritage Natural Sight in 1985.

The Ghana Birds Sanctuary was developed by the efforts of Maharaja Kishan Singh (1895-1929) who, impressed by the exquisite beauty of duck shooting spot in England, thought of developing a similar beautiful spot in Bharatpur. The lake was completed by the end of the 19th century and after two years the sanctuary was ready for duck shooting. The dense forest was flooded by the waters of the Gambhiri river during the rainy season and then drained out in such a way that the water filled the
lowlands on either side of the road. Muddy butts were built with shady
trees in the shallow waters for the hunters for duck shooting.

Here a variety of birds are attracted as soon as the monsoon sets
in. Besides, there are many birds which abound there. These are the
Ardeola Grayit, Nycticorax nycticorax, Ardea cinerea, Ardea purpurea,
sitting in the tree tops. After December when biting cold sets in, migratory
birds fly from the Siberian Plateau to the Keoladeo National Park stopping
at a few places enroute. They stay here for about two months of the
winter season every year. There is a rest house called Shanti Kutir (the
hut of peace) right in the midst of the sanctuary.

The Bharatpur district with flat plains and many depressions has been
subject to flood hazards by the Ruparail, Banganga and the Gambhir rivers
and their tributaries. So the rulers had built hundreds of bunds and dams
to control floods and to irrigate extensive cultivated areas. Sikri Bund,
Ajan Bund and Sewar bund, etc., were built during the reign of Maharaja
Jaswant Singh. By 1904, it is learnt that within the Bharatpur state alone
there were 244 small and big dams. Since Independence, the government
has built many more tanks almost on all the rivers and important nallahs
to augment irrigation, particularly to the east of the Aravalis.

GANDHI Sagar, RANA PrATAP Sagar & JAWAHAR Sagar — More
important are the reservoirs that have been built for irrigation and power
development by damming the hilly and steep gradient rivers. Most important
of them are the Gandhi Sagar, Rana Pratap Sagar, Jawahar Sagar and
Kota Barrage built by a series of dams on the Chambal river. The first
two have an effective capacity of 7,680 m.cu.m. and 2,620 m.cu.m. of
water, respectively. The former makes a fall of 45.8 m and the latter of
38.2 m.

MAHI BAJAJ SAGAR — Similarly on the Mahi river, 16 km from
Banswara near Borkhera village, a 67.50 m. high earth-cum-masonry dam
is being built to store 1,715 m.cu.m. of water to be shared by Rajasthan
and Gujarat for irrigation purposes. The former would also generate power
for its own use.

Besides these major lakes and reservoirs, quite a large number of
medium and small reservoirs are under construction on the various streams
in the State.

Waterfalls

CHULIA FALL — There are several waterfalls in Rajasthan but few
are perennial. Many of them have been utilised for generating
hydro-electricity. Rana Pratap Sagar dam is situated immediately upstream
of the Chulia falls on the Chambal River. The reservoir backs upto the Gandhi Sagar dam, providing adequate storage both for re-regulation and to conserve waters from its intermediate catchment of 2,300 sq. km and enabling full utilization of the available head. The Rana Pratap Sagar power station is located just below a saddle dam built across the Pandajor nalla, a small tributary of the Chambal joining it below the Chulia falls, utilizing, in addition to the head created by the Ranapratap Sagar dam, a drop of about 10.65 m available in the rapid stretch of the river at Chulia falls. The reservoir has a gross storage of 2,820 mil cu. m of water which is released at an average head of about 50.5 m and discharged into the river through a short tailrace channel. The power station has been designed for installation of five generating units of 32,000 KW each.

MENAL FALL — Menal waterfall on the Menal river, a tributary of the Berach, is one of the most beautiful spots in Rajasthan. But its water runs scarcely during the summers. It is located southeast of Mandalgarh.

Springs

GALTA — There are not many springs in Rajasthan. Some springs may however, be seen in the central and southern Aravalis. Galta is the most important spring for its religious sanctity. It is located in the hills to the northeast of Jaipur city and is considered to be the spot where Galavaya Rishi had attained ‘Samadhi’ and where a scanty perennial stream fills a holy tank.

Canals

GANG CANAL — Major, medium and minor irrigation works in Rajasthan all concentrate in the southeast, i.e. east of the Aravali Range. Thus the two-third sandy waste area of the state depends only on the scarce underground water and scanty rainfall, and taking up of more and beneficial irrigation works has been felt for a long time.

The arid areas of the northwest are such that the water of the Punjab rivers can be brought and utilised for development of irrigation. The first successful attempt in this direction was made by Maharja Ganga Singh of Bikaner, who got constructed the Gang Canal from the Satluj river to get 1.12 m. ac ft of water for the Ganganagar area of his state from the Satluj Valley Development Project in June, 1920. The Gang Canal was completed in 1926. It had completely changed the economy of that part of the desert region.

BHAKRA SYSTEM AND RAJASTHAN CANAL — This encouraged the Rajasthan State to get 1.75 m. ac ft of water (15.22 per cent share) from the Bhakra System. Apart from this, Rajasthan was allotted 8 m. ac ft of
water while sharing the flow of 15.85 m. ac ft of the water of the Ravi and the Beas in January, 1955, for the Rajasthan canal. Its share rose to 8.6 m. ac. feet in 1981. The storage facilities for the same have been provided in the Beas Dam at Pong in Punjab. Rajasthan thus gets a total of 11.47 m. ac. ft of water from the Punjab rivers and it is much more than the water resources within the state.

Under the Bhakra System the water stored in the Bhakra Dam (Govind Sagar) is released through the tail ends of the canals of Punjab and Haryana at the Rajasthan Border. As a result of the extension and development works an area of 7 lakh acres of land is being irrigated in Ganganagar district to which may be added 6.6 lakh acres by the Gang Canal in the same district.

The Rajasthan Canal seeks to transform a vast tract of the Great Indian Desert into a prosperous region by irrigating an area of 16 lakh hectares annually in the districts of Ganganagar, Bikaner, Churu, Jodhpur, Jaisalmer and Barmer- a land of dormant fecundity.

The construction work of the Rajasthan Canal Project commenced in the year 1958. The rain waters of the Ravi and Beas rivers are collected at Pong dam on the Beas and the Rajasthan Canal has been taken out from the Harke Headworks at the confluence of the Beas and the Satluj in Punjab. The total length of the Canal from the headworks through Punjab, Haryana, Ganganagar, Bikaner, Jaisalmer and Barmer would be 649 kilometres. The first 204 km length of the canal is called the Rajasthan Feeder, 169 km of which falls in Punjab and Haryana and the remaining 35 km in Rajasthan. The width of the bottom of the Main Canal at the Headworks is about 38 m., depth of water 6.4 m and the discharge capacity is 538 cumecs (cubic metre per second). The total length of the branches, distributaries and minors would be 8532 km.

The project is being completed in two stages. The first stage consists of 204 km of the Rajasthan Feeder, 189 km of the Rajasthan Main Canal and 3,000 km of the branches and distributaries etc. Its irrigated area is 5.4 lakh hectares and the irrigation intensity is 110 per cent. In 1980 the total cost of the first stage was estimated at Rs. 200 crores. The second stage consists of 256 km of the Main Canal and 5409 km of the distribution system and 6.09 lakh hectares of irrigated area. According to the 1980 estimates its total cost comes to Rs. 250 crores.

CHAMBAL CANAL. — Chambal Valley Development Project was executed for the all round development of large parts of Rajasthan and Madhya Pradesh. Under this project dams have been constructed at Gandhi Sagar, Rana Pratap Sagar and Jawahar Sagar and a barrage at Kota. The
Barrage is at a distance of about 80 km from the lowest dam Jawahar Sagar and has a length of 551 m and raises the water surface to a height of 30 m. Two canals have been taken out, one each from either bank, for irrigating 16 lakh acres of land in both the states. The left Main Canal is entirely in Rajasthan with a total culturable command of 1.78 lakh hectare of which 1.05 will be irrigated by the canal. The Right Main Canal courses through Rajasthan and then enters into Madhya Pradesh. Out of a total culturable command area of 6.49 lakh hectare, 4.61 lakh hectare will be irrigated within the two states. The Right Main Canal with a discharge capacity of 189 cumecs flows for the first 130 km in Rajasthan and passes through Chatra Bilas Tank and successively runs into Kotri, Soor Sagar, Raipur and Ummedganj tanks, before entering into Madhya Pradesh. The Left Main Canal with its full supply discharge of 42.5 cumecs runs only for 2.8 km and splits into the Bundi and Kapren branches. The construction work on this project started in 1953-54 and irrigation started in 1962. The Central Government is considering to raise the height of the Kota Barrage.

GURGAON CANAL — In order to utilise the over-flow of rain waters in the Yamuna river, Gurgaon Canal is being constructed. For this, the work on the Yamuna barrage is in progress. This canal would irrigate 25,000 hectare of land in the Kama and Deeg areas of Bharatpur district.

In addition to the aforesaid canals, work is in progress on canals of the Mahi and Jakham rivers and many other small rivers. However, mention may be made of the high-level canal taking off at R.L. 100 m from the Navagam Dam on the Narmada river to deliver the water at Rajasthan border to irrigate some 15 lakh acres of culturable land. The major dispute on sharing of the Narmada water has been almost solved. Bisalpur project on the Banas is under execution. Besides irrigation, it will supply drinking water to Ajmer and Jaipur urban centres.

Wells

Wells continue to be the most important source of irrigation in Rajasthan as about two-third of the irrigated area falls under well irrigation. Their number from 9,20,188 in 1974-75 rose to 9,50,095 in 1976-77 but afterwards fell to 7,35,557 in 1977-78, which may be due to the increase in pump irrigation. In 1977-78 Jaipur, Udaipur and Bhilwara districts abounded in the number of wells while the districts covered with sand and trap had very few wells. (see Appendix I). There were 4,30,123 electrically operated wells in the State during 1992-93.
UNDERGROUND WATER RESOURCES

Underground water surveys of varying degrees of detail aimed at evaluating groundwater availability have been carried out in Rajasthan for the last 25 years. While comprehensive knowledge of the ground water resources has been received from western Rajasthan, knowledge of eastern Rajasthan may be said to be elementary. Also eastern Rajasthan is dominantly underlain by fissured formation and the hydrological environment stands in contrast to western Rajasthan.

A U.N. technical team carried out a detailed study of about 10,000 sq km in the arid Jaisalmer district in cooperation with the Central Ground Water Board and found that there is a 26,640 m. cm. m of fresh water reserve at a depth of more than 150 m. The water is not rechargeable. It means that once extracted, the ground water cannot be replenished. The team found 335 sq km tract having the greatest potential for medium to large scale ground water development. It however, cautioned that before deciding to install high capacity wells in the area, it is necessary to make a detailed socio-economic study to evaluate the interaction of other variables involved in large scale ground water development.

The Central Ground Water Board under water balance projects have discovered appreciable amount of acceptable quality of ground water especially for irrigation purposes in the arid western region. The Sikar Basin has the best potential for future development. The following table gives the number of high and medium capacity tubewells that can be installed in this area:

<table>
<thead>
<tr>
<th>Basin &amp; Region</th>
<th>Area (km$^2$)</th>
<th>No. of wells</th>
<th>Total annual yield (m cu m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Sikar Basin</td>
<td>7,410</td>
<td>987</td>
<td>180.70</td>
</tr>
<tr>
<td>B. Bikaner Basin</td>
<td>1,880</td>
<td>100</td>
<td>22.80</td>
</tr>
<tr>
<td>C. Luni Basin</td>
<td>2,390</td>
<td>361</td>
<td>60.80</td>
</tr>
<tr>
<td>Annual pumping hours</td>
<td></td>
<td></td>
<td>2,000</td>
</tr>
</tbody>
</table>

In another UNDP project the Central Ground Water Board in the Ghaggar River Basin, found the water table generally 47 m below the ground level. In this area most of the tubewells were abandoned either due to high salinity or due to lack of granular formations.

The ground water survey of the eastern Rajasthan may be summarised in the following form:
1. Area assessed 1,33,437 sq km
2. Ground water recharge in consolidated formations from rainfall 14,121.11 MCM
3. Ground water recharge in unconsolidated formations from rainfall 4,423.70 MCM
4. Ground water recharge in irrigated areas due to applied waters 7,563.13 MCM
5. Total recharge 26,793.85 MCM
6. Surplus available 24,544.45 MCM
7. Static reserves in consolidated formations 22,279.00 MCM
8. Static reserves in un-consolidated formations 2,40,000.00 MCM
9. Static reserves down to a max. of 150 m 2,54,280.00 MCM

The actual ground water situation is not as rosy as can be estimated from these figures. The limited rainfall, the high evapo-transpiration factors and rather moderate recharge potential, appear to act as constraints for large development of fresh water aquifer system. Additional constraints exist in the form of saline water pockets in the adjoining areas often with salinity of ground water at all levels. However, there is scope of developing large scale pumping in eastern Rajasthan.

From all the existing resources only 18 per cent of the total cultivated area is under irrigation. The total surface water resources have been calculated as 1,9560 m.ha.m. out of which 1,0700 m.ha.m. is available for irrigation. The rest cannot be made available due to geo-physical constraints. Due to the paucity of internal resources the state has to depend on the neighbouring states for supplementing its irrigation capacity. The total amount of surface waters available from all the external sources is calculated to be 1.9320 m.ha.m. If all the resources are combinedly utilized it would irrigate a maximum of 38 lakh ha. of cultivated land in the state.

GEOLOGY

Geological Antiquity

Considerable geological work has been done in Rajasthan by the officers of the Geological Survey of India, the results of which are published in the memoirs of the GSI. At least three organic cycles as given below have been recognised in Rajasthan.
<table>
<thead>
<tr>
<th>Jodhpur</th>
<th>Mewar, Ajmer-Merwara (main synclinorium)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vindhyan</td>
<td></td>
</tr>
<tr>
<td>Malani volcanics</td>
<td>Delhi orogeny, metamorphism and granitisation.</td>
</tr>
<tr>
<td></td>
<td>Calc-schists and gneisises</td>
</tr>
<tr>
<td></td>
<td>Phyllites and biotite schists</td>
</tr>
<tr>
<td></td>
<td>Delhi</td>
</tr>
<tr>
<td></td>
<td>Quartzites</td>
</tr>
<tr>
<td></td>
<td>System</td>
</tr>
<tr>
<td></td>
<td>Basal arkose-grits</td>
</tr>
<tr>
<td>Raialo (Makrana marble), Ras limestone</td>
<td>Garnet-biotite schist</td>
</tr>
<tr>
<td>Raialo</td>
<td>Raialo (Rajnagar) marble</td>
</tr>
<tr>
<td></td>
<td>Basal grit</td>
</tr>
<tr>
<td>Aravali orogeny, metamorphism &amp; granitisation</td>
<td>Phyllites, limestones, quartzites and gneisises.</td>
</tr>
<tr>
<td>Shales (Sojat)</td>
<td>Aravali</td>
</tr>
<tr>
<td></td>
<td>Basal quartzites, grits and</td>
</tr>
<tr>
<td></td>
<td>Conglomerates</td>
</tr>
<tr>
<td>Schists (Godwar)</td>
<td>Grey gneiss</td>
</tr>
<tr>
<td></td>
<td>Thick volcanics</td>
</tr>
<tr>
<td></td>
<td>Banded Gneissic Complex</td>
</tr>
</tbody>
</table>

Radio activity dating has been done on a number of mineral samples collected from Rajasthan. Muscovite samples from Aravali mica-schist near Kishangarh has indicated an age of 953 million years. The Garnet-biotite schist with well-developed sistorcity collected from the Zawar area yielded a total rock age of 1020 m.y.

Malani rhyolites in Jodhpur have indicated an age of 600 m.y. But these ages indicated the period of recrystallisation (Metamorphism).

In recent years geochronological studies of the pre-cambrian rocks have been attempted by various workers by different methods. Though the data are scanty, it throws some light on the cycles of sedimentation and orogeny. Based on such data and other studies, the following four geologic cycles in Pre-cambrian of Rajasthan have been established, which is also the presently accepted view of Geological Survey of India:

- **Vindhyan Cycle**: 600-1410 m.y.
  (Malani Phase 505-735 m.y.)
- **Delhi Cycle**: 1200-2000 m.y.
- **Aravali Cycle**: between 2000-2500 m.y.
  (Berach granite 2580 m.y.)
- **Pre-Arvali cycle**: more than 2500 m.y.
Geological Formations

Rajasthan forms, both geologically and mineralogically, an important unit in the structure of India. Though considered an integral part of peninsular India, it has certain rock formations which show close relationship with the extra-peninsular ranges. The west sandy alluvial plain on the north-western part indicated organic relationship with the Indo-gangetic plain with which they are quite contiguous. Dr. A.M. Heron and his co-workers had summarised the geological succession in this part of India as follows:

<table>
<thead>
<tr>
<th>System</th>
<th>Group</th>
<th>Subgroup</th>
<th>Type</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quaternary</td>
<td>Alluvium and Desert Sands</td>
<td>Palana Lignites</td>
<td>Nummulitic series.</td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>Eocene-marine and estuarine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deccan Traps</td>
<td>Cretaceous</td>
<td>Terrestrial</td>
<td>Barmer series</td>
<td></td>
</tr>
<tr>
<td>Jurassic</td>
<td>Coastal</td>
<td>Marine</td>
<td>Jaisalmer series</td>
<td></td>
</tr>
<tr>
<td>Cambrian to</td>
<td>Vindhyan</td>
<td>Upper</td>
<td>Bhandari series</td>
<td></td>
</tr>
<tr>
<td>Precambrian</td>
<td>System</td>
<td>Rewa</td>
<td>series</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Raimur</td>
<td>series</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower</td>
<td>Semri series</td>
<td></td>
</tr>
<tr>
<td>Algonkian</td>
<td></td>
<td>Malani Acid Intrusives and Extrusives</td>
<td>Post Delhi Erinpura Granite.</td>
<td></td>
</tr>
<tr>
<td>Delhi</td>
<td>System</td>
<td>Ajabgarh Series</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alwar Series</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eparehacan</td>
<td>Aravali System,</td>
<td>Banded Gneissic Complex including Berach Granite.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archaean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Banded Gneissic Complex

According to Heron, the Banded Gneissic Complex of Rajasthan including the Berach Granite are almost the oldest rocks known anywhere in India. These rocks formed the floor over which the later sedimentaries starting with the Aravalis were deposited. These earliest rock formations are themselves an unresolvable mixture of igneous and sedimentary materials and of these the Berach Granite is considered as pure igneous facies.

This Berach Granite is a medium grained nonporphyritic pinkish to greenish yellow rock with opalescent quartz, acid felspars, biotite and hornblende as major constituents. This granite is developed over a wide belt along the Berach river west of Chittaurgarh. The Banded Gneissic Complex on the other hand occurs over a much wider crescentic belt running from Kishangarh in the north to near Banswara in the South with its convexity to the west near Kankroli. This basement formation is highly
complex and is made up of a variety of rock types, sedimentary as well as igneous, which have lost their original characters through metamorphism. The constituent rock types are granites, gneisses and schists often with garnet, sillimanite, staurolite etc. and are traversed by pegmatites, aplites, amphibolites, epidiorites etc. producing a mosaic of composite gneisses. The pegmatites occurring with this formation are on the whole poor in commercial mica.

The Aravali System

This system, according to Heron, comprises the oldest metamorphosed sediments which occur over the basement gneisses with an unconformity and are classified as Archaean. These are largely clayey in their composition, though bands of quartzites and limestones are not rare.

The Aravali rocks occur in two broad belts, one starts from near Sawai Madhopur running south-west through Bhilwara to Kankroli and then turns round the Berach Granite mass SSE to a little beyond Badi Sadri, while the other belt, separated from the first by a variable width of the Banded Gneissic complex, starts from near Nathdwara and Udaipur in the north, splays out along the eastern flank of the main Aravali Range and extends almost upto the Narbada valley where it abruptly terminates against the Deccan Traps.

The basal members of the Aravali system consist of fine to coarse grained gritty quartzites, commonly brecciated and conglomeratic which often get intimately mixed up with tuffs and phyllites. Higher up in the sequence we often get bands of impure ferruginous and manganiferous limestone. These are followed by a vast thickness of phyllites and schists which make up the bulk of the Aravali system. These rocks exhibit a general increase in metamorphism from east to west such that, whereas they are almost unmetamorphosed near Chittaurgarh, they appear highly metamorphosed near their western margin against the Delhis where they carry large crystals of staurolite, kyanite, garnet etc.

These phyllites and schists also contain numerous lenticles of quartzites and limestones, often of large dimensions and also appear interbedded with basic and ultrabasic intrusives of variable thickness which have undoubtedly contributed to their intense metamorphism.

Besides the basic intrusives, the Aravalis have been extensively intruded by acid igneous rocks. Pegmatites within the Bhilwara zone of Aravali schists have proved most productive in respect of quality mica. The Aravalis have also yielded valuable deposits of manganese and iron ores, particularly in the Udaipur-Banswara zone, whereas the Zawar mines near Udaipur are almost the only known workable deposits of lead and zinc in India. Wolfram deposits of Degana in Jodhpur are also noteworthy.
The Raialo Series

The next significant rock formation in the Rajputana succession is the Raialo Series which rests with strong unconformity over the Aravalis and is overlain by the Delhiis with an equally great unconformity.

Since this Raialo series is recognised only in Rajasthan, while this period marks the great Eocarchean Interval in most other parts of India, it is presumed that the Raialo series covers part of this time interval.

Raialo series comprises largely limestones which are partly or wholly metamorphosed to marble and may locally be associated with some conglomerates, sandstones and garnetiferous mica schists. The best exposures are those near Rajnagar-Kankroli in Mewar, approaching Udaipur on the South and extending on the north-east to Jhazpur hills. Another exposure is along the west flank of the Aravali hills occurring intermittently from Makrana to Burr while the marble band of the Raialo type is also found on the Alwar Jaipur border.

The white marble of Makrana is famous for its statuary and ornamental value in the building stone industry.

The Delhi System

The rock formations constituting the Delhi System form the most prominent morphological feature of the Rajasthan terrain. The main Aravali range composed of Delhi rocks starts from Delhi in the north and runs through Ajmer to Palanpur in the south and divides the whole State into two halves. In the north between Delhi and Jaipur the ridges composed of Delhi quartzites and schists splay in an intricate system of arcuate hill masses convex to the SE and close in again with the main axis in the region of Khetri and Sambhar. South of Ajmer, the Delhi formation runs due SSW as a compact series of ranges almost upto Palanpur when they suddenly disappear under the alluvium. Stray occurrences of the Delhi formations have also been recognised within the main Aravali terrain near Udaipur and Chittaurgarh.

The Delhi formations are composed principally of quartzites towards the base (Alwar series) and of schists and phyllites towards the top (the Ajbaghar series). Sometimes they show development of limestone, (Kushalgarh limestones) and hornstone breccia intervening between the Alwar and Ajbaghar series.

These formations have been extensively intruded by (Erinpura) granites, pegmatites and amphibolites producing extensive metamorphic products like calc-gneisses, calc schists etc.
The Erinpura granite which often forms the batholithic masses as those of Mount Abu is in the main a biotite granite often with hornblende and when foliated it appears as a gneiss. They are developed principally along the western flanks of the Delhi of the Aravali Range, though numerous bosses occur within the main Delhi syncline. The pegmatites intrusive into the Delhis are usually not rich in commercial mica except very locally.

Numerous acidic intrusive and extrusive masses occur separated from the main Erinpura Granite zone. They are considered younger and have therefore been included under the Malani igneous suite. They are known as Jalore and Siwana granites and Malani rhyolites in the Jodhpur division and as Idar granite in the south.

The Delhi formations exhibit numerous shows of copper mineralisation, the promising being only those of Khetri and Singhana in Jaipur, and Dariba and Kho in Alwar. Some of them also appear to be associated with cobalt minerals though in a small measure.

Among the non-metals the Delhis have workable deposits of barytes at Sainpuri and Bhankhera in Alwar and steatite deposits near Dausa.

Delhi formations yield good quality building stones at numerous places.

The Vindhyan System

The highly metamorphosed Delhi rock formations are succeeded by less metamorphosed, almost flat lying Vindhyan rock formations which constitute an important landmark in the geological history of India. These are largely unfossiliferous even though best suited to preserve the life of the period. Traces of life have been described from a few localities and it appears probable that these rock formations cover the period when life in its recognisable forms had just appeared on the earth. It is also possible that although life may have begun its vigorous growth in adjoining marine basins, the region of the Vindhys may have offered quite inhospitable environmental conditions for life to grow as was the case for example in Europe during the Old Red Sandstone period of the middle Palaeozoic.

The Vindhyan formations are best developed along the south eastern borders of the State in the region of Chittaurgarh, Kota, Bundi, Karauli where they form extensive plateaux and scarp.

The rocks are classified as (a) Lower Vindhys constituting the limestone bearing Semri Series and (b) the Upper Vindhys constituting the sandstone bearing Kaimur, Rewa and Bhandar series, the latter also containing some important bands of limestones near Bundi.
Upper Vindhyan are best developed in the Kota division but they also occur as stray patches distributed over a wide area in the Jodhpur division where they are associated with bands of gypsum.

Besides being well known as repositories of the best building and ornamental stones and cement materials, the Vindhyan also contain a few conglomeratic bands which have yielded diamonds.

In the Karauli region the Lower Vindhyan rests unconformably over the folded Arvali phyllites. At the base occur sandstones and conglomerates over which occur massive bands of Tirohan limestone with glauconite bearing layers at the base. These are overlain by the Upper Vindhyan Kaimur Sandstones. In the Chittaur region also the Lower Vindhyan rests over a less metamorphosed series of clive shales and slates (The Binota Shales) considered as belonging to the Aravali system. The Vindhyan succession starts with grits and conglomerates at the base followed by Nimbahera shales, hardly distinguishable from the Binota shales. These are succeeded by thick series of gray limestone, the Nimbahera limestones, which are in turn overlain by the Suket shales. These Suket shales are again indistinguishable from the Nimbahera or Binota shales.

The Vindhyan are beautifully exposed along the slopes of the Chittaurgarh hill where the Nimbahera limestones are exposed at the foot and Suket shales along the slopes while the scarps and the plateau part of the hill are all made of the fine grained white or pink quartzite of the Kaimur series. The higher beds of the Upper Vindhyan (Rewa and Bhandars) are nicely developed further east in the Chittaur-Kota region. Here they form succession of quartzitic sandstones, shales and conglomerates but the Bhandar series also contain important bands of limestones besides shales and sandstones. These three Upper Vindhyan units are separated from one another by bands of diamondiferous conglomerates.

The Upper Vindhyan rocks are again developed in the Jodhpur division largely as detached patches, compound of sandstones and shales and often associated with granitic rocks (Jalor and Siwana granites and porphyries) and with Malani rhyolites and also intruded by younger basic intrusives.

The Mesozoic Tertiary Formations

After a long interval representing nearly the whole of Palaeozoic and the lower part of the Mesozoic, the first authenticated rock formations met with in Rajasthan are those of the Jurassic period which are well developed near Jaisalmer and Bikaner. This rock formation, known as the Jaisalmer Limestone, consists of compact brown limestone and greyish brown sandstones and contain typical marine fossils in abundance. These
fossils are in the main ammonites, very similar to those occurring in Kachchh and the Salt Range where a shallow water marine facies is developed, whereas a deeper geosynclinal facies of the same sea is developed in Baluchistan on the one hand and in the Inner Himalayas (Spiti, Kumaon, Nepal) on the other.

The Tethys sea appears to have receded, at least temporarily during the Cretaceous when the terrestrial deposits known as Barmer Sandstone were developed in Western Rajputana. These contain fossil plants including angiosperms and are thought to correspond to the Himmatnagar sandstone in Gujarat. This recession of the Tethys is probably connected with the enormous outpourings of the Deccan Traps as are seen in S.E. Rajasthan.

The sea was however not far off, for we find along the southern borders of Rajasthan the development of typical coralline limestones and marls rich in marine fossils in the Narbada valley and known as the Bagh Beds of the Mid and Upper Cretaceous period. This was the continuation of the Alps and beyond.

The last traces of this sea in these parts during the Lower Tertiary (Eocene) are preserved in western Rajasthan in the low lying tracts of Jaisalmer and Bikaner in the nature of the well-known Nummulitic limestones associated with important deposits of lignite (Palana), Fullers earth, gypsum, etc. and thus show their intimate relationships with the Salt range on the one hand and with Kutch on the other. These formations in the adjoining extra-peninsular regions are known to be reservoirs of petroleum and as such are the basis for extensive investigations now undertaken by the Government of India for the prospecting of oil in Rajasthan.

MINERAL WEALTH

Rajasthan is one of the important mineral producing states in the country. It occupies first position in case of non-ferrous metallic minerals, like lead, zinc and copper ores. The tungsten ore is also mainly produced in Rajasthan. Small deposits of Iron ore and manganese are also available in the state. Industrial minerals of the state are limestone, rock phosphate, soapstone, asbestos, felspar, gypsum, calcite, wollastonite, barytes, fluorite, china-clay, fireclay, granite, mica, pyrophyllite, quartz, silica sand, etc. Among precious stones, the state is the sole producer of emerald and gem variety of garnet. Besides these, the state also enjoys a distinct position in the field of building stones such as sandstone, limestone, marble and granite.

Production of most of the minerals has increased significantly over these years. A detailed account of mineral production during the last few years is given in Appendix II.

A brief write-up on important minerals is given below:
Metallic Minerals/Ores

**Copper Ores** — Rajasthan is an important producer of copper metal, sulphuric acid being recovered as a by-product during smelting process. Productive mines are at Khetri, Kolihan, and Chandmari in Jhunjhunun district and Kho-Dariba in Alwar district. Production of copper ore during 1978 was 10.29 lakh tonnes. It yielded a revenue of Rs. 56 lakhs in 1978-79.

The main occurrences of copper ore in Rajasthan are located along two prominent mineralized belts viz. Khetri copper and Alwar copper belt in the northern part of the State. Besides, a number of copper and other base metal occurrences are located in the Aravali-Delhi metallogenic province in Sirohi, Dungarpur, Udaipur, Pali, Bhilwara, Sikar, Bharatpur districts.

The mineral is exclusively mined in the public sector (Hindustan Copper Ltd.). A copper smelter with a capacity of 31000 tonnes per annum is located at Khetri.

**Iron Ore** — Iron is extracted from its ores, such as hematite and magnetite. The iron ore deposits are located mainly at Morija, Rampura, Nimla, Rajpur, Maonan, Dasla and Kotputli in Jaipur district, at Taonda, Sior and Kali Pahari in Jhunjhunun district; at Marda-Manowas-Bagoli-Sarai in Sikar district and at Nathara-ki-Pal in Udaipur district.

Production of Iron ore in Rajasthan was 12,400 tonnes during 1978 which is not significant when compared to more than 42 million tonnes of all India production.

**Lead-Zinc Ore** — The ores of lead and zinc metals generally occur together. Rajasthan is the only producer of zinc ore and contributes almost 90% in lead ore production. The most important mines are at Zawar and Rajpur-Dariba (Udaipur district). Both these areas are with M/s Hindustan Zinc Ltd. Production of lead-zinc ore, in 1978 was 10.67 lakh tonnes contributing Rs. 1.64 crore to the mineral revenue. This ore also yields important metals like silver and cadmium and sulphuric acid is recovered as by-product.

The Zawar lead-zinc belt extends for a distance of about 20 km. from Hameta Magra to Parsad. There are five blocks in the belt namely Parsad, Bara, Paduna, Zawar and Hameta Magra. Hameta Magra and Zawar blocks comprise Mochia Magra, Bawa, Balaria, Baroi Magra, and ZawARMala as the main ore bearing hills.

The total reserve of over 62 million tonnes has so far been assessed in the area containing over an average of 1.79% lead and 4.15% zinc.

Rajpur-Dariba is located about 16 km NNE of Fatehnagar Railway Station on the Chittaurgarh-Udaipur section. Exploration by drilling has
proved the existence of two fairly wide sulphide lodes—the Dariba main lode (550 m. strike length) and Dariba East lode (620 m. strike length) at the southern end of the prospect near Dariba. The ore contains mainly zinc and lead with copper, silver, cadmium, antimony and arsenic in minor quantities. The indicated reserves in Rajpura-Dariba have now been placed at 30.41 million tonnes with an average 1.37% lead and 5.90% zinc. Some other blocks of this belt are also being explored and the total reserves are likely to be enhanced substantially.

A small but rich deposit of lead-zinc-copper has been located at Deri in Sirohi district with an estimated ore reserve of 0.8 million tonnes with 17.13% total metal content (zinc 9.12%, lead 6.37 and copper 1.14%). Another deposit of zinc and copper has been established at Basantgarh in the same district. Recently a very rich lead-zinc ore has been located at Agucha in Bhilwara district. The Hindustan Zinc Ltd. has taken over the area for exploitation.

Other occurrences are known in the districts of Ajmer, Banswara, Pali and Alwar.

**Manganese ore** — Manganese is an important metal for the modern metallurgy of steel making where it is used as a ferro-manganese alloy. In Rajasthan, manganese ore deposits of significance occur in Banswara district and are confined to a belt extending from Gararia to Rathimauri for a distance of 20 km. The main deposits are located at Sivnia, Khunta, Ghatia, Itala, Tamisha and Kheria, associated with the phyllites of the Aravalli group. There has hardly been any production in last five years.

**Wolfram (Ore for Tungsten)** — Tungsten is a metal of strategic importance and is used in the manufacture of high speed alloy and special steels, which are essential for machine tools, armour plates and other military equipment.

Rajasthan possesses the largest known deposit of tungsten in India at Degana in Nagaur district. Its production in 1978 was 35.7 tonnes having value of Rs. 31.59 lakhs.

**Other Metallic Minerals** — Other metallic minerals and ore occurrences known from Rajasthan are Uranium, Tin, Silver, Bauxite, Cobalt and Cadmium. Uranium is found at Umra (Udaipur District) and other places of Bhilwara district. Tin ores are known to occur in Parsoli area of Bhilwara. In Rajasthan silver is found associated with lead-zinc ores of Zawar and Rajapura-Dariba areas of Udaipur district and is extracted during the smelting of lead. Presence of bauxite has been reported from Baseli Majola, Mamon and Sherol Kheri in Kota district. Cobalt mineralization has been found associated with pyrrhotite ore of Akwali-Babai
section of Khetri copper belt. Cadmium occurs along with zinc ore of Zawar belt and is recovered during smelting.

Non-Metallic Minerals/Ores

ASBESTOS — Rajasthan is the principal asbestos producing state contributing nearly 90% of total production in India. The emphybole variety of asbestos is predominant in Rajasthan with an estimated reserve of over two lakh tonnes, whereas the few deposits of chrysotile variety contain reserve of about 5000 tonnes. In Ajmer district, the asbestos deposits are mainly located near Kanwali (Kaolai), Kotra reserved forest area, Arjanpura, Kotri and Nai Khurd. Smaller occurrences of asbestos have also been reported from Bhubani, Raigarh and Gudas.

In Udaipur district asbestos is known to occur near Kagdar-ki-pal, Rakhabdeo, Nakarjaba, Serro-ki-pal, Masara-ki-obsi, Jogik-ke-Gudha, Khan, Khankar and Terera, Baroli, Tikki, Antalia, Bhauva, Dhelana, Odwas, Sarai, Salumber, Kuanthal, Molela, Shopol and Shatwation Ka guda.

In Bhilwara district it is known to occur near Barana.

The asbestos occurrences in Pali district are located near Dhal, Mala-ke-Gudha, Sendra, Patona, Chhagri-ki-Bangal, Gona, Dhanbarli and Kanotiya Ramgarh. In all there are 106 mining leases of asbestos and its production during 1979 was 27.6 thousand tonnes. Udaipur district gives maximum production followed by Ajmer and Pali.

BARYTES — There are 32 mining leases and its production during 1978 was 3300 tonnes which although forms only 1% of India's total production but it ranks next only to Andhra Pradesh.


Barlias area of Bhilwara district contains Barytes. In Udaipur district a new deposit of Barytes has been located near Nathdwara in 1969 and recently again a big deposit has been discovered near Jagat.

CALCITE — Rajasthan is the chief producer of calcite mineral in India. Its production during 1978 was 26.5 thousand tonnes which is 93% of India’s total production. In Sirohi district calcite is known from Khila, Bula and Tankiya area. In Sikar district important calcite deposits are located at Maonda, Jhamas, Raipur, Rampura and Baipur. In Pali district calcite occurrences are reported from Baraguda, Bundha, Lalwa, Khalhab, Kapil-ka-Bagal and Kherauhparla. In Jaipur district calcite occurrences are
located at Despura, Sukum and Degetha. Other small occurrences are in Ajmer, Alwar, Jhunjhunun districts.

**BENTONITE** — Bentonite is an important mineral of Rajasthan produced from Barmer district. The bentonite is used as grouting material in engineering construction, in drilling muds and as carrier in insecticides, paint and pharmaceutical industries. It is also used for bleaching vegetable oils and petroleum. Rajasthan possesses a huge reserve of both swelling and non-swelling types of bentonite. Important deposits are located in Akli, Hathisingh-ki-Dhani, Sheo, Thumbli, Giral, Sonri, Harwoacha, Bisala, Bhandres and Mahawar in Barmer district. There are 10 mining leases of bentonite in Rajasthan. During 1978 the production of bentonite was 21.89 thousand tonnes.

**CHINA-CLAY** — It is the main raw material for pottery and ceramic wares, insulators, sanitary wares, tiles, etc. In Rajasthan occurrences of clay have been reported from Bikaner, Jaipur, Sikar, Bhilwara, Udaipur and Sawai Madhopur districts. In Bikaner clay deposits have been reported from Mudh, Chand, Kotri etc. areas. In Jaipur district deposits of chinaclay occur in Buchara and Torda. In Chittaurgarh district good clay deposits are reported from Eral and Sawa. In Bhilwara district clay deposit is known near Mangrup. In Alwar district clay is reported near Rajgarh. In Sawai Madhopur district clay has been reported from Raesena and Basu. In Udaipur district Chinaclay deposit has been reported from Karbaria-ka-Gudha areas. There are 45 mining leases of Chinaclay in Rajasthan and its production during 1979 was 137.1 thousand tonnes.

**DOLOMITE** — Dolomite (calcium-magnesium carbonate) is chiefly used as flux and for refractory purposes in steel and ferro-manganese industry. Dolomite of high purity containing less than 0.2% of iron is used in glass industry. In Rajasthan there are no such large industries and thus its consumption is mainly for lime burning and chips making. There are 21 mining leases for dolomite which are located in Jaipur, Ajmer, Alwar, Sikar, Jhunjhunun and Jaisalmer districts. Its production during 1978 was 20.3 thousand tonnes which is not significant when compared with India’s production of 2.15 million tonnes.

**FELSPAR** — Rajasthan is the main producer of felspar in India contributing almost 68% share. Important mines are located in Ajmer district. In Ajmer, occurrences of felspar have been reported from pegmatites at Dadia, Bander sori, Gujarwara, Champawari, Dantol, Jabarteria, Loharwada, Shoklay, Berawa, Fatehgarh and Kadera. Other occurrences have been reported from Alwar, Pali, Bhilwara, Jaipur, Udaipur, Sikar and Dungarpur districts. There are 152 mining leases for felspar in Rajasthan, mostly in Ajmer district and its production during 1979 was 39.1 thousand tonnes.
FLUORITE (FLUORSPAR) — It is an essential industrial mineral used in steel aluminium and ferro-alloy industries, as fluxing material. It is also used in making opalescent glass, enamel and hydro-fluoric acid and its derivatives.

Gujarat and Rajasthan are the only producers of this mineral in the country. Rajasthan produced 3065 tonnes of fluorite in 1978 which accounts for nearly 20% of India's production. There are six mining leases, all in public sector (RIMDC), in the districts of Dungarpur and Jalore. Other occurrences are in Sikar and Udaipur districts. Important deposits in Dungarpur district are known from Mando-ki-Pal and Kahila areas. In Jalore district fluorite is being mined from Karada area.

GARNET — It is a common mineral of metamorphic rocks and pegmatite. Garnet is mainly utilized for abrasive purpose, well developed transparent variety being used as gem stone. Gem variety occurrences are known from Rajasthan alone. There are 30 mining leases of this mineral in the State which are located in Tonk, Ajmer and Bhilwara districts. In Tonk district occurrences of garnet are near Rajmahal, Gaonri and Sarai. In Ajmer district garnet deposits have been reported from near Sarwa. In Bhilwara, garnet occurrences have been reported near Agucha.

Production during 1978 was 1900 tonnes of abrasive grade and 3.8 tonnes of gem variety.

EMERALD — Emerald is a very highly prized precious stone. In India emeralds are available from Ajmer and Udaipur districts of Rajasthan. They are being mined near Rajgarh, Gudas and Bubani in Ajmer district and Kalagunam and Tikhi in Udaipur district. In 1978, 7.2 Kilogram of raw emerald was produced.

GRAPHITE — In Rajasthan small occurrences of graphite have been found in Pali, Ajmer, Jaipur and Udaipur districts and the latest find was in Banswara district in Mahi Bajaj Sagar area. RIMDC is taking up mining activities in the region. The mineral is of low grade and, therefore, steps for its upgrading are being taken up.

GYPSUM — Gypsum is mainly used in manufacture of ammonium sulphate fertilizer, Plaster of Paris, distemper and cement and also in paper and insecticides etc. as a filler.

Rajasthan possesses the largest reserves of gypsum in the country and ranks first in its production. Its production in 1978 was 7.86 lakh tonnes which is nearly 90% of total production from India. There are 28 working mines all of which except two are in public sector. The deposits are located in western Rajasthan in the districts of Bikaner, Nagaur, Barmer, Jaisalmer, Pali and Sri Ganganagar.
In Nagaur district gypsum occurrences are known from Dhankoria and Bhadwasi.

In Barmer district gypsum deposits are known from Uttarlai and Kavas. Selenite occurrences are known from Thob and Chittar-Ka-Far.

In Bikaner district, good quality gypsum occurs in Dhirera, Cholera, Bharon, Kaoni, Nausher, Jamsar etc. Selenite occurs at Lunkaransar.

In Jaisalmer district gypsum occurrences have been noted from Shri Mohangarh, Hamirwali das, etc.

Kyanite — Kyanite is an important refractory mineral. In Dungarpur district Kyanite occurrences are reported from Chhoti Padri area. In Ajmer district occurrences of Kyanite have been reported near Chainpura and Mandoria. In Bhilwara district, small occurrences of Kyanite have been recorded at Pur and Bari Harnoi. Recently Kyanite-sillimanite occurrences have been located in the pyrophyllite belt of Udaipur. There are 11 mining leases of Kyanite.

Limestone — Rajasthan possesses large reserves of limestone which occur in many parts of the state. Important deposits are located in Ajmer, Bundi, Chittaurgarh, Jodhpur, Nagaur and Pali districts. Nearly 29 lakh tonnes of limestone is being produced annually for cement manufacture, 9.5 lakh tonnes for lime burning and 8.00 lakh tonnes as dimensional stone for building purposes. These altogether yielded a revenue of Rs. 144 lakh during 1978-79.

Magnesite — In Rajasthan, small and low grade occurrences of magnesite have been found in Ajmer, Sirohi, Dungarpur and Udaipur districts. Magnesite deposits occur near Sarupia, Chhaja, Ajour and Beri areas of Ajmer district. Occurrences have also been reported from Bhimana and Lawaha-Gurha in Pali and Udaipur districts respectively. There are sixteen mining leases of magnesite and its production during 1979 was 1.2 thousand tonnes.

Mica — Rajasthan is one of the major contributors of commercial mica produced in India. With Rajasthan mica again, the name of Bhilwara is like a synonym, which accounts for 75% of the total output of the State; other districts such as Ajmer, Tonk, Jaipur and Udaipur also contribute a small fraction. There are 130 mining leases for mica which have produced 717 tonnes during 1978. Some of the mica pegmatites of Bhilwara also contain beryl.

Pyrophyllite — Pyrophyllite is like soapstone in its physical properties but chemically it is a hydrated aluminum silicate while soapstone is hydrated magnesium silicate.
There are eight mining leases for pyrophyllite, all in Udaipur district, which have produced 4250 tonnes during 1978 which is nearly 15% of India’s total production of this mineral.

PYRITES — Pyrites is an important ore for sulphur or sulphuric acid which is indispensable to a large number of industries like fertilizers, steel, rayon, chemicals, explosives, etc. Entire requirement of sulphur is met through imports.

In Rajasthan, a large deposit of pyrite has been proved at Saladipura in Sikar district but it is still in the state of underground exploration and development, awaiting clearance for mining project from the Central Government.

QUARTZ — Quartz is a very common mineral of rocks but its commercial value depends on its chemical purity and silica content. In Rajasthan quartz production mainly comes from Ajmer district, where it is mined along with felspar from pegmatite bodies. Other districts producing quartz are Jhunjhunun, Alwar, Jodhpur, Pali, Tonk and Udaipur. There are 99 mining leases for quartz in Rajasthan and its production during 1979 was 27.5 thousand tonnes.

ROCK PHOSPHATE — It is the most vital mineral of the state which has placed India on the world map of rock phosphate producers. It is an essential mineral for fertilizer industry and various chemical industries.

Deposit of Jhamar-Kotra rock-phosphate in district Udaipur is the largest in the country which was discovered by the State Department of Mines and Geology in the year 1968. The mine is being operated in the public sector through M/s Rajasthan State Mines & Minerals Ltd. Another mine at Matoon in Udaipur district is leased out to M/s Hindustan Zinc Ltd., as a captive mine.

Beneficiation plant to treat low grade ore is also being installed at Jhamar-Kotra.

Other known deposits of low grade phosphate in Udaipur district are Neemuch-mata, Bargaon, Dakan Kotra, Kanpur, Karbaria-ka-Guda areas. Rock-phosphate at Birmania and Fatehgarh in Jaisalmer district was the first discovery in India. Small occurrences of apatite, which is also a source of phosphate, are located at Navania (Udaipur) and Kherpura (Sikar).

In the year 1978 a total production of 6.399 lakh tonnes was made which yielded royalty of Rs. 29.31 lakh and Rs. 15.17 crores was earned from the sales of rock phosphate during 1978-79. Reserves of this mineral are estimated at 80.00 million tonnes in Rajasthan.

SILICA SAND — It is chiefly a raw material for glass industry. Silica sand occurs as friable quartzite or sandstone of high purity containing
98% SiO₂ and less than 0.1% iron oxide, the latter being regarded as the most undesirable impurity.

Rajasthan is an important producer of silica sand in the country, contributing nearly 18% of the total production. Important deposits are located in the Jaipur, Bundi, Bharatpur, and Sawai Madhopur districts. There are 50 mining leases for this mineral and its production during 1979 was 114.4 thousand tonnes.

SOAPSTONE (TALCITE/STEATITE) — It is an important mineral for cosmetic products alongwith several other uses in paper, textiles, rubber, pesticides, ceramic and refractory industries.

Rajasthan is the largest producer of this mineral of India, contributing almost 90% to the total production for 1978 with a production of 2.4 lakh tonnes from Rajasthan.

There are 316 mining leases for this mineral which is largest for any single major mineral in the State. The most important deposits of this mineral are in Jaipur, Bhilwara, Udaipur and Dungarpur districts. Other small deposits are found in Ajmer, Alwar, Banswara, Jhunjhunun, Sikar, Sawai Madhopur, Pali and Sirohi districts.

WOLLASTONITE — This mineral was discovered in 1969 in Sirohi district and since then it is in the stage of making its way in the industrial application. Its main use is in the ceramic industry. There is only one productive mine at Khila in Sirohi district which has produced 1900 tonnes during 1978. Rajasthan is the only producer of this mineral in India.

VERMICULITE — Vermiculite is a group of micaceous minerals which expands or exfoliates many times the original thickness when heated.

This characteristic of vermiculite is suitable for many types of thermal and acoustic insulation in the form of light weight bricks.

Its production is very small, 362 tonnes in 1978, which is from Ajmer district alone.

LIGNITE — Rajasthan is completely deficient in coal deposits except lignite deposit of Palana (Bikaner) which is presently not in the stage of mining. Lignite is inferior variety of coal having low thermal value and more ash content. Palana lignite has sulphur content also which makes it spontaneously combustible on exposure to air. A reserve of about 23 million tonnes has been estimated at Palana.

FULLERS EARTH — It is a non-plastic or semi-plastic clayey mineral having marked ability to absorb grease and remove colouring matters from oil and other liquids including water. In Rajasthan Fullers earth is produced from Bikaner and Barmer districts. Its production during 1978 was 12,966 tonnes and there are 7 mining leases of this mineral.
OTHER MINERALS — Occurrences of agate, Jasper, Corundum, Ochra, Siliceous earth, laterite and saltpetre are also known which are mined in small quantities.

Building Stones

Rajasthan is fortunate in possessing large deposits of building stones such as sandstone, limestone, marble and granite. Minerals and rocks used as building stones are not only important from the point of view of revenue but are rather more important from the point of view of employment to masses. It is estimated that nearly 80,000 persons are directly engaged in about 20,000 quarries of building stones.

SANDSTONE — It is the most important building stone quarried as dimensional stone and also as masonry stone. It has a present production of nearly 26 lakh tonnes of dimensional stone giving a revenue of Rs. 172 lakhs. Important deposits of sandstone are at Jodhpur, Bhilwara (Bijolia), Sawai Madhopur, Kota, Bundi, Jhalawar, Chittaurgarh and Bharatpur districts. There are 1217 mining leases and 8959 RCRLs of sandstone.

LIMESTONE — Limestone is also quarried as slabstone in Kota (Rangnajmandi) and Chittaurgarh districts. Black limestone taking good polish is used as black marble. It had a production of 7.00 lakh tonnes during 1978 giving a revenue of 40.50 lakhs of rupees. Almost every district produces this mineral but important districts are Jaipur, Sikar, Alwar, Pali, Nagaur, Udaipur and Jodhpur. There are 287 mining leases and 85 RCRLs of limestone for lime burning and 53 mining leases and 2339 RCRLs for building purposes.

MARBLE — Rajasthan is known all over India for its marble deposit of Makrana (Nagaur district). But now, other deposits of Jaipur, Udaipur, Ajmer, Sirohi, Bundi, Alwar etc. have also come to be well known in the field of marble. Jaisalmer is also famous for its yellow marble. There are 258 mining leases and 487 RCRLs of marble and its production during the year 1979 was 225 thousand tonnes.

GRANITE — Rajasthan is also coming up in the field of granite production in the country. Pink, grey and black varieties of granite are obtained from Jalore district. One unit of polishing is already working at Jalore under public sector and another unit has come up in private sector at Jodhpur. More interest is developing in this field now. It may become an important commodity of export in future.

Other building stone quarries in the state are phyllites, schists, quartzites, rhyolite, serpentinite, slate stones. Brick earth and river sands are also used in large quantities as building materials.
Revenue from Minerals

Minerals provide important source of revenue to the State Exchequer. With the development of mineral activity in the State, the income from royalty on minerals has grown manifold since 1950 when it was Rs.50 lakhs only. In 1979-80 the revenue from minerals was Rs. 900 lakhs.

Amongst the major minerals, the lead-zinc-silver ores contributed highest amount of royalty of Rs. 163 lakhs or 21% of the total revenue. It was followed by limestone and copper ore which contributed Rs. 72 lakhs and Rs. 65 lakhs respectively. Other major minerals having significant share in revenue were rock-phosphate, gypsum, soapstone, mica, asbestos, silica sand, felspar, clays, calcite, ochres, etc.

Among minor minerals sandstone carrying a royalty of rupees 171 lakhs ranked first followed by masonry stone, limestone (lime making), limestone (dimensional), marble, brick earth and Bajri. Other important contributors are Fuller’s earth, bentonite, millstone, saltpetre, rhyolite, slatestone, and granite.

Among the districts, highest revenue during 1979-80 was contributed by Udaipur district, followed by Sikar and Jhunjhunun (jointly), Bundi, Bhilwara, Jodhpur, Kota, Jaipur etc. The departmental project of rock-phosphate mining at Jhmar-Kotra contributed a sum of Rs. 16 crores in 1979-80 by sale of rock-phosphate.

FLORA

Botanical Divisions

According to Good (1964), the earth has been divided into six floral kingdoms, Rajasthan falling under Paleotropical or Oriental floral kingdom. He also recognised 37 Floristic Regions or Floristic Provinces, out of which Rajasthan is covered under 9 - North African-Indian Desert Region and 17-Indian Region. Phyto-geographically the classification of Chatterjee (1939) is still most widely accepted. He has divided India into 8 Botanical Regions, Rajasthan falling in Indus Plains. The characteristic spp. or floristic elements of this Botanical division are

*Acacia nilotica, A. senegal, A. leucophloea, Anogeissus, Albizia, Dalbergia, Grewia, Prosopis, Salvadoria, Capparis, Euphorbia, and Calotropis.*

Botanical Exploration of Rajasthan

Jacquemont (1832) was the first to botanically explore Rajasthan. It was followed by Dr. George King (1868), Duthie (1886), Blatter & Hallberg (1918-21), Parker (1921), Bhandari (1967) and B. Tigar & S. Sharma (1979).

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RICH FLORA — Jain (1970) estimated flowering plants of Rajasthan to be 1280 spp. as shown below:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Dicots</th>
<th>Monocots</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Families</td>
<td>92</td>
<td>18</td>
<td>110</td>
</tr>
<tr>
<td>(After Bentham &amp; Hooker)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genera</td>
<td>465</td>
<td>128</td>
<td>593</td>
</tr>
<tr>
<td>Species</td>
<td>970</td>
<td>210</td>
<td>1280</td>
</tr>
</tbody>
</table>

LARGEST FAMILIES — According to number of spp. the ten largest families in Rajasthan are :-

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Families</th>
<th>Species</th>
<th>Genera</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poaceae</td>
<td>180</td>
<td>74</td>
</tr>
<tr>
<td>2</td>
<td>Leguminosae</td>
<td>177</td>
<td>51</td>
</tr>
<tr>
<td>3</td>
<td>Compositae</td>
<td>86</td>
<td>51</td>
</tr>
<tr>
<td>4</td>
<td>Cyperaceae</td>
<td>63</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>Acanthaceae</td>
<td>46</td>
<td>22</td>
</tr>
<tr>
<td>6</td>
<td>Euphorbiaceae</td>
<td>44</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>Malvaceae</td>
<td>40</td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>Labiatae</td>
<td>35</td>
<td>13</td>
</tr>
<tr>
<td>9</td>
<td>Convolvulaceae</td>
<td>35</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>Scrophulariaceae</td>
<td>33</td>
<td>19</td>
</tr>
</tbody>
</table>

LARGEST GENERA — The largest genera is Cyperus with 30 spp. while the next is Indigofera with 20 spp. The Acacia occupies 10th position with 11 spp. in Rajasthan.

Endemic Flora

Rajasthan lies in the zone of poor endemism. Of the 134 genera endemic to India, only six namely, Ougeinia, Butea, Caesalia, Glossocardia, Petalidium and Haplanthus are endemic in Rajasthan. Some of the common endemic taxa of Rajasthan are Cleome gynandra var nana (Bl. & Hall.) Bhandari, Cleome brachycarpa Vahl ex D.G. var glauca Bl. & Hall., Convolvulus blatteri Bhandari, Farsetia macrantha Bl. & Hall., Pavonia arabica Steud var glutinosa Bl. & Hall., Zizyphus truncata Bl. & Hall., Tephrosia uniflora sub spp. petrosa (Bl.& Hall). Gillet & Ali, Lasianthus caudatus and Cenchrus rajasthanensis Kanodia et Nanda sp. nov., Tribulus
rajasthensis Bhandari & Sharma, Anogeissus sericea Brandis var nana King ex Duthie, Aonamnia desertorum Bl. & Hall., Anticharis glandulosa Asch. var caenulae Bl. & Hall. ex Sant. Euphorbia jodhpurensis Bl. & Hall., Pulicaria raiputanae Bl. & Hall., Malhania magnifolia Bl. & Hall.

Fossil Plants*

UDAIPUR & KARauli — Fossil evidence is extremely scanty for Rajasthan. Precambrian plant life of the State is represented by five different types of stromatolites namely Callenia columnaris, C. kusensis, C. symmetrica, Bailaicalca prima and Miniaria calceolata from Matoon formation near Udaipur (Banerjee 1971), a filament of Eomycetopsis robusta from Aravali subgroup of Udaipur (Banerjee 1974) dated more than 2 billion years and algal forms Gloeocapsomorpha and Palaeoglaucocystis from the Vindhyan rocks near Karauli.

JAISALMER — The lower or Mid Jurassic plant fossils recovered from rocks exposed near Jaisalmer (Lathi - formation) comprised largely several kinds of pteridophytes like Cyathidites australis rimulre Bahme, C. minor Couper, Dictyotrilites crateris (Bahme) Srivastava, Cingulatisporites lathiensis Srivastava, Polypondiumspotes matherlii Srivastava gymnosperms like Ginkgoceadophytes deterius, var majus Der, G. nitidus (Bahme) Srivastava, Monosulcitites cuoperi Der, Cupressacites ramadiandae Srivastava, Araucariacites ghoshii Srivastava, Podocarpidites spp., Callialasporites dampieri (Bahme) Der and other spp. of Callialasporites & Classopollis. The plant fossils (upper Jurassic) from Habur village (near Jaisalmer) belong to ferns (Gleichenites and Phlebopteris), Bennettitales (Taenopteris, Pterophyllum, Otozamites imbricatus Feistm, Ptilophyllum acutifolium Morris and conifers (Elato cladus conferta Oldh & Morris) Hall and Pagophyllum spp. In Mudh & Kotri of Palana (Jaisalmer) formation are recorded pollen grains of Chelanthtes, Metia and unidentifiable angiosperms of Tertiary period. Now converted as Akal wood fossil park near Jaisalmer are lying huge gymnospermic fossils of large trees of lower Jurassic era estimated to be 180 million years old.

BARMER — Barmer area is also rich in fossil finds. The recorded Cretaceous era plant life is comparable to Polypondium, Lycopodium, Lygodium, Coniopteris, Gaetum, Araucaria, Abies, Pinus, Podocarpus and unidentifiable angiosperms. At Kapurdi Fuller’s earth deposits (Barmer), the Eocene deposits of evergreen trees like Mesua tertiaria, Garncinia boroohli, Calophyllum and fruit of Cocos reveal existence of humid climate with high rainfall.

* Personal communication from Dr. Vishnu Mitte of Birbal Sahni Institute, Lucknow to the author.
Bikaner — From the Bap-Bikaner area at Mayakor, silicified wood and leaf impressions of *Ptilophyllum acutifolium, Pterophyllum* and *Equisetites* of the same age as that of Lathi formation have been recovered.

Sambhar-Didwana-Ajmer — The mixed xeromorphic Thorn Forests with several grasses, sedges, composites and forbes (spp. of *Tephrosia, Solanum, Heliotropium, Boerhaavia, Digera* and *Indigofera*) waned about 6000-4000 years ago in the vicinity of Lunkaransar, expanded between 5000-4000 years ago in the vicinity of Didwana and appeared at Sambhar between 4500-3000 years ago. Together with this, Psammophytic scrub represented by *Calligonum polygonoides* and *Aerva* grew near Lunkaransar. Phog (*C. polygonoides*) invaded Didwana and Sambhar areas by about 6000 years and 3000 years ago respectively. Ultimately in the northern parts of Rajasthan desert developed Lithophytic scrub represented by *Capparis* and *Mimosa*. Plant life from Paanakar lake near Ajmer is known from about 5000 years. The genus *Artemisia* which was significantly present 10,000 years ago is now occasional and even two spp. *A. scoparia* and *A. nilagirica* are now of rare occurrence in the Rajasthan desert.

Rare & Endangered Plants

Destruction of natural habitats have resulted in decline of many plant species. Although definite information is lacking, the plants given in Appendix III are either getting rare or threatened with extinction in Rajasthan.

**FAUNA**

Introduction

Rajasthan is endowed with a variety of habitats. It has the oldest mountain chain of India in Aravalis, and also the hot arid sandy desert of western Rajasthan - the Thar. It possesses thick and dense forests in the south-east but only grasslands and scrub forests in the deserts of north and north-west. There is a network of rivers in eastern Rajasthan but in western Rajasthan there may be very scanty rain for years together. The State has the highest mountain peak at Gurushikhar (Mt. Abu) between the Himalayas and the Nilgiris while there are low lying areas of Indo-Gangetic plains in N.E. These biotopes, quite different from each other, obviously support a variety of fauna. It abounds in the National animal - the tiger, the National bird—the Peacock. One can see the sly panther, the innocent chinkara; robust nilgai, delicate cheetal; spiny porcupine; hairy sloth bear; lazy python, active viper; gigantic crocodiles, small fish; largest bird- the saras crane and the smallest bird Tickell’s flower-pecker, abundant vultures, rare Siberian crane; the threatened Great Indian Bustard, plentiful parakeet, colourful king-fishers, dull sandlarks etc.

* Personal communication to the author from Dr. B.V. Shetty of Botanical Survey of India, Jodhpur & Dr. J.K. Maheshwari, National Botanical Research Institute, Lucknow in Feb. 80.
Faunal Fossils

Dry beds of Tethys sea of the Mesozoic era exist in Rajasthan and obviously numerous aquatic faunal fossils have been traced especially from the Thar Desert. The most important recoveries of fossils have been made from Kolayat, Marh, Bandha formation, Rohli, Siasar, Domedera, Utтарlai, Nagaurda, Palana, Jaisalmer, Kuijal, Khewansar, Kuchri, Kapurdi, Shawal, Dangri, Gunga, Kuldhara, Amarsagar, Jamsar, Ramgarh, Bap, Bhadawara, Harbars, Boa, Bhadesar, Osian, Abur, Barmer, Bikaner and Ganganagar. Fossils of animals have also been reported from Chittaurgarh, Nathdwara, Udaipur, Bhiwara, Luni basin, Jaipur, Bharatpur, Khetri, Sikar, Kota and Jhalawar etc.

The invertebrate fossils* of 289 spp. have been collected. The fossils of protozoa so far identified are of 94 spp. which include Alveolina, Discocystina, Lagena, Assilina, Nummulites, Glogigerina, Cibicides, Rotalia, Calcarina, Trocholina, etc. Unidentified sponge spicules of Porifera have been found from Jaisalmer. From Lodewa unidentified corals (Coelenterata) have been collected. Of the Bryozoan fossils Polypora ampla Lonsd are traced from Bap. The Annelida fossils of Nereites have been obtained from Jaisalmer. The Arthropoda fossils of 25 spp. have been reported including those of Cypris, Cytherella, Progonocystere, Panaeus and unidentified crabs and caridean. Of the Echinodermata fossils, 14 have been recovered especially Cidaris, Pyguris, Macroneustes, Metalida and unidentified Asteroids, Echinoids, Crinoid etc. The Molluscan fossils of 218 spp. have been picked up. The common genera are Nerinea, Vivipara, Venericardia, Corbula, Nuculana, Ostrea, Pecten, Pholadomya Unio, Ammonites, Belemnites, Deshayestes, Epimayaites, Obtusticosites, Virgatospinctes, Reineckia, Dentalium spp. The Brachiopoda fossils consist of 31 spp. including Productus, Rhynchonella, Spirifer, Jaisalmeria, Kutichthyris, Terebratula, Dielasma spp. etc.

Among Chordates the Pisces namely Odontopsis macrata striata (Winkler) from Gunga, Clupeoid fish from Kapurdi have been reported. The unplaced fossils are Lingular spp. (from Badhaura) Leiomene kapurdiensis (from Barmer) Scombroupea misrai (from Barmer).

Excavations carried out at sites of mesolithic culture in Luni basin particularly near Tilwara in Barmer, have unearthed charred bones of the spotted deer or chéetal and the hog deer (Axis porcinus, para)** both of which have now disappeared from Rajasthan desert.

In the Eocene age, near Kolayati (50 km. S.W. of Bikaner) the marine fauna consisted several formanifera but the vertebrate fauna (Singh et al

* Based on personal communication to the author from Dr. Vishnu Mitre of Birbal Sahni Institute, Lucknow and Director Zoological Survey of India Calcutta.

1974) included Sphyra fishes (*Arius kutchensis*, *Coelodus*, *Pristis*, *Nylidobatis* & *Sphyra*) and large limbs of reptiles.

**Zoological Types**

Due to diversity of biotopes, Rajasthan has a rich faunal wealth. The zoological types reported from the State are as follows :-

A. **MAMMALS** † — 76 spp. of mammals are found in the State. These are given in the statement at (Appendix IV).

B. **BIRDS** — Bird life in Rajasthan is quite plentiful and varied. It is also on the flyway of migratory birds. In Bharatpur 4,273 ducks were shot in a day on 12th November 1938 while 10,417 Imperial sandgrouse were hunted in Gajner (Bikaner) in two days in February 1929. The rarest bird - Great White or Siberian Crane visits only Bharatpur in India. Another threatened bird - Great Indian Bustard is still successfully breeding in Rajasthan Desert. The birds recorded from various parts of the State are given in Appendix V. The list is not complete and a few more birds may be found, especially migratory ones.

C. **REPTILIA** — More than 50 species of reptiles **are** found in Rajasthan. Gharial and Magar are common in the Chambal waters while sandboa and sawscaled viper are common all over Rajasthan. Skinks are found all over. Monitor lizards are not uncommon. However, the existence of 'Piwana' snake in Thar Desert (especially Chohtan area of Jaisalmer) is only a myth. **Some** of them are threatened with extermination. The animals of this class are given in Appendix VI.

D. **FISHES** — Fishes in Rajasthan Water are common. The fisheries wing of Animal Husbandry Department auctions the fish contracts from various waters in Rajasthan. There are 92 spp. reported in Rajasthan. Many carps and larvicidal fishes have been successfully introduced. A list of fishes found in the State is given in Appendix - VII.

**Vanishing Species**

The wild animals, included in Schedule I of the Wildlife (Protection) Act (as amended up to October 80) are those which have been given complete protection and from the point of view of the country as a whole are threatened with extermination, although some of them like black-buck, chinkara, peacock, are really found in good numbers in Rajasthan. Such 33 vanishing animals (Sch. I) as listed below are found in Rajasthan :-

* Largely based on information received from the Director, Zoological Survey of India, Calcutta in June, 1980.

** Largely based on personal communication to the author from Director, Zoological Survey of India, Calcutta in June, 1980.

*** Personal communication to the author from Shri J.C. Daniel, Curator, B.N. History Society, Bombay in 1980.

% Largely based on personal communication to the author from Director, Zoological Survey of India, Calcutta in June, 1980.
A. Mammals
1. Tiger, Bagh, Sher, Nahar (*Panthera tigris*)
2. Leopard, Bhaghera, Tendua, Gulkar, (*P. pardus*)
3. Caracal, Siyagosh, (*Felis caracal*)
4. Desert Cat, Registhani billi (*F. libycas*)
5. Fishing Cat, Maccheri billi (*F. vittata*)
6. Leopard cat, Chitta billi (*F. bengalensis*)
7. Indian Wolf, Bedia (*Canis lupus pallipes*)
8. Sloth bear, Bhalu, Reench, (*Melursus ursinus*)
9. Pangolin, Sely Sanp, (*Manis crassicaudata*)
10. Ratel, Beju, (*Mellivora capensis*)
11. Flying Squirrel, Udangilhari (*Petaurista petaurista*)
12. Mouse deer, Pisora (*Tragulus meminna*)
13. Black buck, Kala Hiran (*Antelope cervicapra*)
14. Chinkara or Indian Gazelle, Chinkara (*Gazella gazella benetti*)
15. Four horned antelope, Chousingha (*Tetraceror guadricornis*)

B. Amphibians and Reptiles
16. Agra monitor lizard, Patagoh (*Varanus griseus*)
17. Yellow Monitor Lizard, Padagoh, (*V. flavescens*)
18. Water Lizard, Padagoh (*V. salvator*)
19. Crocodile, Magar, (*Crocodilus palustris*)
20. Gharial, (*Gavialis gangeticus*)
21. Python, Aigar (*Python molurus*)
22. Indian softshelled turtle (*Lissemys punctata punctata*)
23. Starred tortoise, Pahadi Kacchua (*Geochelone elegans*)

C. Birds
24. Peafowl, Mor (*Pavo cristatus*)
25. Great Indian Bustard, Godawan, Gunjan (*Choriotes nigiceps*)
26. Houbara Bustard, Tilor or Tiloor (*Chlamydotis undulata*)
27. Siberian White Crane, Safed Saras (*Grus leuco-geranus*)
28. Stork White, Laglag (*Ciconia ciconia*)
29. Spoon bill, Chamcha (*Platalea leucoodla*)
30. Osprey, Maccllmar (*Pandion haliaetus*)
31. Peregrine Falcon, Shahin, (*Falco peregrinus*)
32. Lagger Falcon, Baheri, (*F. biarmicus*)
33. Red headed Merlin, Turumti, (*F. chicquera*)

Although not listed in the Schedule I, the hedge-hog, Jhau-chuha (*Hemiechinus auritus collaris*), Grey Musk Shrew, chbakhahnder (*Suncus murinus sindensis*), Indian Flying fox, Chamgadad (*Pteropus giganteus giganteus*) among mammals, Rajasthan spotted Grey creeper (*Salpornis spilonotus*), Mt. Abu white throated Babbler (*Dumetia hyperythra abensis*), Barred jungle Owlet (*Glaucidium radiatum*) among birds, Indian toad Agama (*Phynocepal spp. novo*), Spiny tailed lizard, sanda (*Uromastix hardwicki*), chhipkali (*Hemiechinus*), Dhaman or Rat snake (*Ptyas mucosus*), Rare Racer (*Coluber gracilis*), Trinket snake (*Elaphe helena*), Indian sand snake (*Psammophis condanurus*), Cobra or Nag (*Naja Naja*), Kander or Pitless viper (*Vipera russelli*) are dwindling in numbers.

**Wildlife Preservation**

Rajasthan has always been a place of renown for its splendour and variety of colourful fauna. Rulers zealously guarded the wild fauna of their areas. Hunting was their favourite pastime and it always found place on the itinerary of visiting Viceroys and V.I.P’s. In most of the States, a separate department known as ‘Shikarkhana’ was generally maintained. Illicit shooting was a cognizable offence. The defaulters used to be penalised heavily. The duck shoot of Bharatpur, the tiger hunt of Kota, Imperial sandgrouse shikar of Gajner (Bikaner), pig sticking of Jodhpur were famous far and wide. Feeding ‘makka’ (maize) to wild boars at Tali (in Udaipur) and Sardarsamand (in Pali), cheese to tiger in Van Vihar (Dholpur) was a joy to behold.

**THE CRUCIAL PERIOD** — During the period following the formation of composite Rajasthan State in 1949, excessive shooting took place. Banswara and Dungarpur are today practically a wildlife desert, though in 1908, according to Imperial Gazetteer (Vol. VI & XI of 1908) tigers, leopards, wild dogs, wolves, hyacnas, sloth bears, sambhars, chitals, nilgais, were found there. But for Vishnois, the Chinkara and Blackbucks, too would have been wiped out of western Rajasthan. Great Indian Bustard, our endemic bird, dwindled in numbers.
WILDLIFE LEGISLATION — This destruction of wildlife attracted attention of the State Government and an enactment known as ‘Rajasthan Wild Animals & Birds Protection Act’ was passed in 1951. Under this Act, the rules notified on May 2, 1958, the State authorised certain persons to arrest the offenders without warrant. Rajasthan Entrance to the Game Sanctuary Rules were gazetted on May 13, 1959. ‘The Rajasthan Preservation of Certain Animals Act 1950’ had already protected the peacock and blue rock pigeon etc. For forest areas, however, special rules ‘Forest Hunting, shooting and fishing and water poisoning rules 1957’ made under the Rajasthan Forest Act 1953, prescribed procedure for shooting. The close seasons of wildlife (in which shooting was prohibited) were notified vide Government of Rajasthan (Forest Section) Order No. F. 39 (2) For. 54 dated 9th September, 1957 and 21st July, 1960. In general, no animal was allowed to be shot during July to September every year. The Great Indian Bustard, crocodile, monitor lizard, black buck, chinkara, four horned antelope, pangolin, ratel, tiger cubs with their mother, panther, bear and birds like ibises, spoonbill, painted snipe, storks, egrets, herons, flamingoes, curlews had their close season all the year round.

In spite of all these rules and Acts, the wildlife, was decreasing year after year, for their only refuges, the forests, were shrinking fast. The development of sophisticated guns and rifles, and the extensive use of war invention-the Jeep, played havoc with their survival. The Indian Board for Wildlife, the State Advisory Boards for Wildlife, were persistently agitated over this decimation of the wildlife and as a result of this the Government of India enacted Wildlife (Protection) Act, 72 (No. 53 of 1972) which was notified in the Gazette of India extra ordinary part II No. 61, Ministry of Law and Justice (Legislation Deptt.) dated 11th September 1972. This Act was made applicable in Rajasthan by Government of Rajasthan in September, 1973. Under this Act, the Government of Rajasthan notified, vide G.S.P. 117, Revenue (Gr. 8) Department dated June 6, 1977, the Wildlife (Protection) (Rajasthan) Rules, 1977. These Acts and Rules are quite comprehensive and provide for conservation and preservation of the wildlife resources including declaration of national parks, sanctuaries, closed areas, game reserves, procedure for obtaining licences for trading in wildlife products, permission for shooting, penalties for wildlife offences etc. The wildlife offences in sanctuaries, national parks and in respect of Schedule I animals cannot be compounded. These have to be challaned in the court of Law where minimum punishment is imprisonment for six months and a fine of Rs. 500/-.

The Chief Wildlife Warden (Forest Department), is the competent authority for servicing the provisions of the Act in the State.
WILDLIFE SANCTUARIES/CLOSED AREAS—The auction or exploitation of forest produce in National Parks and Sanctuaries is not allowed. Animals and plants are interdependent. Both are the products of their environment and conservation of total environment is the best safeguard against the extinction of species. The temptation to exploit the forest wealth to the fullest continues to constitute a deadly syndrome. The tiger, gravely threatened largest cat of the forests, demands the largest undisturbed habitat of all. 'In Situ' conservation of most animals depends upon the protection of their ecosystem. The denudation of vegetation and the destruction of prey species biomass has to be put an end to. The only future that these wild creatures and also the rarer plant species have, are in national parks, sanctuaries and reserves, which soon become the repositories of wild genetic resources. These provide natural gene-pools of the widest possible range of plants, animals and other organisms which may be essential for the well being of future generations.

The State has already declared 14 sanctuaries (59994.10 sq. kms) and 6 closed areas (1521.49 sq. km) covering an area of 7325.59 sq. km. of which about 4000 sq. kms. is non-forest area. It is the only State where two Project Tigers exist (Ranthambore and Sariska). The Bharatpur, Sariska and Ranthambore sanctuaries have come on international wildlife map. The detailed information on sanctuaries and closed areas is given in the Appendix VIII.

Some tribes indulge in killing of wildlife and pursue it as their main source of subsistence. The bigger cats like tiger and leopards have been killed not only for trophy but also for earning money through sale of their skins; raw skin of tiger was sold at Rs. 6,000/- to Rs. 8,000/- and that of leopard for Rs. 4,000/- to Rs. 5,000/-. The spotted deer, sambar, black bull, chinkara, chousingha, wild boars are either hunted for meat or hide and antlers or both. Thousands of desert fox, jungle cats, civets, jackals, hare, mongoose, squirrels are killed for fur. Monkeys were captured for export. Lust and demand from the trade for the skins of crocodiles, gavials, cobras, pythons, sand boa, snakes, monitor lizards etc. for shoes, purses, belts, suitcases etc. stimulated excessive slaughtering of these important components of the eco-system. The traditional snake-charmers keep the snakes and mongoose in captivity for long periods but reject them if they are unable to make a play. Such rejected captive snakes are generally killed. Medicinal value of snake vertebrae in curing hyperthyroidism and the oil from the fat bodies of monitor lizard and spiny tailed lizard is partly also responsible for their butchering. Varanus salvator is immediately killed on sight out of a superstitious belief that its presence brings lightening. Turtles and tortoise are captured alive and sent to
Calcutta etc. They are also roasted alive. Fishes are captured by dynamiting the waters and using fish poisons like fruits of vishtendu (*Diospyros cordifolia*). Birds like tilore are threatened due to its wanton killing by white collared poachers.

Various ways are adopted to capture or kill the innocent wild animals. Partridges, quails, hares are trapped in nets. Dogs are used to chase and pick them up. Insecticides like andrine is put in carcass to kill carnivores like tiger, leopard, hyaena, jackals etc. Explosives including lime covered by wheat flour is put as a bait in agricultural fields to kill wild boars who swallow these and die a painful death due to explosion. Iron and spring nooses ‘Funda’ are put on the track of tiger, panther etc. in which their legs and paws get entangled and then they are killed by the tribal people and poachers by spears, axes etc. or they die by starvation. Jackals, abundant only a decade ago, are now dwindling in numbers, too fast because of their being shot for meat and fur and shrinkage of habitat.

**MORTALITY AMONG WILDLIFE** — There always exists an equilibrium between the autotroph and heterotroph animals. The predator-prey relationship in nature keeps the population at optimum level.

This balance of nature, if not interfered with, allows the ecological niches of different animals to persist and mortality is not perceptible. Predatory animals do not kill prey animals for the sake of killing. However, sometimes epidemics among wild ungulates do take place. In 1965, Swine Fever took a heavy toll in wild boars in Bharatpur sanctuary while haemorrhagic septicemia among bluebills and sambhar in Sariska, through drought stricken migratory cattle in 1975, killed hundreds of them. Foot and mouth disease although not very common is sometimes seen in ungulates but generally it is not fatal. Frequent droughts often cause decimation of fish and river turtles. Floods in 1972 in Bharatpur wiped off the hog deer from Ghana, the only area where three of them were still surviving. Occasionally wind storms and hail storms also result in mortality of juvenile birds and chicks especially of water birds.

**ZOOLOGICAL MUSEUMS AND ZOOS** — There are no zoological museums worth the name. The colleges and Universities, however, have some miniature natural history museums to cater to the teaching needs of the students. Such museums exist in the University of Rajasthan at Jaipur, University at Jodhpur, Agriculture University at Udaipur, Government colleges at Ajmer, Kota etc. An Egyptian mummy is preserved in Albert Museum, Jaipur. Stuffed wild animals are kept by ex-rulers in their palaces at Kota, Udaipur, Bharatpur etc. but these are not open to public. A natural history museum is however, being developed at Jaipur Zoo.
There are 5 zoos in Rajasthan. They were originally managed by the former princely states at Jaipur, Jodhpur, Bikaner, Udaipur and Kota. These are now managed by the Forest Department. Modern concepts of zoo management are gradually being applied at Jaipur and Jodhpur zoos but the others need considerable improvement. The details of zoos are shown in the Chapter on Zoological gardens.

CLIMATE

Meteorological Sub-divisions *

The State is divided into two sub-divisions:

(a) WEST RAJASTHAN—consisting of the districts Barmer, Bikaner, Churu, Ganganagar, Jalore, Jaisalmer, Jodhpur, Nagaur and Pali.

(b) EAST RAJASTHAN—consisting of districts Ajmer, Alwar, Banswara, Bundi, Bharatpur, Bhiwara, Chittaurgarh, Dungarpur, Jaipur, Jhalawar, Jhunjhunun, Kota, Sikar, Sirohi, Sawai Madhopur, Tonk and Udaipur.

Areas in the State under each climatic pattern based on Koppen’s classification are as below:

West Rajasthan has a climate: Tropical desert, Arid; hot (BWh). The districts adjacent to Madhya Pradesh have a climate type marginally varying between the types Tropical Savanna - Hot; seasonally dry (AW) and Interior Mediterranean, Mild Winter; dry summer; hot summer (Csa). The remaining part of the State belongs to the climate type: Tropical Steppe, semi-arid; hot (Bsh).

Climatic Seasons

The year may be divided into four seasons. The winter season from November to March is followed by pre-monsoon season from April to June. The period from July to Middle or September constitutes the south-west monsoon season and the period from the latter half of September to October forms the post-monsoon period.

The period from November to March is generally very unpleasant due to biting cold over the entire State when a series of severe cold waves associated with western disturbances effect the entire State. In the summer months from April to June weather is very dry and uncomfortable. The plateau regions are, however, comparatively less uncomfortable in summer due to lower temperature. Weather tends to be oppressive during July due to high humidity and temperature. The rest period of the monsoon is fairly comfortable due to reduced day temperature, although humidity continues to be high.

* Source: Office of the Additional Director of Meteorology (Research), India Meteorological Department, Government of India, Pune.
Atmospheric Pressure and Winds

The seasonal variation of atmospheric pressure over the State takes place in a systematic manner with a maximum in the winter (January) and a minimum in the monsoon season (July). The pressure gradient over the State generally remains weak except during the late summer and monsoon season. During winter, the higher pressure is to the north. In April, the pressure decreases from west to east in Rajasthan. Accordingly the winds, which are light and mainly from north-west to north over northern parts of the State and north to north-east over southern parts in January, turn gradually anticlock-wise and are replaced by light northwesterly to westerly winds in April. With the advance of the summer, the pressure gradient increases and correspondingly the winds from south to south-west also strengthen reaching their maximum strength in July. In July, the pressure decreases from west-south-west to east/north-east over the State and correspondingly the winds become mainly from west to south-west. With the progress of the monsoon, winds become more and more westerly. October is the month of transition, with weakest pressure gradient. From October onwards, the change over of the pressure and wind pattern to the winter pattern commences. Appendix IX gives the monthly mean wind speed in km. p. hr. for the observatory stations in the two sub-divisions. In addition, predominant wind directions in the morning and evening have been included. For each sub-division, the mean monthly wind speed is given at the bottom of the respective sub-divisional table.

Temperature

Appendix X gives the mean daily maximum and minimum temperatures at the observatory stations and for each of the three sub-divisions.

Day temperatures are more or less uniform over the plains except during winter and monsoon when temperatures increase southwards and north-westwards respectively. In general the night minimum temperatures are lower in higher latitude except during the south-west monsoon when they are more or less uniform. Both day and night temperatures are lower over the plateau and at high level stations than over the plains.

May is the hottest month with the mean maximum temperature of 41°C in the plains, the plateau regions and elevated places recording 2°C to 5°C lower.

The highest temperature recorded at an individual station in the plains is 50.0°C at Ganganagar on June 14, 1934 which is about 8°C higher than the normal of the warmest month. Mount Abu, a hill station registered the highest maximum temperature of 38.7°C on 21st May, 1962 which was 7°C higher than the normal for the warmest month.
January is the coldest month when the mean minimum temperature for the State as a whole is 7.8°C, varying from 5°C in the north to 11°C in the south. During winter, much lower temperatures may be experienced in the wake of western disturbances. On such occasions minimum temperatures below the freezing point can be registered at a few stations in the northern parts of Rajasthan. The lowest temperature on record at an individual plain station was -5.9°C at Jaisalmer on 12 January 1967, while the hill station of Abu had recorded the lowest temperatures of -1.1°C on 31st January, 1929. These were 13.8°C and 10.4°C below the respective normals for the coldest months.

Both the maximum and minimum temperatures rise rapidly from February onwards till May. The increase in maximum temperature in the period from January to May ranges from 14°C to 19°C at individual stations as we proceed from south to north of the State. From the beginning of June to the end of July the maximum temperature falls by about 4°C to 7°C whereas the minimum temperature falls only by about 4°C from June to September. In September a slight rise in the maximum temperature is experienced due to increased insolation. The night temperatures start falling rapidly after September while the day temperature follow this trend after October and both attain lowest values by January. The fall in minimum temperature and maximum temperature is about 14°C - 20°C and 8°C - 17°C respectively during these periods. In both cases, the fall increases from southern parts of the State to the northern parts.

July and August have the smallest diurnal range of temperature (about 8°C - 9°C) in the State. The diurnal range increases rapidly after withdrawal of monsoon. During the period from November to May the diurnal range is of the order of 15°C to 18°C, being greatest in November.

Humidity

Appendix XI gives the mean relative humidity at 0830 and 1730 hrs I.S.T. for the individual stations in the two sub-divisions. The relative humidity is generally high during the period from June to September. It is about 46% in June rising to a little less than 70% during August in West Rajasthan and to about 76% in East Rajasthan. The diurnal variations in relative humidities are least during monsoon season, being higher in West Rajasthan. The relative humidity is least during summer afternoons when it becomes about 15 - 34% in West Rajasthan and 14 - 37% in East Rajasthan making the summer very dry and hot. The diurnal variation is highest during the winter period November to March.
Cloudiness

The period October to May, is cloudless or lightly clouded. The part of the period from January to March is more clouded. Afternoons are, however, comparatively more clouded than forenoons in this period. In April and May the sky remains cloudless or lightly clouded over West Rajasthan but clouding over East Rajasthan increases where about 1 to 1.5 Oktas of the sky remains covered during evenings. During monsoon season (July to September) skies are heavily clouded specially during July and August, when a little less than 5 Oktas of skies are covered with clouds. On an average in each of these two months, the sky remains overcast for more than 5 days per month and clear on 7 days in West Rajasthan; overcast for more than 11 days per month and clear on 1-2 days in East Rajasthan. During October, clouding decreases to a great extent over the entire State, more so in West Rajasthan.

Appendix XII and XII (a) give the mean monthly total cloud amount and mean number of days with clear and overcast skies at 0830 and 1730 hrs. I.S.T. respectively.

For general information, the mean hours of bright sun-shine for different months for some observatory stations in the State are indicated in Appendix XII (b)².

Rainfall

Appendix XIII gives district-wise and sub-divisional normals, monthly and annual rainfall and number of rainy days.

The total annual rainfall in the State varies from 14 Cms. over the extreme north-western parts to 95 Cms. over the south-eastern parts. The south-west monsoon is the principal rainy season when the State receives 75 to 85% of its annual rainfall. Rainfall in the winter season (November-March) is about 1 to 8% of the annual total, in the hot weather season (April-June) about 8 - 13% and in the post-monsoon season (mid-September - October) about 2 - 3%.

Southern/South-eastern districts adjacent to Madhya Pradesh constitute the area of maximum rainfall in the State. Pali and Jalore districts on the west of Aravali hills receive maximum amount of rain in West Rajasthan. In the north/north-west districts Bikaner, Ganganagar, Jaisalmer receive annual rainfall of 26.0 Cms, 25.4 Cms and 14.1 Cms respectively; annual rainfall over Jaisalmer district being the lowest. These districts and the adjoining area constitute the driest zone of the State. The mean annual rainfall in the east and west sub-divisions of Rajasthan is about 68.3 Cms. and 31.8 Cms. respectively with the districts of East Rajasthan receiving more rainfall than those of West Rajasthan.
The south-west monsoon sets in over the eastern parts of the State by about the last week of June and extends over the entire State by the first week of July. July and August are the rainiest months, each accounting individually to about 30% of the annual rainfall. In each of these months there are 2-7 rainy days (with daily rainfall of at least 2.5 mm.) in West Rajasthan and 7-14 rainy days in East Rajasthan.

The withdrawal of the southwest monsoon begins from the north-western parts of the State around 1st September and by 15th September monsoon withdraws from the entire State.

During winter (November - March) East and West Rajasthan receive 2.6 and 1.7 Cms of rainfall respectively, which although small in amount, is of great significance for agriculture. This rainfall occurs in association with western disturbances which move from west to east across northern parts of the country.

Appendix XIV gives the monthly and annual rainfall for various river catchments in the State.

Rainfall Variability

Co-efficient of variation of annual rainfall is more than 40% over some portions of eastern districts viz. Jaipur, Tonk, Bundi, Sawai Madhopur and Alwar and is more than 80% for western districts viz. Jaisalmer and Barmer. This varies from less than 40% over eastern districts viz. Udaipur, Bhilwara, Ajmer, Sikar, Jaipur to more than 80% over western districts of the state. As about 80% of the annual rainfall occurs during the monsoon months, variability in this season also resembles closely that for the annual rainfall.

Co-efficient of variation of rainfall is extremely high in winter, hot weather and post-monsoon seasons over the State.

Droughts and Excessive Rainfall

DROUGHTS—Meteorologically drought over an area or place may be defined as situation when annual rainfall over the area or place is less than 75% of the normal. It is further classified as 'moderate drought' if rainfall deficit is between 25 and 50% and 'severe drought' when it is more than 50%.

Areas where frequency of drought as defined above is 20% of the years examined are classified as 'drought areas' and areas having drought condition for more than 40% of the years under consideration represent 'Chronically drought affected areas'. The severity of drought not only depends upon the order of rainfall deficiency in a single year, but also upon continued occurrence of deficient rain in successive years, even
though the deficiency in each such successive year may not be as high as in a single year.

Drought conditions as they prevailed over Rajasthan during the 50 year period from 1901 to 1950 are described below. Probabilities of occurrence of low rainfall, based on co-efficient of variation of rainfall described in the previous section, are also mentioned.

(a) West Rajasthan

All the districts in this sub-division viz. Barmer (18) Bikaner (16), Jodhpur (14), Nagaur (13), Pali (14), Churu (11), Ganganagar (12), Jalore (17), Jaisalmer (16) became the victims of 'drought' for the number of years as indicated within the brackets against each district. Each and every district of the sub-division experienced the drought condition for more than 20% of the years under consideration and may, therefore, be classified as 'drought areas', while Barmer district very nearly satisfies the criterion for being classed as a 'Chronically drought affected area'.

Occurrences of occurrence of drought conditions in successive years, were very frequent in the case of this sub-division. The following table gives the years of successive drought (i.e. the district rainfall less than 75% of annual normal in each year) during the 50 year period 1901-50, and the districts in which it occurred.

Table (i)

<table>
<thead>
<tr>
<th>Years of successive drought and the affected districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901-02 Barmer, Bikaner, Jalore, Jodhpur, Nagaur, Pali</td>
</tr>
<tr>
<td>1904-05 Barmer, Jalore, Jaisalmer, Jodhpur, Pali</td>
</tr>
<tr>
<td>1905-06 Nagaur</td>
</tr>
<tr>
<td>1911-12 Bikaner</td>
</tr>
<tr>
<td>1920-21 Ganganagar</td>
</tr>
<tr>
<td>1920-22 Churu</td>
</tr>
<tr>
<td>1935-36 Jalore</td>
</tr>
<tr>
<td>1936-37 Barmer</td>
</tr>
<tr>
<td>1938-39 Bikaner, Churu, Ganganagar, Jaisalmer, Jodhpur, Nagaur</td>
</tr>
<tr>
<td>1939-40 Jalore</td>
</tr>
<tr>
<td>1946-48 Jaisalmer</td>
</tr>
<tr>
<td>1948-49 Jalore</td>
</tr>
</tbody>
</table>
The above table clearly brings out the area which was simultaneously affected by drought conditions. Further, rainfall of less than 50% of the annual normal representing severe drought conditions occurred in various districts as indicated in the following table, where the actual rainfall expressed as percentage of the normal rainfall is given in brackets against each district.

Table (ii)

(Years of severe droughts and the affected districts)

1901  Barmer (37), Jalor (26), Pali (49).
1904  Barmer (33), Jalor (48), Jaisalmer (37), Jodhpur (45).
1905  Barmer (49), Bikaner (34), Jaisalmer (48), Jodhpur (30), Nagaur (32), Pali (40).
1911  Bikaner (44), Jalor (32), Jaisalmer (41), Jodhpur (47), Nagaur (48), Pali (41).
1915  Jalor (36).
1918  Barmer (26), Bikaner (24), Churu (24), Ganganagar (43), Jalor (39), Jaisalmer (4), Jodhpur (16), Nagaur (19), Pali (23).
1920  Ganganagar (45).
1923  Jalor (47).
1925  Barmer (37), Jalor (46).
1928  Jaisalmer (46)
1930  Barmer (28).
1936  Jalor (47).
1938  Churu (44), Jodhpur (49).
1939  Jaisalmer (30), Nagaur (43).
1943  Ganganagar (45).
1946  Jaisalmer (45).

It can be seen that the lowest district rainfall, expressed as percentage of the annual normal was only 4 recorded in Jaisalmer district in 1918.

1901, 1905, 1911, 1915, 1918, 1939 were the years of widespread drought when the number of districts experiencing rainfall less than 75% of the annual normal was 7, 7, 9, 9, 9, 9, respectively out of the 9 districts in the sub-division. In the years 1911, 1915, 1918 and 1939 the whole sub-division was affected by drought condition.
The probability of occurrence of drought, moderate drought and severe drought for the whole sub-division is about 18% i.e. 9 times in 50 years, about 12% i.e. 6 times in 50 years, about 6% i.e. 3 times in 50 years respectively in the long run.

(b) East Rajasthan

All the districts in this sub-division viz. Ajmer (12), Alwar (13), Banswara (13), Bundi (14), Bharatpur (10), Bhilwara (20), Chittaurgarh (15), Dungarpur (17), Jaipur (10), Jhalawar (11), Jhunjhunun (10), Kota (13), Sikar (11), Sirohi (17), Sawai Madhopur (11), Tonk (11), Udaipur (12), experienced drought condition for the number of years as indicated within brackets against each district. Each and every district of the sub-division had drought condition for at least 20% of the years and may, therefore, be classified as drought areas, while Bhilwara district exactly satisfies the criterion for being classed as a 'Chronically drought affected area'.

Occasions of occurrence of drought conditions in successive years were very frequent in the case of this sub-division also. The following table gives the years of successive drought (i.e. the district rainfall less than 75% of annual normal in each years) during the 50 years period 1901 - 1950, and the districts in which it occurred.

Table (iii)

(Years of successive drought and the affected districts)

<table>
<thead>
<tr>
<th>Year</th>
<th>Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901-02</td>
<td>Bundi, Jhunjhunun, Sikar</td>
</tr>
<tr>
<td>1901-05</td>
<td>Bhilwara, Sirohi</td>
</tr>
<tr>
<td>1904-05</td>
<td>Banswara, Chittaurgarh, Dungarpur, Udaipur</td>
</tr>
<tr>
<td>1905-06</td>
<td>Tonk</td>
</tr>
<tr>
<td>1905-07</td>
<td>Sawai Madhopur</td>
</tr>
<tr>
<td>1911-12</td>
<td>Chittaurgarh</td>
</tr>
<tr>
<td>1918-19</td>
<td>Ajmer</td>
</tr>
<tr>
<td>1920-21</td>
<td>Jhalawar, Chittaurgarh</td>
</tr>
<tr>
<td>1928-29</td>
<td>Alwar</td>
</tr>
<tr>
<td>1929-30</td>
<td>Kota</td>
</tr>
<tr>
<td>1935-36</td>
<td>Dungarpur, Banswara, Bhilwara, Chittaurgarh</td>
</tr>
<tr>
<td>1937-39</td>
<td>Alwar</td>
</tr>
<tr>
<td>1938-39</td>
<td>Jaipur, Bhilwara, Bundi, Ajmer, Jhunjhunun, Sikar, Sawai Madhopur, Tonk</td>
</tr>
<tr>
<td>Year</td>
<td>Districts</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>1939-40</td>
<td>Sirohi</td>
</tr>
<tr>
<td>1947-48</td>
<td>Sirohi</td>
</tr>
<tr>
<td>1947-49</td>
<td>Dungarpur</td>
</tr>
<tr>
<td>1948-49</td>
<td>Udaipur</td>
</tr>
<tr>
<td>1948-50</td>
<td>Bhilwara</td>
</tr>
</tbody>
</table>

The table (iii) clearly brings out the area which was simultaneously affected by drought conditions. Further, rainfall of less than 50% of the annual normal representing severe drought conditions occurred in various districts as indicated in the following table, where the actual rainfall expressed as percentage of the normal rainfall is given in brackets against each district.

**Table (iv)**

(Year of severe drought and the affected districts)

<table>
<thead>
<tr>
<th>Year</th>
<th>Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>Jalor (26), Chittaurgarh (46), Dungarpur (48), Jhunjhunun (31), Sirohi (22), Udaipur (44)</td>
</tr>
<tr>
<td>1902</td>
<td>Sirohi (42).</td>
</tr>
<tr>
<td>1904</td>
<td>Sirohi (45), Jalor (48).</td>
</tr>
<tr>
<td>1905</td>
<td>Ajmer (35), Alwar (35), Bundi (41), Bharatpur (40), Bhilwara (26), Jaipur(24), Kota (33), Sikar (31), Sirohi (46), Sawai Madhopur (30), Jhunjhunun (30), Tonk (36)</td>
</tr>
<tr>
<td>1911</td>
<td>Bhilwara (33), Chittaurgarh (44), Dungarpur (40), Sirohi (27), Udaipur (44), Jalor (32).</td>
</tr>
<tr>
<td>1913</td>
<td>Sawai Madhopur (47), Tonk (46).</td>
</tr>
<tr>
<td>1915</td>
<td>Chittaurgarh (49), Jalor (36).</td>
</tr>
<tr>
<td>1918</td>
<td>Ajmer (27), Alwar (39), Banswara (44), Bundi (42), Bharatpur (38), Bhilwara (26), Dungarpur (46), Jaipur (41), Jhunjhunun (42), Kota (43), Jalor (39), Sikar (38), Sirohi (25), Sawai Madhopur (35), Tonk (31), Udaipur (45).</td>
</tr>
<tr>
<td>1923</td>
<td>Jalor (47).</td>
</tr>
<tr>
<td>1925</td>
<td>Chittaurgarh (49), Jalor (46).</td>
</tr>
<tr>
<td>1930</td>
<td>Bundi (49).</td>
</tr>
<tr>
<td>1932</td>
<td>Chittaurgarh (46).</td>
</tr>
<tr>
<td>1936</td>
<td>Banswara (47), Dungarpur (49), Sirohi (46), Udaipur (48), Jalor (47).</td>
</tr>
</tbody>
</table>
1938 Sikar (46).
1939 Bundi (45), Bhilwara (28), Jaipur (44), Tonk (49).
1941 Bundi (40), Bharatpur (45), Tonk (45), Bhilwara (49).

It can be seen that the lowest district rainfall expressed as percentage of the annual normal was only 22 recorded in Sirohi district in 1901.

1901 and 1939 were the years of widespread drought when the number of districts experiencing drought (rainfall of less than 75% of the annual normal) was 16 and 14 respectively out of 17 districts in the sub-division and in the years 1905 and 1915 the whole sub-division was affected by drought.

The probability of occurrence of drought, moderate drought and severe drought for the whole sub-division is 14% i.e. 7 times in 50 years, 10% i.e. once in 10 years and 4% i.e. once in 25 years respectively in the long run.

During the period 1901-50, there was no drought anywhere in the State in the 12 years viz. 1908-10, 14, 16-17, 26, 31, 33-34, 44-45. In the 3 years viz. 1919, 24, 27 only one district experienced the drought condition. 1901, 1905 and 1911 were the years of widespread drought in the State when the number of districts experiencing drought was 23, 24, 20 respectively out of 26 districts of the State while the entire State was caught in the severity of drought in the 2 years viz. 1915 and 1918. It is remarkable that during the above 50 years period Bharatpur district of East Rajasthan has never fallen in the grip of drought in any two consecutive years. Occasions of occurrence of drought conditions in successive years were more frequent in East Rajasthan than in West Rajasthan and hence, the severity of drought is more in eastern districts. From what has been stated, it is seen that the whole State is extremely drought prone.


EXCESSIVE RAINFALL — It may generally be said that rainfall, sufficiently in excess of the normal, is a predominant factor for occurrence of floods, particularly in high rainfall regions. Even with co-efficient of variation of rainfall of 20% or less these regions are prone to frequent floods. For the purpose of the present description, annual rainfall of 125% or more of the normal is considered as excessive rain.
(a) **WEST RAJASTHAN** — The following table (v) gives the district-wise years of excessive rainfall (i.e. annual rainfall of 125% or more of normal annual rainfall) in increasing order of number of such years with highest percentage of annual rainfall and the year in which it occurred:

### Table (v)

District-wise years of excessive rainfall with highest percentage of annual rainfall and the year in which it occurred.

<table>
<thead>
<tr>
<th>District</th>
<th>Years</th>
<th>Percentage</th>
</tr>
</thead>
</table>

From the above table it may be seen that during the period under consideration, the districts of the sub-division recorded excessive rainfall in 32 years the maximum amount being 351% of normal annual rainfall in year 1917 for the district Jaisalmer. Churu, Barmer and Nagaur had 8, 11, 12 years and other districts had 13 years of such rainfall. In 1917, all the districts of the sub-division except Jalore received maximum amount of rainfall and hence, the sub-division registered maximum amount of rainfall in the above year. Successive years of excessive rainfall are shown against each district.

<table>
<thead>
<tr>
<th>District</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barmer</td>
<td>1907-09, 1916-17, 1926-27.</td>
</tr>
<tr>
<td>Bikaner</td>
<td>1907-09, 1916-17, 1936-37, 1941-42.</td>
</tr>
<tr>
<td>Churu</td>
<td>1908-09, 1944-45.</td>
</tr>
</tbody>
</table>
Ganganagar 1908-09, 194-45.
Jaisalmer 1908-09, 1916-17.
Jodhpur 1908-09, 1916-17, 1933-34, 1943-45.
Nagaur 1908-09, 1916-17, 1942-43.
Pali 1907-08, 1926-27, 1933-34, 1943-44.

Each of the districts Barmer, Bikaner, Jalor and Jodhpur experienced excessive rainfall in 3 consecutive years only once and also the first three districts mentioned above received such rainfall in the same three consecutive years, viz. 1907-09. The heaviest one day rainfall on record at any station in the sub-division was 511.8 mm at Sanchor (Jalor district) on 16th September, 1893.

So far as vagaries of rainfall are concerned, the periods 1901-05, and 1906-10 stand unique as both fairly deficient and excessive rainfall occurred in these 5 year periods alternately. The period 1901-05 has become marked for 4 years of drought out of which one year was of severe drought in the sub-division, while the period 1906-10 had 3 consecutive years of excessive rainfall and not registered any drought condition in the sub-division. The probability of occurrence of heavy rain of 125% or more of the normal over the sub-division is about 18% i.e. 9 times in 50 years in the long run.

EAST RAJASTHAN — The following table (vi) gives the district-wise years of excessive rainfall in increasing order of number of such years with highest percentage of annual rainfall and the year in which it occurred:

Table (vi)

<table>
<thead>
<tr>
<th>District</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhilwara</td>
<td>1917, 1942, 1944-214% in 1917.</td>
</tr>
</tbody>
</table>

From the above table it may be seen that during the period under consideration, the excessive rainfall occurred in the sub-division in 32 years, the maximum and minimum amount being 232% and 157% of normal annual rainfall in the-years 1917 and 1942 for the districts Ajmer and Jhalawar respectively. Excessive rain occurred in the districts of Bhilwara (3), Chittaurgarh (6), Banswara (7), Jhunjhunu (8), Udaipur (8), Bundi (10), Dungarpur (10), Jaipur (10), Sikar (10), Sawai Madhopur (10), Alwar (11), Bharatpur (11), Kota (12), Sirohi (12), Tonk (12), Ajmer (13), Jhalawar (14), in 3-14 years as shown within the brackets against each. In 1917, 11 districts of the sub-division received maximum amount of rainfall. Successive years of excessive rainfall are shown against each district.

Ajmer 1908-09, 1916-17, 1926-27, 1933-34, 1942-44.
Alwar 1908-09.
Bundi 1916-17, 1945-47.
Bharatpur 1916-17.
Chittaurgarh 1916-17, 1928-29.
Jaipur 1916-17, 1933-34.
Jhunjhunun 1908-09, 1916-17.
Kota 1916-17, 1923-24, 1933-34, 1945-46.
Sikar 1908-09, 1916-17, 1933-34.
Sirohi 1907-09, 1926-27, 1943-45.
Sawai Madhopur 1933-34.
Udaipur 1916-17, 1926-27.

Only Jhalawar district experienced excessive rainfall in 7 consecutive years only once i.e. in the years 1942-48. Each of the districts Ajmer, Bundi, Tonk registered such rainfall in 3 consecutive years only once while Sirohi had such rainfall in 3 consecutive years twice. Eleven districts of this sub-division registered excessive rainfall in the 2 consecutive years 1916-17, Banswara, Bhilwara and Dungarpur had no consecutive years of excessive rain in the 50 year period. The heaviest one day rainfall on record at any station in the sub-division was 558.8 mm. at Banswara on 23 July, 1959.

The periods 1906-10, 1911-15 are worth mentioning as there were no drought and excessive rainfall in these periods respectively. During the period 1926-50 there was only one drought year namely 1939 in this sub-division. The probability of occurrence of heavy rain of 125% or more of the normal over the sub-division is 20% i.e. once in every 5 years in the long run.

Every drought year for East Rajasthan was also a drought year for West Rajasthan and from probability figures of drought and excessive rainfall, it can be concluded that the frequency of occurrence of drought is more in West Rajasthan although severity of drought is more in East Rajasthan.

The following table* gives the data of average rainfall in Rajasthan from 1952 to 1992:

<table>
<thead>
<tr>
<th>Year</th>
<th>Rainfall</th>
<th>Year</th>
<th>Rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1952</td>
<td>57.22</td>
<td>1973</td>
<td>77.93</td>
</tr>
<tr>
<td>1953</td>
<td>47.72</td>
<td>1974</td>
<td>48.78</td>
</tr>
<tr>
<td>1954</td>
<td>46.53</td>
<td>1975</td>
<td>81.03</td>
</tr>
</tbody>
</table>

Cyclonic Storms and Depressions

The cyclonic storms and depressions which mostly affect India originate and/or intensify over the Bay of Bengal, mostly during May to November or December. Some of them originating over the Arabian Sea also affect Konkan, Gujarat, Saurashtra and Kutch and north-west India during the above period. They usually travel west to northwest and cross the coast. In general, storms and depressions weaken on entering land. Hence Rajasthan situated far inland, does not experience the full fury of the severe storms/depressions like the coastal regions. During the course of their movement the disturbances sometimes turn or recurve towards north or northeast. This point of turning progressively shifts westwards till September. For example, the disturbances in May recurve while still out in the Bay of Bengal. As such, the few of them which cross the coast and travel inland weaken far away from the State and cannot affect it. During the period 1891-1960, only one such storm originating over the Arabian Sea affected West Rajasthan in May 1902. The disturbances during the period June to September form over the head Bay of Bengal and travelling westwards pass across the State of Madhya Pradesh. During this period sometimes they move west/northwestwards as far as Rajasthan. With the advance of the above period, the tracks of the Bay storms and depressions progressively shift south. In association with these systems, heavy to very heavy rain occurs over the area affected by them.
The track of the Bay cyclones is even more southerly in October and
November and these have no influence on Rajasthan weather. During the
period 1891-1970, only two storms, one in 1917 and the other in 1956
originating over the Arabian Sea affected the weather of Rajasthan. The Bay
cyclonic storms/ depressions which reach the State generally become
considerably weak due to long land travel. Maximum number of
storms/depressions from the Bay of Bengal affect the State in the month
August/September.

The Appendix XV gives the total number of depressions/storms which
affected each of the two sub-divisions during the 80 years period ending
1970. For this purpose, depressions affecting more than one sub-division
have been counted separately for each sub-division. The last column
gives the total number of depressions/storms which affected the State as a
whole during this period. For this purpose, each depression is counted as
one even though it may have affected more than one sub-division.

OTHER WEATHER PHENOMENA

Thunderstorms and Duststorms

Convective activity is essential for the occurrence of thunderstorms and
dust-storms. With the advance of summer thunder activity becomes
pronounced due to ground heating. When the moisture is insufficient in the
atmosphere, dry thunderstorms or dust-storms occur. The maximum number
of thunder storms occur, with the approach of the monsoon current, while
dust-storms are mainly confined to the summer months of March to June.
Pre-monsoon and monsoon thunderstorms are sometimes severe and
accompanied by hail. Squall is uncommon in the State. The average number
of days of thunderstorms during the monsoon season is 6.4 in West Rajasthan
and 14 in East Rajasthan, the maximum being in July in both the sub-divisions.
The average annual numbers of thunderstorms in the East and West
sub-division are 28.3 and 14.0, showing thereby that eastern parts of the
State encounter much more thunder activities than the western parts of the
State. In the winter months, the State experiences thunderstorms sometimes
accompanied by hail in association with western disturbances. Thunder activity
is minimum in the months of November and December in both the
sub-divisions.

Fog

Hill fog is frequent during the rainy months of July to September, when
air is almost saturated and is easily cooled below the dew point while rising
over high elevations. During July - August hill fog occurs for about 18 days
in each month. Conditions like light to calm wind, clear skies etc. which
favour occurrence of radiation fog, exist from after the withdrawal of the
monsoon till February. But, due to lack of sufficient moisture, fog occurs
only occasionally, the maximum frequency of occurrence being only about
1 and 0.5 in January in West and East Rajasthan respectively.
**APPENDIX - I**

**DISTRICTWISE NUMBER OF ENERGISED WELLS IN RAJASTHAN**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ajmer</td>
<td>66,848</td>
<td>67,594</td>
<td>68,074</td>
<td>68,941</td>
<td>46,664</td>
<td>12,863</td>
</tr>
<tr>
<td>2.</td>
<td>Alwar</td>
<td>44,763</td>
<td>47,565</td>
<td>49,500</td>
<td>50,110</td>
<td>41,913</td>
<td>32,739</td>
</tr>
<tr>
<td>3.</td>
<td>Banswara</td>
<td>17,529</td>
<td>17,752</td>
<td>17,841</td>
<td>18,102</td>
<td>8,669</td>
<td>3,087</td>
</tr>
<tr>
<td>4.</td>
<td>Barmer</td>
<td>7,413</td>
<td>7,674</td>
<td>7,864</td>
<td>8,159</td>
<td>6,289</td>
<td>5,327</td>
</tr>
<tr>
<td>5.</td>
<td>Bharatpur</td>
<td>44,931</td>
<td>46,604</td>
<td>39,158</td>
<td>48,449</td>
<td>33,119</td>
<td>9,855</td>
</tr>
<tr>
<td>6.</td>
<td>Bhilwara</td>
<td>1,00,258</td>
<td>1,01,011</td>
<td>1,03,099</td>
<td>1,07,322</td>
<td>83,465</td>
<td>17,600</td>
</tr>
<tr>
<td>7.</td>
<td>Bikaner</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>385</td>
</tr>
<tr>
<td>8.</td>
<td>Bundi</td>
<td>19,358</td>
<td>19,404</td>
<td>20,514</td>
<td>20,965</td>
<td>16,500</td>
<td>7,349</td>
</tr>
<tr>
<td>9.</td>
<td>Chittaurgarh</td>
<td>63,212</td>
<td>64,309</td>
<td>65,259</td>
<td>66,500</td>
<td>64,058</td>
<td>35,351</td>
</tr>
<tr>
<td>10.</td>
<td>Churu</td>
<td>557</td>
<td>580</td>
<td>581</td>
<td>1,941</td>
<td>485</td>
<td>1,734</td>
</tr>
<tr>
<td>11.</td>
<td>Dungarpur</td>
<td>16,755</td>
<td>16,986</td>
<td>17,077</td>
<td>17,299</td>
<td>8,345</td>
<td>4,484</td>
</tr>
<tr>
<td>12.</td>
<td>Ganganagar</td>
<td>868</td>
<td>897</td>
<td>927</td>
<td>927</td>
<td>789</td>
<td>7,744</td>
</tr>
<tr>
<td>13.</td>
<td>Jaipur</td>
<td>1,15,364</td>
<td>1,21,429</td>
<td>1,19,319</td>
<td>1,23,976</td>
<td>98,061</td>
<td>66,508</td>
</tr>
<tr>
<td>14.</td>
<td>Jaisalmer</td>
<td>878</td>
<td>1,116</td>
<td>1,836</td>
<td>1,928</td>
<td>1,484</td>
<td>194</td>
</tr>
<tr>
<td>15.</td>
<td>Jalore</td>
<td>21,368</td>
<td>22,341</td>
<td>22,791</td>
<td>23,311</td>
<td>17,692</td>
<td>17,723</td>
</tr>
<tr>
<td>17.</td>
<td>Jhunjhunun</td>
<td>13,978</td>
<td>14,913</td>
<td>15,250</td>
<td>25,938</td>
<td>10,079</td>
<td>21,725</td>
</tr>
<tr>
<td>18.</td>
<td>Jodhpur</td>
<td>10,772</td>
<td>11,089</td>
<td>10,780</td>
<td>11,019</td>
<td>9,598</td>
<td>11,875</td>
</tr>
<tr>
<td>19.</td>
<td>Kota</td>
<td>31,342</td>
<td>31,844</td>
<td>32,698</td>
<td>32,783</td>
<td>24,501</td>
<td>8,583</td>
</tr>
<tr>
<td>20.</td>
<td>Nagaur</td>
<td>20,612</td>
<td>19,647</td>
<td>19,956</td>
<td>20,449</td>
<td>12,272</td>
<td>23,070</td>
</tr>
<tr>
<td>21.</td>
<td>Pali</td>
<td>37,335</td>
<td>38,264</td>
<td>37,790</td>
<td>38,670</td>
<td>29,565</td>
<td>18,200</td>
</tr>
<tr>
<td>22.</td>
<td>S.Madhupur</td>
<td>39,086</td>
<td>41,581</td>
<td>42,667</td>
<td>44,242</td>
<td>39,356</td>
<td>17,033</td>
</tr>
<tr>
<td>23.</td>
<td>Sikar</td>
<td>23,406</td>
<td>27,372</td>
<td>27,776</td>
<td>27,162</td>
<td>20,496</td>
<td>31,826</td>
</tr>
<tr>
<td>24.</td>
<td>Sirohi</td>
<td>10,945</td>
<td>11,071</td>
<td>11,262</td>
<td>NA</td>
<td>10,250</td>
<td>7,985</td>
</tr>
<tr>
<td>25.</td>
<td>Tonk</td>
<td>37,821</td>
<td>37,710</td>
<td>52,111</td>
<td>32,753</td>
<td>32,197</td>
<td>6,425</td>
</tr>
<tr>
<td>26.</td>
<td>Udaipur</td>
<td>1,07,386</td>
<td>1,09,196</td>
<td>1,12,139</td>
<td>1,13,959</td>
<td>85,897</td>
<td>14,979</td>
</tr>
<tr>
<td>27.</td>
<td>Baran</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5,407</td>
</tr>
<tr>
<td>28.</td>
<td>Dhaulpur</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1,618</td>
</tr>
<tr>
<td>29.</td>
<td>Dausa</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>13,869</td>
</tr>
<tr>
<td>30.</td>
<td>Raj Samand</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9,154</td>
</tr>
</tbody>
</table>

**Total** | 8,92,885 | 9,20,188 | 9,39,068 | 9,50,095 | 7,35,557 | 4,30,123

**Sources:**
3. N.A. = Not Available
4. * Provisional (Source: Office of the Deputy Director (Statistics), PES Section, Rajasthan State Electricity Board, Jaipur.*)
### APPENDIX - II

**PRODUCTION OF MAJOR MINERALS (1974 to 1978)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Copper ore</td>
<td>'000 tonne</td>
<td>565.2</td>
<td>736.6</td>
<td>1112.4</td>
<td>1213.4</td>
<td>1039.2</td>
</tr>
<tr>
<td>2</td>
<td>Iron ore</td>
<td></td>
<td>2.4</td>
<td>2.1</td>
<td>3.5</td>
<td>3.2</td>
<td>12.4</td>
</tr>
<tr>
<td>3</td>
<td>Lead-Zinc &amp; Silver</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(A) Run of mine ore</td>
<td>&quot;</td>
<td>564.5</td>
<td>686.3</td>
<td>808.0</td>
<td>932.2</td>
<td>1067.8</td>
</tr>
<tr>
<td></td>
<td>(B) Lead conc</td>
<td>&quot;</td>
<td>11.0</td>
<td>13.8</td>
<td>13.9</td>
<td>14.1</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>(C) Zinc conc</td>
<td>&quot;</td>
<td>29.1</td>
<td>38.3</td>
<td>45.0</td>
<td>46.0</td>
<td>64.3</td>
</tr>
<tr>
<td></td>
<td>(D) Silver</td>
<td>Kg.</td>
<td>4334.0</td>
<td>2358.0</td>
<td>2321.0</td>
<td>12006.0</td>
<td>9655.0</td>
</tr>
<tr>
<td>4</td>
<td>Manganese ore</td>
<td>'000 tonne</td>
<td>-</td>
<td>-</td>
<td>0.025</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Tungsten conc</td>
<td>tonnes</td>
<td>17.0</td>
<td>24.9</td>
<td>36.6</td>
<td>38.5</td>
<td>35.7</td>
</tr>
</tbody>
</table>

**NON-METALLIC MINERALS**

<p>| 6     | Agate                 | Tonnes   | 152   | 1070  | -     | -     | -     |
| 7     | Asbestos              | '000 tonnes| 18.0  | 15.5  | 20.0  | 12.5  | 19.4  |
| 8     | Ball clay             | &quot;        | 0.023 | 2.9   | 1.54  | 10.2  | 27.4  |
| 9     | Barytes               | &quot;        | 2.2   | 5.5   | 4.2   | 3.0   | 3.3   |
| 10    | Calcite               | &quot;        | 18.5  | 7.7   | 16.2  | 22.9  | 26.5  |
| 11    | China clay            | '000 tonnes| 88.6  | 65.8  | 88.1  | 84.5  | 89.6  |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>Corundum</td>
<td>tonnes</td>
<td>0.5</td>
<td>-</td>
<td>-</td>
<td>2.6</td>
<td>315.0</td>
</tr>
<tr>
<td>13.</td>
<td>Dolomite</td>
<td>'000 tonnes</td>
<td>22.4</td>
<td>13.3</td>
<td>21.6</td>
<td>32.9</td>
<td>20.3</td>
</tr>
<tr>
<td>14.</td>
<td>Emerald (Crude)</td>
<td>Kg.</td>
<td>0.5</td>
<td>7.6</td>
<td>0.165</td>
<td>0.110</td>
<td>7.2</td>
</tr>
<tr>
<td>15.</td>
<td>Felspar</td>
<td>'000 tonnes</td>
<td>41.3</td>
<td>29.4</td>
<td>36.2</td>
<td>37.9</td>
<td>34.8</td>
</tr>
<tr>
<td>16.</td>
<td>Fireclay</td>
<td>Kg.</td>
<td>31.3</td>
<td>18.0</td>
<td>15.8</td>
<td>26.7</td>
<td>31.1</td>
</tr>
<tr>
<td>17.</td>
<td>Fluorite</td>
<td>Kg.</td>
<td>4.1</td>
<td>3.1</td>
<td>3.4</td>
<td>3.3</td>
<td>3.1</td>
</tr>
<tr>
<td>18.</td>
<td>(i) Granet (Abrasive)</td>
<td>tonnes</td>
<td>1.6</td>
<td>1.3</td>
<td>2.1</td>
<td>0.7</td>
<td>1.9</td>
</tr>
<tr>
<td>(ii) Garnet (Gem)</td>
<td>tonnes</td>
<td>0.6</td>
<td>0.4</td>
<td>3.8</td>
<td>7.0</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Graphite</td>
<td>'000 tonnes</td>
<td>4.9</td>
<td>3.6</td>
<td>13.7</td>
<td>12.6</td>
<td>13.5</td>
</tr>
<tr>
<td>20.</td>
<td>Gypsum</td>
<td>'000 tonne</td>
<td>969.4</td>
<td>733.3</td>
<td>624.2</td>
<td>683.1</td>
<td>786.3</td>
</tr>
<tr>
<td>21.</td>
<td>Jaspar</td>
<td>Kg.</td>
<td>1.6</td>
<td>1.5</td>
<td>1.5</td>
<td>1.4</td>
<td>1.1</td>
</tr>
<tr>
<td>22.</td>
<td>Kyanite</td>
<td>tonne</td>
<td>-</td>
<td>55.7</td>
<td>61.8</td>
<td>34.0</td>
<td>-</td>
</tr>
<tr>
<td>23.</td>
<td>Laterite</td>
<td>Kg.</td>
<td>-</td>
<td>-</td>
<td>1140.7</td>
<td>13394.1</td>
<td>16600.0</td>
</tr>
<tr>
<td>24.</td>
<td>Limestone</td>
<td>'000 tonne</td>
<td>1948.4</td>
<td>2148.3</td>
<td>2261.3</td>
<td>2985.7</td>
<td>2839.6</td>
</tr>
<tr>
<td>25.</td>
<td>Magnesite</td>
<td>tonne</td>
<td>-</td>
<td>97.6</td>
<td>0.018</td>
<td>514.5</td>
<td>1300.0</td>
</tr>
<tr>
<td>26.</td>
<td>Mica</td>
<td>'000 tonne</td>
<td>1.8</td>
<td>1.6</td>
<td>0.77</td>
<td>0.7</td>
<td>0.717</td>
</tr>
<tr>
<td>27.</td>
<td>Ochres</td>
<td>Kg.</td>
<td>34.6</td>
<td>51.2</td>
<td>52.4</td>
<td>35.7</td>
<td>37.3</td>
</tr>
<tr>
<td>28.</td>
<td>Pyrophyllite</td>
<td>Kg.</td>
<td>5.8</td>
<td>5.0</td>
<td>3.9</td>
<td>4.9</td>
<td>4.2</td>
</tr>
<tr>
<td>29.</td>
<td>Quartz</td>
<td>Kg.</td>
<td>30.9</td>
<td>32.7</td>
<td>42.2</td>
<td>40.8</td>
<td>29.5</td>
</tr>
<tr>
<td>30.</td>
<td>Rock phosphate</td>
<td>Kg.</td>
<td>416.4</td>
<td>413.6</td>
<td>581.3</td>
<td>627.9</td>
<td>639.9</td>
</tr>
<tr>
<td></td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
<td>5.</td>
<td>6.</td>
<td>7.</td>
</tr>
<tr>
<td>---</td>
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<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>31.</td>
<td>Sillimanite</td>
<td>tonne</td>
<td>-</td>
<td>36.0</td>
<td>38.5</td>
<td>28.7</td>
<td>81.0</td>
</tr>
<tr>
<td>32.</td>
<td>Selenite</td>
<td>'000 tonne</td>
<td>16.5</td>
<td>8.2</td>
<td>6.1</td>
<td>6.9</td>
<td>5.8</td>
</tr>
<tr>
<td>33.</td>
<td>Silica sand</td>
<td>''</td>
<td>73.2</td>
<td>74.5</td>
<td>78.4</td>
<td>96.8</td>
<td>99.7</td>
</tr>
<tr>
<td>34.</td>
<td>Siliceous Earrth</td>
<td>tonne</td>
<td>30.0</td>
<td>25.0</td>
<td>50.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>35.</td>
<td>Soapstone</td>
<td>'000 tonne</td>
<td>256.5</td>
<td>184.2</td>
<td>207.8</td>
<td>211.6</td>
<td>244.6</td>
</tr>
<tr>
<td>36.</td>
<td>Slate stone</td>
<td>tonne</td>
<td>115.8</td>
<td>63.3</td>
<td>68.4</td>
<td>101.6</td>
<td>73.9</td>
</tr>
<tr>
<td>37.</td>
<td>Sulpher ore (Pyrite)</td>
<td>''</td>
<td>-</td>
<td>1700.00</td>
<td>-</td>
<td>-</td>
<td>6.7</td>
</tr>
<tr>
<td>38.</td>
<td>Tourmaline</td>
<td>''</td>
<td>-</td>
<td>-</td>
<td>118.3</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>39.</td>
<td>Vermiculite</td>
<td>''</td>
<td>109.0</td>
<td>284.8</td>
<td>647.5</td>
<td>419.5</td>
<td>362.2</td>
</tr>
<tr>
<td>40.</td>
<td>Wollastonite</td>
<td>''</td>
<td>947.2</td>
<td>1101.7</td>
<td>4540.6</td>
<td>3300.0</td>
<td>1900.0</td>
</tr>
</tbody>
</table>
APPENDIX - III

LIST OF RARE & ENDANGERED PLANTS OF RAJASTHAN

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Latin Name</th>
<th>Local Name</th>
<th>Family</th>
<th>Habit</th>
<th>Tropical locality</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td><em>Anogessus sericea</em> Brandis var nummularia King ex Duthie (= <em>A. rotundifolia</em> Blatt. &amp; Hallb.) indok</td>
<td>Combretaceae</td>
<td>Tree</td>
<td>Ajmer, Jodhpur</td>
<td>Udaipur</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td><em>Anticharis glandulosa</em> Asch, var caerulea Blatt. &amp; Hallb. ex Sant. --</td>
<td>Scrophulariaceae</td>
<td>Herb</td>
<td>Jaisalmer</td>
<td></td>
<td>Found on rocks.</td>
</tr>
<tr>
<td>4.</td>
<td><em>Bouchea marrubifolia</em> Schauer (= <em>Pleurostigma subrotundum</em> Hochst. nom nud) bai</td>
<td>Verbenaceae</td>
<td>Herb</td>
<td>N.W. Rajasthan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td><em>Commiphora wightii</em> (Arnott) gugul Bhandari (= <em>C. mukul</em> Engl. and = <em>Balsamodendron mukul</em> Hook. ex Stock)</td>
<td>Burseraceae</td>
<td>Shrub</td>
<td>Aravalis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td><em>Convolvulus scindicus</em> Stock Kaland</td>
<td>Convolulaceae</td>
<td>Herb</td>
<td>N.W. Rajasthan, Barmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7.</td>
<td><em>Crypsis schoenoides</em> Lamk.</td>
<td>Gramineae</td>
<td>Herb</td>
<td>Bap, Jaisalmer (grass)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td><em>Eriolaena hookeriana</em> W. &amp; A. bhoti dhaman Sterculiaceae</td>
<td>Tree Hills</td>
<td></td>
<td></td>
<td>Very rare</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td><em>Grewia damine</em> Gaertn (=<em>G. salvifolia</em> Weyne ex Roth non Linn. f.) Phalsa Tiliaceae</td>
<td>Shrub Aravali hills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td><em>Monsonia heliotropoides</em> Boiss</td>
<td>Geraniaceae</td>
<td>Herb Jaisalmer</td>
<td></td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td><em>M. magnifolia</em> Blatt. &amp; Hallb. - do - Sterculiaceae</td>
<td>Shrub N.W. Rajasthan</td>
<td></td>
<td>On rocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td><em>Moringa concanensis</em> Nimmo Sarguro Moringaceae</td>
<td>Tree Aravali, rocks</td>
<td></td>
<td>Getting very rare</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Species</td>
<td>Family</td>
<td>Type</td>
<td>Location</td>
<td>Habitat</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------</td>
<td>-----------------</td>
<td>---------</td>
<td>-------------------</td>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td><em>Nonnae pilla</em> Lamk. ex D.C.</td>
<td>Roraginaceae</td>
<td>Herb</td>
<td>N.W. Rajasthan</td>
<td>Wheat fields</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td><em>Pulicaria rajputanae</em> Blatt. &amp; Hallb.</td>
<td>Compositae</td>
<td>Herb</td>
<td>- do -</td>
<td>Dry, Salty bed.</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td><em>Rhynchelytrum villosum</em> (Parl) Chiov.</td>
<td>Greminaeae</td>
<td>Herb</td>
<td>Sardar Sammand</td>
<td>Rocky gravel</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(grass)</td>
<td></td>
<td>(Pali)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td><em>Rose hyelii</em> Lindl.</td>
<td>Rosaceae</td>
<td>Shrub</td>
<td>Mt. Abu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td><em>Seetzenia orientalis</em> Decne</td>
<td>Zygophyllaceae</td>
<td>Herb</td>
<td>Jaisalmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td><em>Talinum portulacifolium</em> Aschers ex Schweinf</td>
<td>Portulacaceae</td>
<td>Shrub</td>
<td>Rocks in Jodhpur, Barmer</td>
<td>Very rare</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td><em>T. avermiera cuneifolia</em> Arn.</td>
<td>Papilionaceae</td>
<td>Under-shrub</td>
<td>Pali</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td><em>Teconella undulata</em> (Sm) Seem.</td>
<td>Bignoniaceae</td>
<td>Tree</td>
<td>Sandy soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td><em>Tribulus rajasthanensis</em> Bhandari et Sharma</td>
<td>Zygophyllaceae</td>
<td>Herb</td>
<td>Jodhpur, Jaisalmer &amp; Ajmer</td>
<td>Sand stone rocks preferred</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td><em>Tripogon jacquemontii</em> Stapf</td>
<td>Gramineae</td>
<td>Herb</td>
<td>N.W. Rajasthan</td>
<td>Very rare</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Grass)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td><em>T. roxburghianus</em> Bhide</td>
<td>paneer</td>
<td>Under-shrub</td>
<td>N.W. Rajasthan</td>
<td>Grassly hill tops.</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td><em>Withania coagulans</em> Dunal</td>
<td>Solaniaceae</td>
<td>Shrub</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX - IV

LIST OF MAMMALS FOUND IN THE STATE

INSECTIVORA
1. Long-eared Hedge-hog, Jhau chuha - Hemiechinus auritus collaris, Gray
2. Indian Hedge-hog - Paraechinus micropus micropus Blyth
3. Brown Collared Pale Hedgehog - P. intermedius Biswas & Ghose
4. House Shrew, Chhachhunder - Suncus murinus sindensis (Anderson)

CHIROPTERA (BATS)
5. Indian Flying fox - Pteropus giganteus giganteus Brunich
6. Fulvous Fruit Bat - Rousettus leschenaultii Desmarest
7. Arabian Fruit Bat - R. arubicus Anderson and de Winton
8. Rat-tailed Bat - Rhinopoma microphyllum kinneari Wroughton
9. Lesser Rat-tailed Bat - R. hardwickei hardwickei Gray
10. Kutch Tomb Bat - Taphozous kakhensis kakhensis Dobson
11. Tomb Bat - T. perforatus Geoffroy
12. Indian False Vampire, Bagad - Megaderma lyra lyra Geoffroy
13. Little Indian Horse-shoe Bat - Rhinolophus lepidus lepidus Blyth
14. Kachcha Wrinkel-lipped Bat - Tadarida aegyptica Geoffrey
15. Mouse-eared Bat or Common European Bat - Myotis blythii (Tomes)
16. Serotin - Eptesicus serotinus pachyomus (Tomes)
17. Indian Pygmy Pipistrelle - Pipistrellus minus glaucillus Wroughton
18. Indian Pipistrelle - P. coromandia Gray
19. Dormar's Bat - P. dormeri caurinus (Thomas)
20. Greater Yellow Bat - Scotophilus heathi belangeri Geoffroy
21. Desert Scotophil - S. heathi Horsfield
22. Leafnosed Bat - Hipposiderus fulvus pallidus Anderson

PRIMATES
23. Red faced or Rhesus macaque, Bandar - Macaca mulatta mulatta Zimmerman
24. Langur or Hanuman Monkey - Presbytis entellus entellus Dufresne
PHOLIDOTA
25. Indian Pangolin, Selusanp - *Manis crassicaudata* Gray

CARNIVORA
26. Small Indian Wolf, Bhedia - *Canis lupus pallipes* Sykes
27. Asiatic Jackal, Gidad or Siyar - *C. aureus aureus* Linn.
28. Desert or Common Red Fox, Lomdi - *Vulpes vulpes pusilla* Blyth
29. Indian Fox, Lomdi - *V. bengalensis* Shaw
30. Small Indian Mongoose, Sunhari Newala - *Herpestes auropunctatus pallipes* Blyth
31. Indian Grey Mongoose, Newala - *H. edwardsi ferrugineus* Blanford
32. Ruddy Mongoose, Newala - *H. smithi, smithi* Gray
33. Striped Hyaena, Jarakh or Lakad bagga - *Hyaena hyaena hynea* Linn.
34. Indian Desert Cat, Registani Billi - *Felis libyca omata* Gray
35. Jungle Cat, Jangali Billi - *F. chaus prateri* Pocock
36. Caracal, Siyagosh - *F. caracal schmitzi* Matschie
37. Leopard Cat, Chitta Billi - *F. bengalensis* Kerr
38. Fishing Cat, Machheri Billi - *F. viverrina* Bennent
40. Leopard, Baghera, Tendua, Guldar - *P. pardus* (Linn)
41. Common Palm Civet or Toddy Cat, Bijjoo - *Paradoxurus hermaphroditus* (Pallas)
42. Small Indian Civet, Kasturi - *Viverricula indica deserti* Bonhote
43. Sloth Bear, Bhalu, Reench - *Melursus ursinus ursinus* (Shaw)
44. Smooth Indian Otter, Udbilao, Jalmanush - *Lutra perspicillata sindica* (Pocock)
45. Ratel or Honey Badger, Beju - *Mellivora capensis indica* (Kerr)

ARTIODACTYLA
46. Wild boar, Suar - *Sus scrofa cristatus* Wagner
47. Sambhar - *Cervus unicolor niger* Blainville
48. Spotted deer, Cheetal - *Axis axis* Erxleben
49. Hog deer, para - *A. porcinus porcinus* Zimmermann (Not seen after 1972 floods in Bharatpur Sanctuary)
50. Mouse deer or Indian Chevrotain, Pisora - *Tragulus meminna* (Erxleben). Found in Sitamata sanctuary
51. Barking deer, Kakar - *Muntiacus muntjak* (Zimmerman). Extremely rare and reported from Sitamata (Pratapgarh) sanctuary only.

52. Chinkara or Indian Gazelle, Hiran - *Gazella gazella bennetti* Sykes

53. Black buck or Indian Antelope, Kala Hiran - *Antelope cervicapra rajputanae* Zukowsky

54. Chousingha or Four Horned Antelope, Gchantali - *Tetracerus quadricornis* (Blainville)

55. Blue bull or Nilgai, Roj - *Boselaphus tragocamelus* (Pallas)

**LAGOMORPHA**

56. Indian Hare or Rufoustailed Hare, Khargosh - *Lepus nigricollis nuficaudatus* Geoffroy

57. Indian Desert Hare, Khargosh - *L.n. dayanus* Blanford

**RODENTIA**

58. Five stripped Squirrel, Gilhari - *Funambulus pennanti* Wroughton

59. Three stripped Squirrel, Gilhari - *F. palmarum* (Linn). Some have been seen in Udaipur region.

60. Common Giant Flying Squirrel - *Petaurista petaurista philippensis* Elliot. Have been seen in Sitamata sanctuary only.

61. Indian Porcupine, Sehi - *Hystrix indica indica* Kerr

62. Sand coloured Rat - *Rattus gleadowi* (Murray)

63. House Rat, Chuha - *R. rattus mfescens* Gray

64. Kachchh Rock Rat, Pahari Chuha - *R. cutichus cutichus* Wroughton

65. Soft-furred Field Rat - *R. melada* (Gray)

66. House Mouse, Chuna - *Mus musculus bactrianus* Blyth

67. Little Indian Mouse - *M. booduga booduga* (Gray)

68. Brown Spiny Mouse - *M. platythrix sadhu* (Wroughton)

69. Fawn-coloured Mouse - *M. cervicolor phillipsi* Wroughton

70. Indian Bush Rat - *Golunda ellioti* Gray

71. Large Bandicoot Rat, Mota Chuha - *Bandicota indica* (Bechstein)

72. Short-tailed Bandicoot Rat - *Nesokia indica* (Gray and Hardwickei)

73. Indian Hair-footed Gerbil - *Gerbilus gleadowi* Murray

74. Little Gerbil - *G. nanus* Blanford

75. Indian Gerbil - *Tatera indica indica* Hardwickei

76. Desert Gerbil - *Meriones hurrianae hurrianae* Jerdon
APPENDIX - V

LIST OF BIRDS FOUND IN RAJASTHAN

GREBES
1. Little Grebe - Dubdubi, Podiceps ruficollis capensis Salvadori
2. Great Crested Grebe - Videsh Dubdubi, P. cristatus cristatus (Linn.)

PELICANS
3. Rosy or White Pelican - Hawasil, Pelecanus onocrotalus Linn.
5. Dalmation Pelican - Pilichonch Hawasil, P. crispus Bruch

CORMORANTS, DARTER
6. Large Cormorant - Bada Pankowa, Phalacrocorax carbo sinensis (Shaw)
7. Indian Shag - Bichla Pankowa, P. fuscicollis Stephens
8. Little or Pygmy Cormorant - Chhota Pankowa, P. niger (Vieillot)
9. Darter or Snake Bird - Pandubbi, Anhinga rufa melanogaster (Pennant)

HERONS, EGRETS
10. Common or Grey Heron - Anjan, Ardea cinerea rectirostris Gould
11. Purple Heron - Kabud, A. purpurea manilensis Mayen
12. Pond Heron or Paddy bird - Andha Bugla, Ardeola grayii grayii (Sykes)
13. Cattle Egret - Gai Bugla, Bubulcus ibis coromandus Boddart
14. Eastern Large Egret - Bada Bugla, Egretta alba modesta (J.E. Gray)
15. Little Egret - Karchia Bugla, Egretta garzetta (Linn.)
16. Median or Smaller Egret - Bugla, E. intermedia intermedia (Wagler)
17. Night Heron - Kwak, Nycticorax nycticorax (Linn.)
18. Chestnut Bittern - Lal Bugla, Ixobrychus cinnamomeus (Gmelin)
19. Black Bittern - Kala Bugla, Duperrot flavicollis flavicollis (Latham)
20. Little Green - Kancha Bugla, Butorides striatus chloriceps Bonaparte

STORKS
21. Painted Stork - Janghil, Ibis leucocephalus (Pennant)
22. White Stork - Laglag, Ciconia ciconia ciconia (Linn.)
23. White-necked Stork - Manikjor, *C. episcopus episcopus* (Boddaert)
27. Adjutant Stork - Mahabak, *Leptoptilos dubius* (Gmelin)
28. Lesser Adjutant Stork - Bak, *L. javanaicus* (Horsfield)

IBISES
29. Glossy Ibis - Kala Buzza, *Plegadis falcinellus falcinellus* (Linn.)
30. Black Ibis - Kala Buzza, *Pseudibis papillosa papillosa* (Temminck)

FLAMINGOS, SPOONBILL
32. Spoonbill - Chamcha, *Platalea leucorodia major* Temminck & Schlegel
33. Flamingo - Hansavar, *Phoenicopterus roseus* Pallas
34. Lesser Flamingo Hansavar Chhota, *P. naias minor* (Geoffroy)

DUCKS, GEESE, TEALS
35. Grey Lag Geese - Kalhans, *Anser anser rubricostris* Swinhoe
36. Barheaded Geese - Rajhans, *A. indicus* (Latham)
37. Lesser Whistling Teal or Tree Duck - Silhi *Dendrocygna javanica* Horsfield
38. Brahminy Duck - Surkhab or Chakwa - Chakwi, *Tadorna ferruginea* (Pallas)
42. Shoveller - Tidari, *A. clypeata* Linn.
43. Marbled Teal - *A. angustirostris* Menetries
44. Falcated Teal - *A. falcata* Georgi
45. Garganey or Bluewinged Teal - Chaitwa, *A. querquedula* Linn.
47. Mallard - Nilsir, *A. platyrhynchos* Linn.
51. Common Pochard - Budar, *Aythya ferina* (Linn.)
52. Tufted Duck - Ablak, *A. fuligula* (Linn.)
53. White-eyed Pochard - Kurchiya, *A. nyroca* (Guldenstad)
54. Cotton Teal or Pygmy Geese - Gurgurra, *Nettapus coromandelianus coromandelianus* (Gmelin)
55. Comb Duck - Nakta, *Sarkidiomis melanotos melanotos* (Pennant)

**BIRDS OF PREY, VULTURES**

56. Blackwinged Kite - Kapassi, *Elanus caeruleus vociferus* (Latham)
57. Crested Honey Buzzard - *Pernis pilorhynchus ruficollis* Lesson
58. Pariah Kite - Cheel, *Milvus migrans govinda* Sykes
59. Brahminy Kite - Dhobia Cheel, *Haliastur indus indus* (Boddart)
60. Goshawk - Baz, *Accipiter gentilis schvedowi* (Menzbier)
61. Central Asian Shikra - *A. badius cenchoide* (Severtzov)
62. Indian Shikra - Shikra, *A.b. dussumieri* (Temminck)
63. Besra Sparrow Hawk - *A. virgatus kashmiensis* (Whistler & Kinnear)
64. Asiatic Sparrow Hawk - Basha, *A. nisus melaschistos* Hume
65. Long legged Buzzard - Chuhamar, *Buteo rufinus rufinus* (Cretzschmar)
66. Desert Buzzard - Chuhamar *B. vulpinus vulpinus* (Gloger)
67. White eyed Buzzard - Teesa, *Butastur teesa* (Franklin)
68. Crested Hawk-Eagle - Shabaz, *Spizaetus cirratus cirratus* (Gmelin)
69. Bonnelis or Slender Hawk Eagle - Merangi, *Hiraaetus fasciatus fasciatus* (Vieillot)
70. Booted Hawk Eagle - Baghati, *H. pennatus* Gmelin
71. Tawny Eagle - Ukab, *Aquila rapax vindhiana* Franklin
72. Imperial Eagle - Buta Jumiz, *A. heliaca heliaca* Savigny
73. Great Spotted Eagle - Kaljunga, *A. clanga* Pallas
74. Steppe Eagle - Garud, *A. nipalensis nipalensis* (Hodgson)
75. Lesser Spotted Eagle - Pahari Teesa, *A. pomarina hastata* Lesson
76. Ringtailed or Pallas’s Fishing Eagle - Machmanga, *Haliaetus leucoryphus* (Pallas)

77. White tailed Eagle - *H. albicilla* (Linn.)

78. King or Black vulture - Raj Gidh, *Torgose calvus* Scopoli

79. Indian Long-billed Vulture - Gidh, *Gyps indicus indicus* (Scopoli)

80. Indian White backed or Bengal Vulture - Gidh, *G. bengalensis* (Gmelin)

81. White Scavenger or Egyptian Vulture - Safed Gidh, *Neophron percnopterus percnopterus* (Linn)

82. Pale Harrier - Girgitmar, *Circus macrovus* Gmelin

83. Marsh Harrier - Kala Girgitmar, *C. aeruginosus aeruginosus* (Linn.)

84. Hen Harrier - Pattai, *C. cyaneus cyaneus* (Linn.)

85. Short toed Eagle - Sanpmar, *Circaetus gallicus gallicus* (Gmelin)

86. Montagu's Harrier - *C. pygargus* (Linn.)

87. Crested Serpent Eagle - Dogra Cheel, *Spilornis cheela cheela* (Latham)

88. Osprey or Fish Hawk - Machhlimar, *Pandion haliaetus haliaetus* (Linn.)

89. Peregrine Falcon - Shahin *Falco peregrinus babylonicus* P.L. Scalter

90. Cherrug or Saker Falcon Baheri, *Falco biarmicus cherrug* Temminck

91. Laggar Falcon - Jaggar, *F.b. jugger* J.E. Gray

92. Redheaded Merlin - Turumti, *Falco chicquera chicquera* Daudin

93. European Kestrel - Korutia *Falco tinnunculus tinnunculus* Linn.

94. East Himalayan Kestrel - *Falco tinnunculus interstinctus* Mccoll

95. Oriental or Indian Hobby - Dhuti, *F. severus nsfspedoides* Hodgson

96. E. Red legged Falcon - *F. vesperinus amurensi* Radde

**PARTRIDGE, QUAILS, PEAFOWL**


98. N. Indian Grey Partidge - Titar, *F. pondicerianus interpositus* Hartert

99. Common Grey Quail - Bater, *Coturnix coturnix coturnix* (Linn.)

100. Black-breasted or Rain Quail - Cheena Bater, *C. coromandelica* (Gmelin)


106. Indian Peafowl - Mor, *Pavo cristatus* Linn.
107. Indian Yellowlegged Button Quail - Lawa, *Turnix tanki tanki* Blyth
108. Indian Bustard Quail - Gundlu, *T. suscitor taigoor* (Sykes)

CRANES

109. Indian Sarus Crane - Sarus, *Graus antigone antigone* (Linn.)
110. Common Crane - Sarang, *G. grus lilfordi*, Sharpe
111. Siberian or Great White Crane - Saied Sarus, *G. Leucogeranus*, Pallas
112. Demoiselle Crane - Krunj, Anthropoides virgo (Linn.)

RAILS, CRAKES, COOT

113. Indian Water Rail - *Rallus aquaticus korejwiz* Zarudny
114. Baillon’s Crane - *Porzana pusilla pusilla* (Pallas)
115. Spotted Crake - *P. porzana* (Linn.)
116. Brown Crake - *Amaurornis akool akool* (Sykes)
117. White breasted water hen - Dauk, *A. poenicurus chinensis* (Boddart)
118. Water Cock - Kora, *Gallicrex cinerea cinerea* (Gmelin)
119. Purple Moorhen or Purple Coot - Kalim, *Prophyrio porphyrio poliocephalus* Latham

119a. Coot - Aad, *Fulica atra atra* (Linn.)
120. Indian Moorhen - Jalmurghi, *Gallinula chloropus indica* Blyth

BUSTARDS

121. Great Indian Bustard - Godawan, Gunjan, Hukna, *Choriotis nigriceps* (Vigors)
122. Houbara Bustard - Tilor or Leekh, *Chlamydotis undulata macqueenii* (J.E. Gray)
123. Lesser Florican - Kharmor, *Sypheotides indica* (J.F. Miller)

JACANA

124. Pheasant tailed Jacana - Pihu, *Hydrophasianus chirurgus* (Scopoli)
125. Bronzewinged Jacana - Pipi, *Metopidius indicus* (Latham)

**PLOVERS, SANDPIPERS, SNIPES**

126. White tailed Lapwing - *Vanellus leucurus* (Lichtenstein)
127. Peewit or Lapwing - *V. vanellus* (Linn)
128. Sociable Lapwing - *V. gregarius* (Pallas)
129. Grey-headed Lapwing - *V. cinereus* (Blyth)
130. Spurwinged Plover - *V. spinosus duvaucelii* (Lesson)
131. Redwattled Lapwing - Titodi, *V. indicus indicus* (Boddaert)
132. Yellow-wattled Lapwing - Sirdi, *V. malabaricus* (Boddaert)
133. Kentish Plover - *Charadrius alexandrinus alexandrinus* Linn.
134. Lesser Sand Plover - *C. mongolus atrifrons* Wagler
135. Ringed Plover - *C. hiaticula tundrae* (Lowe)
136. Little Ringed Plover - Zirriya, *C. dubius curonicus* Gmelin
137. Little Ringed Plover - Merwa *C.d. jerdoni* (Legge)
138. Grey or Black bellied Plover - Bada Batan *Pluvialis squatarola* (Linn)
139. Eastern Golden Plover - Chhota Batan, *P. dominica fulva* (Gmelin)
140. Eastern Curlew - Bada Gulinda, *Numenius arquata orientalis* C.L. Brehm
141. Black-tailed Godwit - Khag, *Limosa limosa* (Linn.)
142. Dusky Redshank - *Tringa erythropus* (Pallas)
143. Common Redshank - *T. totanus eurinus* (Oberholser)
144. Marsh Sandpiper or Little Greenshank - *T. stagnatilis* (Bechstein)
145. Greenshank - Tintima, *T. nebularia* (Gunnerus)
146. Green Sandpiper - *T. ochropus* Linn.
149. Terek Sandpiper or Avocet Sandpiper - *T. terek* (Latham)
150. Turnstone - * Arenaria interpres interpres* (Linn.)
151. Pintail Snipe - *Capella stenura* (Bonaparte)
152. Common or Fantail Snipe - Chaha, *C. gallinago gallinago* (Linn.)
153. Jack Snipe - Chhota Chaha, *C. minima* (Brunnich)
154. Little Stint - Chhota Panlowa, *Calidris minutus* (Leisler)
155. Temminck’s Stint - *C. temminckii* (Leisler)
156. Knot - *C. canutus canutus* (Linn.)
157. Dunlin - *C. alpinus alpinus* (Linn.)
158. Currelew Sandpiper - *C. testaceus* (Pallas)
159. Broadbilled Sandpiper - *Limicola falcinellus falcinellus* (Pontoppidan)
160. Ruff - Gehwala, *Philomachus pugna* (Linn.)
161. Red-necked Phalarope - *Phalaropus lobatus* (Linn.)

**STILTS, AVOCET**

163. Indian Balckwinged Stilt - Tinghur, *Himantopus himantopus* (Linn.)
165. Indian Stone Curlew - Bad Siri, *Burhinus oedicnemus indicus* (Salvadori)
166. Great Stone Plover - Bada Karwanak, *Esacus recurvirostris recurvirostris* (Cuvier)

**COURSER & PRATINCOLES**

167. Indian Courser - Nukri, *Cursorius coromandelicus* (Gmelin)
168. Small Indian Pratincole or Swallow Plover - *Glareola lactea* Temminck
169. Collared Pratincole - Swallow Plover, *G. pratincola pratincola* (Linn.)

**GULLS & TERNs**

170. Herring Gull - Dhumra, *Larus argentatus mongolicus* Sushkin
171. Great Black-headed Gull-Dhumra, *L. ichthyaetus* Pallas
173. Indian Whiskered Tern-Chlidonias hybrid indica (Stephens)
174. Gullbilled Tern-Gelochelidon nilotica nilotica (Gmelin)
175. Indian River Tern-Kurari, *Sterna aurantia* J.E. Gray
176. Little Tern or Ternlet - Kurari S. albifrons albifrons Pallas
177. Indian Skimmer.or Scissorbill - Pancheera, *Rynchops albicollis* Swainson

**SANDGROUSE**

178. Indian Sandgrouse-Bhatbhat, *Pterocles exustus erlangeri* (Neumann)
179. Blackbellied or Imperial Sandgrouse - Shahi Bhatbhat, *P. orientalis orientalis* (Linn.)
180. Painted or Close-barred Sandgrouse - Bhat Teetar, *P. indicus indicus* (Gmelin)

PIGEONS & DOVES

181. Bengal Green Pigeon - Harial, *Treron phoenicoptera phoenicoptera* (Latham)
182. Blue Rock Pigeon - Kabutar, *Columba livia intermedia* Gmelin
183. W. Turtle Dove - Banfakhta, *Streptopelia orientalis meena* Latham
184. Ring Dove - Dholi.Fakhta, *S. decaocta decaocta* (Frivaldszy)
185. Red Turtle Dove - Girvi Fakhta, *S. tranquobarica tranquobarica* Hermann
186. Spotted Dove - Chitta Fakhta, *S. chinensis suratensis* (Gmelin)
187. Little Brown Dove - Chhoti Fakhta, *S. senegalensis cambeyensis* (Gmelin)
188. Emerald Dove - Hari Fakhta, *Chalcophaps indica robinsoni* Baker

PARAKEETS

189. Large Indian or Alexandrine Parakeet - Gagroni Tota, *Psittacula eupatria nipalensis* (Hodgson)
190. Northern Roseringed Parakeet - Tota, *P. krameriborealis* (Neumann)
191. Blossom headed Parakeet - Tuiyatota, *P. cyanocephala bengalensis* Forster

CUCKOOS

192. Pied Crested Cuckoo - Chatak, *Clamator jacobinus serratus* (Sparrman)
193. Common Hawk - Papiha, Cuckoo or Brainfever Bird, *Cuculus varius varius* Vahl
194. Indian Cuckoo - Kyphalpakka, *C. micropterus micropterus* Gould
196. Indian Plaintive Cuckoo - *Cacomantis merulinus passerinus* (Vahl)
197. Indian Koel - Koel, *Eudynamys scolopacea scolopacea* (Linn.)
198. Western Sirkeer Cuckoo - Jangali Tota, *Taccocua leischenaullii sirkee* (J.E. Gray)
199. Coucal or Crow - Pheasant - Kuka, Mahok, *Centropus sinensis sinensis* (Stephens)
OWLS

200. Indian Barn Owl - Karail, Tyto alba stertens Hartert
201. N. Indian Scops Owl - Otus scops suntia (Hodgson)
202. Gangetic Collared Scops Owl - Chughad, O. bakkamoena gangeticus Tiechurst
203. W. Pakistan Collored Scops Owl - O.b. deserticolor Tiechurst
204. Eagle Owl or Great Horned Owl - Ghughu, Bubo bubo bengalensis (Franklin)
205. Dusky Horned Owl - Jungali Ghughu, B. coromandus coromandus (Latham)
206. Brown Fish Owl-Ulloo, B. zeylonensis leschenault (Temminck)
207. Northern Spotted Owlet - Tharkavi, Athene brama indica (Franklin)
208. Barred Jungle Owlet-Jangali Chugad, Glaucidium radiatum radiatum (Tickell)
209. Shorteared Owl-Asio flammeus flammeus (Pontoppidan)
210. N. Mottled Wood Owl-Strix ocellata gijsezens, Koelz

NIGHT JARS

211. Indian Jungle Nightjar-Chippak, Caprimulgus indicus indicus Latham
212. Syke’s or Sind Nightjar - C. mahrattensis Sykes
213. Indian Little Nightjar-Dabchidi, C. asiaticus asiaticus Latham
214. Franklin’s Nightjar or Allied Night Jar - C. affinis monticola Franklin

SWIFTS

215. Indian House Swift-Babila, Apus affinis affinis (J.E. Gray)
216. Alpine Swift-Bara Batashi, A. melba melba (Linn.)
217. Palm Swift - Patta Deuli, Cypsiurus parvus batasiensis (J.E. Gray)

KING FISHERS

218. Lesser Pied Kingfisher - Kilkila, Ceryle rudis leucomelanura Reichenbach
219. Central Asian Small Blue Kingfisher - Chhota Kilkila, Alcedo atthis pallasii Reichenbach
220. Blackcapped Kingfisher - Kourilla, Halcyon pileata (Boddaert)
221. White-breasted Kingfisher - Bada Kilkila, H. snyrensis (Linn.)
222. Brownheaded Stork billed Kingfisher - Badami Kourilla, *Pelargopsis capensis capensis* (Linn.)

**BEE EATERS**

223. Bluecheeked Bee eater - Bada Patringa, *Merops superciliosus persicus* Pallas

224. Blue tailed Bee-eater - *M. philippinus philippinus* Linn.

225. Indian Small Green Bee - eater - Patringa, *M. orientalis orientalis* Latham

226. Chestnut headed Bee-eater - Lalsir patringa, *M. leschenaulti leschenaulti* Vieillot

**ROLLERS, HOOPOE**

227. Kashmir Roller - Nikkanth, *Coracias garrulus semenowi* Loudon & Tschudi •

228. Indian Roller - Nlkkanth, *C. benghalensis benghalensis* (Linn.)


**HORN BILL**

230. Grey Hornbill - Dhanesh, *Tockus birostris* (Scopoli)

**BARBETS, WRYNECK**

231. Northern Green Barbet - Bada Basanta, *Megalaima zeylanica caniceps* (Franklin)

232. Crimsonbreasted Barbet or Coppersmith - Chhota Basanta, *M. haemacephala indica* (Latham)

233. European Wryneck - *Jynx torquilla torquilla* (Linn.) Gardanaintha

**WOOD PECKERS**


235. Maharatta or Yellow fronted pied Woodpecker - Khatichida, *Picoides maharattensis maharattensis* Latham

236. Pygmy Woodpecker - Kathphora, *P. nanus nanus* (Vigors)

**PITTA**

237. Indian Pitta - Navrang, *Pitta brachyura brachyura* (Linn.)

**LARKS**

238. Redwinged Bush Lark - *Mirafra erythroptera sindiana* Ticchurst
239. Ashycrowned Black Bellied Finch Lark - Diyora, *Eremopterix grisea* (Scopoli)
240. Blackcrowned Finch Lark-*E. nigriceps affinis* (Blyth)
241. Rufoustealed Finch Lark-Agga, *Ammonomanes phoenicurus* (Franklin)
242. Short-toed Lark-Bagheri, *Calandrella cinerea longipennis* (Eversmann)
243. Indus Sand Lark - Retal, *C. rayal adamsi* (Hume)
244. Eastern Calandra Lark-*Melanocorypha bimaculata torquata* Blyth
245. Indian Crested Lark-Chandool, *Galerida cristata chendoola* (Franklin)
246. Sykes Crested Lark - *G. deva* Sykes
247. West Siberian Skylark-*Alauda arvensis dulcivol* Brooks
248. Eastern Skylark-Bhurat, *A. gulgula gulgula* Franklin

**MARTINS, SWALLOWS**

249. Plain Sand Martin-Mati Ababil, *Riparia paludicola chinensis* (J.E. Gray)
250. Callared Sand Martin-Ababil Paki, *R. riparia diluta* (Sharpe & Wyatt)
251. Dusky Crag Martin-Chattan-Ababil, *Hirundo concolor concolor* Sykes
253. Indian Cliff Swallow-Nahar Ababil, *H. fluvicola* Blyth
254. Wiretailed Swallow-Leishra, *H. smithii filifera* Stephens
255. Indian Striated or Redrumped Swallow-Masjid Ababil, *H.d. erythopygia* Sykes
256. Redrumped Swallow-Masjid Ababil, *H. daurica nipalensis* Hodgson

**SHRIKES**

257. Indian Grey Shrike - Safed Lahtora, Sonchidiya, *Lanius excubitor lahtora* (Sykes)
258. Indian Baybacked Shrike-Chhota Lahtora, *L. vittatus vittatus* Valenciennes
260. Rufous Shrike-Lal Lahtora, *L.c. phoenicuroides* (Schalow)
261. Pale Brown Shrike - *L.c. isabellinus* Hemprich & Ehrenberg
262. Rufousbacked Shrike-Kasai Chidiya or Kagla Lahtora, *L. schach erythronotus* (Vigors)
ORIOLES
265. Indian Golden Oriole-Pilak, *O. oriolus kundoo* Sykes

DRONGOS, SWALLOW-SHRIKES
266. Northern Indian Black Drongo or King Crow-Kotwal, Bhujanga *Dicrurus adsimilis albinictus* (Hodgson)
267. Whitebellied Drongo-Pahari Bhujanga - *O. D. caerulescens caerulescens* (Linn.)
268. N. Large Racket-tailed Drongo-Bhimraj, *D. paradiseus grandis* (Gould)
269. Indian Gray Drongo - *D. leucophaeus longicaudatus* Hay
270. Ashy Swallow Shrike, Tadi Ababil, *Artamus fuscusc* Vieillot

MYNAS STARLINGS
271. Grey headed Myna-Pawe, *Sturnus malabaricus malabaricus* (Gmelin)
272. Brahmini Myna or Black-headed Myna-Bemani Maina, *S. pagodanum* (Gmelin)
274. Rosy pastor or Rose coloured Starling-Tilyer, *S. roseus* Linn.
275. Starling-Nakshi Tilyer, *S. vulgaris pellaratksyi* Finsch
277. Indian Myna-Desi Maina, *A. tristis tristis* (Linn.)

TREE-PIES, CROWS
279. Tree Pie-Mahalat, *Dendrocitta vagabunda pallida* (Blyth)
280. House Crow-Kagla, Kowwa, *Corvus splendens splendens* Vieillot
281. Jungle Crow-Jangali Kowwa, *C. macrorhynchos culminatus* Sykes
282. Punjab Rava-Domkak, *C. corax subcorax* Severtzov

CUCKOO-SHRIKES, MINIVETS
283. Indian Large Cuckoo Shrike - Kasya, *Coracina novaehollandiae macei* (Lesson)
284. Blackheaded Cuckoo Shrike - Jungali Kasya, *C. melanoptera sykesci* (Strickland)

286. Black-backed pied Flycatcher Shrike-Kala Latora, *Hemipus picatus picatus* (Sykes)

287. Scarlet Minivet-Pahari Bulalchashma, *Pericrocotus flammeus specious* (Latham)

288. Short-billed Minivet - *P. brevirostris brevirostris* (Vigros)

289. White bellied Minivet-Safed Rajalal, *P. erythropygius erythropygius* (Jerdon)

290. Sind Small Minivet-Saheli, *P. cinnamomeus pallidus* Baker

**IORAS, BULBULS**


293. Redwhiskered Bulbul - Pahari Bulbul, *Pycnonotus jocosus abuensis* (Whistler)

294. White Cheeked Bulbul - Bulbul, *P. leucogenys leucotis* (Gould)

295. Redvented Bulbul - Bulbul, Guldum, *P. cafer humayuni* Deignan

296. White browed bulbul-Bhuri Bulbul, *P. luteolus luteolus* (Lesson)

**BABBLERS**

297. Mount Abu Scimitar Babbler - *Pomatorhinus schisticeps obscurus* Hume

298. Mt. Abu Whitethroated Babbler - Karamadi Laldeo, *Dumetia hyperythra abuensis* Harington

299. Yellow eyed Babbler-Bulalchashma, *Chrysomma sinense hypoleucum* (Franklin)

300. Common Babbler-Chilchil, *Turoides caudatus caudatus* (Dumont)

301. Large Grey Babbler - Bhaina, *T. malcolmi* (Sykes)


**FLY-CATCHERS**

304. Spotted Flycatcher - *Muscicapa striata sanadnyi* Snigirewski

305. Redbreasted Flycatcher - *Turra, M. parva parva* Bechstein
306. Tickell’s Redbreasted Blue Flycatcher - Adhranga, *M. tickelliae tickelliae* (Blyth)

307. White browed blue Flycatcher - *M. superciliaris superciliaris* Jerdon

308. Verditer Flycatcher - Zakki, *M. thalassina thalassina* Swaingon

309. Brown Flycatcher - *M. latirostris* Raffles

310. Greyheaded Flycatcher - Zard phutki *Culicicapa ceylonesis calochrysea* Oberholser

311. White browed Fantail Flycatcher - Nachan, *Rhipidura aureola aureola* (Lesson)

312. Whitespotted Fantail Flycatcher - Nachan, *R. albicollis albogularis* (Lesson)

313. Indian Blacknaped Monarch Flycatcher-Kala Katkatia, *Monarche azurea syani* (Hartlaub)

314. Paradise Flycatcher - Dudhraj, *Terpsiphone paradisi paradisi* (Linn.)

315. Moustached Sedge Warbler - *Lusciniola melanopogon mimica* Madarasz

316. Streaked Fantail Warbler - Ghaski phutki, *Cisticola juncidis curstans* (Franklin)

317. Redheaded Fantail Warbler - *C. exilis erythrocephala* Blyth

318. Franklin’s Ashy-grey Wren-Warbler-Phutki, *Prinia hodgsonii hodgsonii* (Blyth)

319. Indian Streaked Wren-Warbler - *P. gracilis lepida* Blyth

320. Rufousfronted Wren-Warbler - *P. buchanani* Blyth

321. N.W. Plain Wren-Warbler - *P. subflava tericolor* (Hume)

322. N. Ashy Grey Wren-Warbler-Phutki, *P. socialis stewarti* Blyth

323. North-western Jungle Wren-Warbler - *P. sylvatica insignis* (Hume)

324. Tailor Bird-Darzee Chidiya, *Orthotomus sutorius guzuratus* (Latham)

325. Streaked Grasshoper Warbler - *Locustella lanceolata* Temminck

326. Thickbilled Warbler - *Phragmaticola aedon aedon* Pallas

327. Indian Great Reed Warbler-Pan-Tikti, *Acrocephalus stentoreus brunnesens* (Jerdon)

328. Blyth’s Reed Warbler-Tikti, *A. dumetorus* Blyth

329. Indian Paddyfield Warbler-A. *agricola agricola* (Jerdon)

331. Siberian Booted Tree Warbler - *Hippolais caligata caligata* (Lichtenstein)
332. Orphean Warbler-Bara Safed Kantha, *Sylvia hortensis jerdoni* Blyth
333. White throat - *S. communis ieterops* Meneties
334. Small White-throat - *S. curruca minula* Hume
335. Lesser Whitethroat - Chickchik *S. curruca blythi* Ticehurst & Whistler
336. Desert Warbler - *S. nana nana* (Hemprich & Ehrenberg)
337. Brown Chiffchaff or Leaf Warbler *Phylloscopus collybita tristis* Blyth
339. Large crowned Leaf Warbler - *P. occipitalis occipitalis* (Blyth)
340. Tytler's Leaf Warbler - *P. tytleri* Brooks
341. Tickell's Leaf Warbler - *P. tytleri* Brooks
342. Siberian Dusky Leaf Warbler - *P. fuscatus fuscatus* (Blyth)
343. Hume's Yellow Browed Leaf Warbler - *P. inomatus humei* (Brooks)
344. Brook's Leaf Warbler - *P. subviridis* (Brooks)
345. Pallas's or Yellow rumped Leaf Warbler - *P. proregulus simianensis* Ticehurst
346. Dullgreen Leaf Warbler or Greenish Willow Warbler - *P. trochiloides viridanus* (Blyth)
347. Bright Green Leaf Warbler - *P. t. nitidus* Blyth
348. Yellow eyed or Black Browed Flycatcher Warbler - *Seicercus burkii whistleri* Ticehurst

**THRUSHES, CHATS**

349. Rubythroat-Motia Pidda, *Erithacus calliope* (Pallas)
352. Indian Magpie Robin-Dehiyal, *Copsychus saularis saularis* (Linn.)
353. Brown Rock Chat-Dauma, *Cercomela fusca* (Blyth)
356. Dark-grey Bush Chat - *S. ferrea* Gray
357. Isabelline Chat-Pilo Piddo, *Oenanthe isabelline* (Temminck)
358. Redtailed Chat - *O. xanthopyrna kingi* (Hume)
361. Whitecapped Redstart or River Chat - Girchaondia, *Chaimarornis leuco-cephalus* (Vigors)
362. Indian Robin-Kalchiri, Kali Deva, *Saxicoloides fucicata cambaiensis* (Latham)
363. Blueheaded Rock Thrush - *Monticola cinclorhynchus* (Vigors)
364. Blue Rock Thrush - *M. solitanus pandoo* (Sykes)
365. Orange-headed Ground Thrush-Kastura, *Zoothera citrina citrina* (Latham)
366. Tickell’s Thrush-Deshi Pawci, *Turdus unicolor* Tickell
367. Black throated Thrush (Red throated form) - *T. ruficollis atrogularis* Jarocki
368. Greywinged Blackbird-Kasturi, *T. boublou* Latham

**TITS**

369. Indian Grey Tit-Ramgangra, *Parus major stupae* Koelz
370. Whitewing Black Tit-Kabari Ramgangra, *P. nuchalis* Jerdon
371. Yellow cheeked Tit - *P. xanthogenys aplonotus* Blyth

**NUTHATCHES, CREEPER**


**PIPITS & WAGTAILS**

374. Indian Tree Pipit-Musarichi, *Anthus hodgsoni hodgsoni* Richmond
375. European Tree Pipit - *A. trivialis trivialis* (Linn.)
377. Persian Rock Pipit - *A. similis decaptus* Meinertzhagen
378. Blyth's Pipit - *A. godlewskii* (Taczanowski)
379. Central Asian Water Pipit - *A. spinolaia coutellii* Audouin
380. Tawny Pipit-Dhan Chidi, *A. campestris campestris* (Linn.)
381. Vinaceous breasted Pipit - *A. roseatus* Blyth
382. Black-headed Yellow Wagtail-Pillakh *Motacilla flava melangrisea* Homeyer
383. Blue headed Yellow Wagtail - *M. f. beema* Sykes
384. White headed Yellow Wagtail - Pilkiya, *M. f. leucocephala* (Przevalski)
385. Greyheaded Yellow Wagtail - Pikua, *M. f. thunbergi* Billberg
386. Yellowheaded Wagtail - *M. citreola* (Pallas)
387. Grey Wagtail - Pilkiya, *M. caspica caspica* (Gmelin)
388. Wagtail - *M. alba personata* Gould
389. Pied or White Wagtail - Dhaban, *M. a. dakhunensis* Sykes
390. Large Pied Wagtail - Khanjan, *M. maderaspatis* Gmelin

FLOWER- PECKER, SUNBIRD, WHITE EYE

391. Thickbilled flower-pecker - Phulchuki, *Dicaeum agile agile* (Tickell)
392. Tickell's flower-pecker - Phulchuki, *D. erythrorhynchos* erythrorhynchos (Latham)
393. Sind Purple Sunbird-Shakarkhora, *Nectarina asiatica brevirostis* Blanford
394. Purple Sunbird-Shakarkhora, *N. a. asiatica* (Latham)

SPARROWS, FINCHES & BUNTINGS

396. Indian House Sparrow-Goraiyya, *Passer domesticus indicus* Jardine & Selby
397. Turkestan House Sparrow - Turki Goraiyya, *P. d. bactrianus* Zarudny & Kudashev
399. Spanish Sparrow-Vilayati Goraiyya, *P. hispaniolensis transcaspicus* Tschusi
400. Sind Yellowthroated Sparrow-Jungli Chidi, *Petronia xanthocolis transfuga* (Hartert)
401. Indian Baya or Common Weaver Bird Baya, *Ploceus philippinus philippinus* (Linn.)
402. Black throated Weaver Bird-Kanthiwalaya Baya, *P. benghalensis* (Linn.)
403. Streaked or Striated Weaver Bird - Bamani Baya, *P. manyar flaviceps* Lesson
404. Red Munia or Avadavat or Waxbill-Lal Munia, *Estrilda amandava* (Linn.)
405. Green Munia-Hari Munia, *E. formosa* (Latham)
406. White throated Munia or Common Silver bill-Sar Muniya, *Lonchura malabarica malabarica* (Linn.)
407. Spotted Munia or Striated Mannikin-Telia Muniya, *L. punctulata punctulata* (Linn.).
408. Whitebacked Muniya or Nutmeg Mannikin- Shakari Muniya, *L. striata* (Linn.)
409. Black headed Muniya-Nakalnor, *L. malacca malacca* (Linn.)
410. Common Rosefinch or Scarlet Grosbeak-Laltuti, *Carpodacus erythrinus erythrinus* (Pallas)
411. Blackheaded Bunting-Gandam, *Emberiza melanocephala* Scopoli
412. Redheaded Bunting-Lahir Gandam, *E. bruniceps* Brandt
413. Greynack Bunting-Jamjohara, *E. buchanani buchanani* Blyth
414. Whitecapped Bunting-Safedsir Gandam, *E. stewarti* Blyth
415. Transscaspian Rock Bunting - *E. ciapar* Hartert
416. Grey headed Bunting - *E. fucata aruata* Sharpe
417. Striolated Bunting - *E. striolata striolata* (Lichtenstei
APPENDIX - VI

LIST OF REPTILES FOUND IN THE STATE OF RAJASTHAN

1. Marsh crocodile, Magar - *Crocodilus palustris* Lesson
2. Gavial, Gharial or Chamdiyal - *Gavialis gangeticus* (Gmelin)
3. Indian Flapshell Turtle, Kachhua - *Lissemys punctata punctata* (Schoepff)
4. Indian Soft shell Turtle - *Trionyx gangeticus* and many other spp. of turtles not authentically identified.
5. Indian Star Tortoise, Pahadi Kachhuva - *Geochelone elegans* Schoepff
   Numerous lizards are found
6. *Stenodactylus orientalis* Blanford
7. *Gymnodactylus scaber* Steyden
8. Smaller Gecko, chipakali - *Hemidactylus brooki* Gray
9. House Gecko, Badichhipakali - *H. leschenaulti* Dumeril & Bibron
10. Wall lizard, *H. flaviviridis* Ruppell
11. Lizard, chipkali - *H. triedus* Daudin
12. Tuck-too lizard- Gecko gecko (Linn.)
13. Fat-tailed Gecko- *Eublepharis macularius* Blyth
15. N. Western Agamid Lizard- *Agama agilis* Olivier
16. Desert Lizard- *Phynocephalus laungwalaensis* (Sharma)
17. Indian Toad Agama- *P. sp. novo.*
18. Spiny tailed Lizard, Sanda - *Uromastix hardwickii* Gray
19. Sita's Lizard- *Sitana ponticeriana*, Cuvier
20. Skink- *Mabuya macularia* (Blyth)
21. *Ablepharus grayanus* (Stoliczka)
22. *Riopa punctata* (Gmelin)
23. Ground Skink, banni- *Eumece taeniolatus* Blyth
24. Sandfish- *Ophiomorus tridactylis* (Blyth)
25. *Acanthodactylus cantoris cantoris* Gunther
26. *Cabrita jerdoni* Beddome
27. *Ophisops jerdoni* Blyth
28. *Eremias guttulata watsonana* - Stoliczka
30. Yellow Monitor lizard, Padagoh - *V. flavescens*, Gray
31. Water lizard - *V. salvator* Laurenti
32. Monitor Lizard, Padagoh - *V. bengalensis*, Daudin

NON POISONOUS SNAKES

33. Common Blind Snake, Andha Sanp - *Typhlops braminus* (Daudin)
34. Black Earth Boa, Dumuhi - *Eryx conicus* (Schneider)
35. Red Sand Boa-Dumuhi - *E. Johni johni* (Russel)
37. Rat Snake, Dhaman - *Ptyas mucosus* Linn.
38. Rare Racer - *Coluber gracilis* Günther
39. Glossy bellied Racer - *C. ventromaculatus* Gray & Hardwicke
40. Red Spotted Diadem Snake, *C. arenarius* (Boulenger)
41. Royal or Daidem Snake, Rajithans *Spalerosophio diadema diadema* (Schlegel)
42. Wolf Snake, Kawdi Sanp, *Lycoodon striatus* (Shaw)
44. Golden Tree Snake, Flying Snakes Udon Sanp - *Chrysopelea ornata* Shaw (Banswara area)
45. Water snake-Jal Sarp - *Natix stolata*
46. Checkered Keelback, Pani Samp - *N. piscator* (Schneider)
47. Green Keel back - *Macropisthodon plum bicolor* Cantor
48. Common Green Whip Snake, Hara Sanp - *Ahaetulla nasutus* (Lacepede)
49. Trinket Snake - *Elaphe helena* Daudin
50. Afro-Asian Sand Snake - *Psammophis schokari* (Forskal)
51. Pakistan Ribbon Snake or Sand Snake - *P.leihi* Günther
52. Indian Sand Snake - *P. condanarius* Merrem

POISONOUS SNAKES

53. Common Indian Krait, Karayat - *Bungarus caeruleus* (Schneider)
54. Common Cobra, Nag, Gokhura - *Naja naja naja* (Linn.)
55. Black Cobra (Oxus Cobra), Kalasanp - *N.n. oixana* Eichwald
56. Russel's Viper, Kander - *Vipera russelli* (Shaw)
57. Side Winder or Saw Scaled Viper, Afsai - *Echis carinatus* (Schneider)

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APPENDIX - VII

LIST OF FISHES FOUND IN THE STATE

1. Notopterus notopterus (Pallas), Phulai, Patra.
2. Gudiasia chapra (Ham), Khera.
3. N. chitala (Ham), Chittal.
4. Oxygaster bacaila (Ham), Chilwa, Chal.
5. O. clepeoides (Bloch) Negtelii.
6. O. gora (Ham), Daria Chalho.
7. O. phulo (Ham), Dunnahree.
8. Barilius barila Ham
9. B. barna (Ham), Popta.
10. B. bendelisis (Ham)
11. B. bola (Ham), Gulab, Buggarah.
12. B. vogra (Ham), Popta.
13. Danio aequipinnatus (Mc CII)
14. D. d. devario (Ham), Patukari
15. Danio (Brachydanio) rerio (Ham), Anju.
16. Esomus daurica (Ham), Dendua.
17. Rasbora daniconius (Ham), Dendua.
18. Carassius carassius (Linn.), Minnow, Wild Goldfish.
19. Garra gotyla gotyla (Gray) Pathar chat.
20. G. mulya (Sykes) Pathar chat, Suckerfish.
22. Hypophthalmichthys molitrix - Silver Carp (Exotic).
24. C. c. specularis- Mirror Carp (Exotic).
25. C. c. nudus- Feather Carp (Exotic).
26. Labeo angra (Ham), Thuthunahia Raia.
27. L. bata (Ham.), Bata.
28. L. boga (Ham.), Morah.
29. L. bogutt (Ham.), Loi.
30. L. Calbasu (Ham.), Kalbauns.
31. L. dero (Ham), Arangi.
32. *L. dycochilus* (Mc. Cll), Bodila.
33. *L. fimbriatus* (Bloch), Bahrum.
34. *L. gonius* (Ham), Kursi.
35. *L. nigripinnis* Day.
36. *L. rohita* (Ham), Rohu.
38. *L. udaipurensis* Tilak.
39. *Cirrhinus mrigala* (Ham), Naini, Mrigal, Naraini.
40. *C. reba* (Ham) Reba, Raibata.
41. *Puntius amphibia* (Val.), Puthi.
42. *P. conchonius* (Ham), Sidhari.
43. *P. chola* (Ham)
44. *P. chrysopterus* (Mc Cll), Puthi.
45. *P. dorsalis* (Jerdon).
46. *P. pinnauratus* (Day).
47. *P. sarana sarana* (Ham), Durai, Putha.
48. *P. sophore* (Ham), Puthi.
49. *P. ticlo* (Ham).
50. *P. tetrarupagas* (Mc Cll).
51. *P. vittatus* Day.
52. *Aspidoparia morar* (Ham), Moraki.
53. *Amblypharyngodon mola* (Ham), Mohil.
54. *Chagunius chagunio* (Ham), Gelhari
55. *Catla catla* (Ham), Katla.
56. *Osteobrama cotio* (Ham), Gurda.
57. *Tor khudree* (Sykes), Tor.
58. *Botia lohachata* Chaudhuri, Billi, Bagatia.
59. *Lepidocephalichthys guntea* (Ham), Nakati.
60. *Noemacheilus botia* (Ham).
61. *N. dayi* Hora.
63. *N. rajasthanicus* Mathur Neazdani.
64. *Mystus bleekeri* (Day), Tengan, Tengara.
65. *M. cavasius* (Ham), Kevas.
66. *M. seenghala* (Ham), Seenghara, Darai-Tengar.
67. *M. vitatus* (Blouch).
68. *Clupisoma garua* (Ham), Bachua.
69. *Calarias betracus* (Linn.) Magur.
70. *Ompak bimaculatus* (Bloch), Pabda.
71. *Wallago attu* (Schneider), Mulley, Lanchi, Ilaichi.
72. *Silonia silondia* (Ham), Silond.
73. *Bagarius bagarius* (Ham), Silond.
74. *Heteropneustes fossilis* (Bloch), Singh.
75. *Xenentodon cancila* (Ham), Suan, Kagla.
76. *Gambusia affinis* (Baird & Girard) Larvicidal fish.
77. *Aplocheilus lineatus* (Val.) Larvicidal fish (Exotic).
78. *A. panchax* (Ham), Ka Nakuri Larvicidal fish (Exotic).
79. *Channa gachua* (Ham), Sauli Larvicidal fish (Exotic).
80. *C. marilus* (Ham), Guldar, Saul.
81. *C. punctatus* (Bloch), Sirai.
82. *C. striatus* (Bloch), Saul.
83. *C. orientalis* (Bloch & Schn.)
84. *Ambassus baculis* (Ham), Chandla.
85. *A. nama* (Ham), Chandla.
86. *A. ranga* (Ham), Chandala.
87. *Colisa fasciatus* (Bloch & Schneider), Kharda.
88. *C. sota* (Ham), Kharda.
89. *Osphronemus goramy* Lacepede, Gorami.
90. *Glossogobius giurus* (Ham), Gulwa.
91. *Mastacembelus armatus* (Lacepede), Bam.
92. *M. pancalus* (Ham), Gilj.
### APPENDIX - VIII

**WILDLIFE SANCTUARIES OF RAJASTHAN (OCTOBER, 1980)**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name</th>
<th>Area</th>
<th>Notified</th>
<th>Location</th>
<th>Terrain</th>
<th>Main Flora</th>
<th>Wildlife</th>
<th>Other features</th>
<th>Best season</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Bharatpur</td>
<td>29.00</td>
<td>(17) 53</td>
<td>west of F.239</td>
<td>50 kms</td>
<td>Babool, Kadam, water</td>
<td>Primarily water bird available. It is close to Bharatpur city, famous for Fort seen in thousands.</td>
<td>Summer</td>
<td>July to February.</td>
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<td>13.3.1956</td>
<td>dated Agra,</td>
<td>fresh water</td>
<td>Kadam, Kadam, ber, jal,</td>
<td>breeding</td>
<td>storks &amp; Cranes</td>
<td>In</td>
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<td></td>
<td>from 180 km</td>
<td>water</td>
<td>jamun, makhi, khas grass</td>
<td>sanctuary. 328 spp. recorded</td>
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<td></td>
<td>&amp; 180 km saline</td>
<td>patches. with a</td>
<td>varieties of water</td>
<td>like cormorants ibis, storks,</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>km. from Delhi</td>
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<td>water plants like</td>
<td>herons, comb</td>
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<td></td>
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<td></td>
<td></td>
<td>on broad and</td>
<td>Typha,</td>
<td>lily, duck weed,</td>
<td>duck,</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>meter guage</td>
<td>Hydrilla, Ipomea,</td>
<td>Hydrilla,</td>
<td>spoonbill, egrets,</td>
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<td></td>
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<td></td>
<td>Rly. lines.</td>
<td>Aguatica, Wildrice,</td>
<td>Aguatica,</td>
<td>peafowl, spotbill,</td>
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<td></td>
<td>Nearest air port</td>
<td>Pseudo raphis</td>
<td>Pseudo raphis,</td>
<td>spotted, grey, creeper,</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Agra.</td>
<td>aspera</td>
<td>aspera</td>
<td>peregrine</td>
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*Endangered Species.*
Echinochloa, Paspalum, Astrocyntha etc. and laggar falcons* & migrants like Siberian cranes*, geese, pelicans, shelducks, teals, plovers, osprey, brown headed gull and animals like black buck, cheetah, sambar, wild boar, blue bull, pangolin
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<tr>
<td>2</td>
<td>Sariska</td>
<td>492</td>
<td>F. 39 (2). Rev/ A/54 dated 5.8.1958</td>
<td>200 kms. from Delhi, 110 km from Jaipur.</td>
<td>457</td>
<td>Aravali hills with numerous valleys.</td>
<td>Thick forests. Main spp.</td>
<td>dhok, salar, ber, bamboo, flame of the forests (dhak), semal, god</td>
<td>Tiger, leopard, sambhar, cheetal, blue bull, Chou singha pangolin, civets, cats, jackal, wild boar, Garh Rajor, Nilkhanth, Pandupole &amp; Bhartari temples and hot spring at Banital also fall in the sanctuary.</td>
<td>Feb. to June. November onwards also good.</td>
<td>It is now under Project Tiger area &amp; 308 km. of area has been added to the project.</td>
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<tr>
<td>godal, umb, jharberi, adusa, Grewia and heavy grasses like Apluda, Heterropogon sorghum, etc. <em>Ficus</em> spp. with Khajur &amp; Jamun, rohini, pula, occur in Nallahs.</td>
<td>porcupine, hyaena, caracal, ratel, mongoose, hedge hog &amp; tortoise, monitor lizard, python, cobra, krait, sandboa &amp; birds like peafowl, black stork, oriole, redspur-fowl, flycatchers, parakeet, woodpecker, Indian pitta, hoopoe etc.</td>
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<tr>
<td>No.</td>
<td>Area</td>
<td>Distance</td>
<td>Topography</td>
<td>Vegetation</td>
<td>Wildlife</td>
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<td>3.</td>
<td>Sawai Madhopur</td>
<td>392.30 km</td>
<td>Hilly with flat tops &amp; valleys, Aravallis &amp; Vindhyan mountain chains</td>
<td>Dry deciduous forests containing best dhok forest of the State with arunji, dhak, khair, jhinjha, vanphalsa, salar, godal, kadaya and valleys support evergreen trees of aam, jamun, pipal, bargad, pakar. Wild sitaphal, Tiger, leopard, jungle cat, palm civet, small Indian civet, porcupine hyaena, jackal, wild dogs (occasionally), sambar, cheetal, nilgai, chinkara, chausin-gha, wild-boar, sloth bear, crocodile, monitor lizard, Uroma strix, Viper, cobra.</td>
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**Misc.**
- No. F. 39 (2)
- For / 55
- Nearest Railhead (Broad & Meter guage)
- Nearest air-port: Sawai Madhopur 8 km.
- Nearest from Jaipur.

- Except monsoon (July to October), it is good throughout the year but January to June are the best.
- Ranthambore Project tiger area & is to be declared as a National Park.
<p>| plants, are common. Shrubs &amp; grasses including khas grasses are fairly thick. The walking tree banyan in Jogi Mahal Rest House campus covers about 100 sq. metres of area. | krait, sandboa, birds like red spur fowl, peapowl*, partridges, bush quails, green pigeon, paradise flycatcher, shikra warblers, lesser whistling teal, black stork, egrets, herons etc. According to the latest Census (1980) |</p>
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there are 3,500 Sambhars in the area (probably highest in the country) & 32 tigers.

4. Darrah 201 F. 39 (2)
For/56 dt. 7.11.1955

50 kms. from Kota on Kota-Jharwar road. Nearest airport Kota & railhead Darrah (2 kms).

Hilly with long narrow valleys. Dry deciduous forest of dhok and its association like Khair, salar, semal, kadaya, godal, dhavra, tendu, bel. Leopard*, tiger (occasional), jungle cat, toddy cat, jackal, hyena, mongoose, porcupine, hare, palm squirrel, cheetal, sambar, blue bull, The broad gauge train passes through the thick forests.

December to June. Rawatbhata Atomic Power plant is hardly 20 kms. and close by, in the Chambal river is now a National Gavial Sanctuary.
<p>|       |       |       |       |       |       | ganjan, hingot, grasses like <em>Themeda,</em> <em>Aphuda,</em> <em>Heteropogon</em> etc. <em>Ficus</em> spp. are common.       | chinkara, wild boar, sloth bear, monitor lizard, chameleon, cobra, krait and birds like woodpecker, barbets, tree pie, green pigeon, minivets mynas, partridge, grey hornbill &amp; buzzards are common. Black scorpions are also |</p>
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<tr>
<td>5.</td>
<td>National gavial</td>
<td>River</td>
<td>F.11</td>
<td>Chambal River</td>
<td>Through hills of Vindhyan &amp; ravines upto 100 metres on either bank of river Chambal.</td>
<td>Basically river Vegetation poor like <em>Typha</em>, <em>Polygonum</em>, <em>Syzygium</em>, <em>Terminalia arjuna</em>, <em>Kadaya</em>, godal etc.</td>
<td>Crocodile, gavial &amp; otters and variety of fish including carps, eel, Mongoose, &amp; some-times sloth bear.</td>
<td>The Kota barrage, Jawahar sagar dam are on it. It is also close to Ranthambore Project tiger.</td>
<td>Whole year.</td>
<td>Crocodile &amp; gavials lay eggs on sandy banks. It is a National Project. Chambal river falling in M.P., Rajasthan, U.P. is notified for Gavial protection.</td>
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<tr>
<td>6.</td>
<td>Jawahar Sagar</td>
<td>290</td>
<td>Jawahar Sagar</td>
<td>Hilly</td>
<td>Mainly aquatic</td>
<td>Crocodile, rana Fratap</td>
<td>Whole year.</td>
<td>Crocodile and</td>
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<tr>
<td><strong>Rev/ dated 9.10.1975</strong></td>
<td>dam (Rawat Bhata) on Chambal river.</td>
<td>undulating &amp; plateau Vindhyan mountain chain.</td>
<td>plants but along banks and on hills are found mixed miscellaneous -- anecous forests supporting dhavra, godal, salar, mokha, tendu, bel, kadaya, dhik, dhak, khat &amp; sea of grasses, rateda, phulari, lapia, surwala kared etc.</td>
<td>turtle, cat fish, carps, eel etc.</td>
<td>Sagar and Jawahar Sagar dam on Chambal river.</td>
<td>gavial both breed in the sanctuary.</td>
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<tr>
<td>Van Vihar</td>
<td>59.0</td>
<td>F.39</td>
<td>57 kms from Agra &amp; 29 kms from Dholpur</td>
<td>Nearest Airport Agra. Railway Station Dholpur.</td>
<td>Vindhyan hills with plateau &amp; flat tops &amp; precipitous &amp; deep gorges with ravines of Chambal.</td>
<td>Dry deciduous forests with Chok, jhinjha, khair, arunj, godal tendu, semal, kadaya &amp; few mohwa with bushes of Grewia, slepan hins, goyak hair and grasses</td>
<td>Dry deciduous forests with Chok, jhinjha, khair, arunj, godal tendu, semal, kadaya &amp; few mohwa with bushes of Grewia, slepan hins, goyak hair and grasses</td>
<td>Leopard*, tiger (occasionally), Chinkara, blue bull, cheetal, sambar, leopard cat*, palm civet, hyena, jackal, wild dog wild boar, sloth bear, mongoose, hedge hog, otter, The Ramsagar Urmila, Sagar, Talab, Shahi tank are interesting picnic points. Moghal period Talab Shahi mahar is attractive. November to June. Water birds during winter only. In pre-Indep endence days, the ex-ruler Udai Singhji used to feed ungulates regularly by his own hands. Cheese used to be given to tiger by him.</td>
<td>7.11.1955</td>
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<td><em>Aphuda</em>,</td>
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<td><em>Jamun</em>, khas</td>
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| | lag geese,
red crested and tufted, pochard, pintail, comb, duck common, garganey & cotton teals, dabchick, coot, sarus, caranes, painted, black necked open billed stork etc. are seen as also stone sudew, lapwing partridge, sandgrouse (painted) quail,

Mt. Abu hills. The famous hill station of Rajasthan 20 kms from Abu Road, the rail head. Nearest airport Ahmedabad in Gujrat.

Hilly. Lofty Aravali mountain for camel back and razor sharp ridge. Highest point Guru Shikar (1722.14 m) between the mighty Himalayas & Nilgiris. Endowed with unique geographical features, it supports Central Indian sub tropical evergreen forests with mango, Jamun, fiscus, racemosa, spur fowl, grey tit, peafowl*, larks, etc.

Leopard*, sloth, bear, sambar, blue bull, wild boar, hyaena, Hanuman monkey, palm civet, porcupine, hare, bats and birds, grey jungle fowl, redspur. The famous Dilwara Jain temple at Nakki lake, Achalgarh are in this hill resort. Numerous trails for trekking have been made. Today rock; sunset point, sunrise.

Whole year except July to September. It is proposed to declare it as a National biosphere reserve.
F. retusa, arnottiana, Mallotus, Trema, Mani - Ikara, Carissa, Berberis, Carvea, Rosa and orchids like Aerides supp. Other plants including Erythrina, suberosa, E. arbore- scence, E. lithos- perma, androk, dhaman, kakon, thor, dhavra, godal, fowl, peafowl¹, valley are interesting.
fly catchers, minivet, shikra vultures, koel hawk cuckoo, crested bunting, tailor bird, treepie, Lapwing darter, egrets, scimater babbler, Rufous babbler, bellied babbler. Among reptiles are seen turtle, tortoise.
9. Ranakpur 500
Kumbhalgarh.

F. 10
(2)
Rev/A/
71
dated
13.7.1971

In Udaipur & Pali districts. 80 kms. from Udaipur (Dabok) Airport & nearest railhead Udaipur.

Araval hills with numerous valleys. Mainly dhok forests with khair, arunj, jhinjha, tendu, dhak. Upper reaches are

urabia, mokha, kalam, bamboo, kalia, khajoor & creepers, like malkanganji, Rivea, Ipomea etc. Grasses & herbs are many.

cham - eleon, lizards, snakes, particularly water snakes.

Leopard, sloth, bear, chousingha, chinkara, sambhar, bluebull, wildboar, jackal, jungle, cat, palm Has the famous Jain temple at Ranakpur, historical Kumbhalgarh fort & drive on the meander-

November to June. It has a large population of chousingha.
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<td>dhavra,</td>
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<td>godal,</td>
<td>hyenea,</td>
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<td>kadaya</td>
<td>porcupine,</td>
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<td>mokha,</td>
<td>hare,</td>
<td>rewarding.</td>
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<td>ganiara</td>
<td>mongoose</td>
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<td>haldu,</td>
<td>hedgehog,</td>
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<td>umbia,</td>
<td>squirrel,</td>
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<td>Valleys,</td>
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<td>Ficus trees</td>
<td>quail,</td>
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<td>jamun,</td>
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<td>Bamboo is found</td>
<td>flycatcher,</td>
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<td>Sandal wood trees are found.</td>
<td>jungle</td>
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<td>Grasses possibly</td>
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10. Jaisamand 52

60 kms. Aravali
hills with
Udaipur vide
Banswara valleys.

dated
13.7.1955

Nearest
airport
&
railhead
Udaipur.

Dhok
forests
with
kunta,
jhinja,
khair
arunai
dhak,
salar,
godal,
kadaya,
tendu,
umbia,
etc. with
under-
growth of
Grewia,
goya -

are heavy
in open
patches
especially
rated in
masuri
phulari
surwala,
sheen etc.

red
jungle
fowl.

Leopard*,
An
artificial
lake
Jaisamand
once the
biggest
artificial
lake with
a
perimeter
of 48 kms.

jungle
cat,
fishing
cat*,
hyena,
jackal,
chinkara,
blue bull,
dotted
deer,
sambhar,
loth,
bear*,
otter,
mongoose,
monitor

From
spacious
watch
tower
panther is
seen on
bait.

November
to June.
During
monsoon
a drive
along the
lake is
very
pleasant.
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<td>khair &amp; jhar beri &amp; grasses sheen, surwala phulari etc. Ficus trees along nalas are seen.</td>
<td>lizard, chameleon, chameleon, king, cobra, rat snake, krait, tortoise, turtle, peafowl, weaver bird, blue rock thrush, munia, iora, grey tit, tawny eagle, shikra, vultures, egrets, cormorants snake bird, dabchick, coot, marsh harrier etc.</td>
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<td>Rev (8)</td>
<td>from with.</td>
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<td>November</td>
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<td>78</td>
<td>Udaipur. broad</td>
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<td>12</td>
<td>Tchalappar</td>
<td>8.20 F. (379) Rev/ A/ 59 dated 19.6.1962</td>
<td>In Churu district. Close to railhead Sujangarh (12 kms) and 215 kms from Plain land with some shallow gullies. Grassy saline patch with <em>Sporobolus Eleusine Ergrostis</em> grasses and Pedominantly black buck (about 700 as per 1980 census). Desert hare, desert, lizard, turtle, tortoise, comb duck, spoon bill, king fishers, dabchick, wood pecker, blue rock thrush, honey buzzard &amp; shikra etc. Common salt is prepared closed by. Whole year. Thar desert sand dunes can be seen nearby.</td>
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Jaipur. plants of salsola, Cyperus (nagar-motha) Haloxylon (Sajji) and few trees of Khejri only.
cat, gerbil, mongoose, Lanner, falcon are common, as also rough-legged buzzard and short-toed eagle, peacock, lapwing, Indian courser, and larks. Among reptiles are sawscaled viper, spiny tailed lizard, monitor lizard, skink etc.
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<td>13.</td>
<td>13. Desert National Reserve (presently) only a sanctuary.</td>
<td>3,000</td>
<td>F. 3 (1) Rev./dt. 4.8.1980</td>
<td>20 kms. away from sandy plains in the Thar desert.</td>
<td>Rolling sand dunes, with xerophytes, main spp. khejri, jal, rohira, ber, phog, aak, khimp, senia, murali grasses, sewan, girama, dhaman, arjun, bhurat, lapla, makla etc.</td>
<td>Typical desert scrub with xerophytes, main spp. khejri, jal, rohira, ber, phog, aak, khimp, senia, murali grasses, sewan, girama, dhaman, arjun, bhurat, lapla, makla etc.</td>
<td>Chinkara, Famous yellow stone, Patuon Haveli Jaisalmer, fort Jaisalmer</td>
<td>Whole year. May-June rather too hot.</td>
<td>Aal wood fossil park (15 kms) from Jaisalmer has 180 million year old wood fossils. It is soon going to be declared as a National park.</td>
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sand, grouse, bustard, sand, grouse, crane, Indian crane, courser, larks, pipits, sparrows, sparrow, banked, sand, lizard, Indian lizard, toad, gecko, skink, monitor, lizard, saw, scaled, viper, rat, snake, sandfish, sand boa.
<p>| 14. Nahargarh 50 | F.11 (39) Rev/8/80 dated 22.9.1980 | On the outskirts of Jaipur. | High Aravali hills. | Dhok forests with kumta, jhinjha, arunj, ber, goya khair, salar, godal semal, dhak, etc. with grasses like <em>Aphuda</em>, <em>Opismenus</em> <em>Digitaria</em> etc. | Leopard*, Sambhar, blue bull, jungle cat, jackal, hyaena, turtle, monitor lizard, snakes, many water birds in winter like gese, pochard, teals, shoveller (especially) Akeda tank &amp; other birds like. | Nahar - garh, Jaigarh &amp; Amer fort &amp; many temples. | Whole year but monsoon is rewarding. | It is proposed to be declared as National park which will be the nearest to any metropolitan city. |</p>
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<th>CLOSED AREAS (October 1980)</th>
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<td>1. Doli Dhawa Phinch</td>
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50 kms from Jodhpur on Barmer road. Nearest Rail & Airport Jodhpur.

Sandy plains interspersed with agricultural fields of 21 villages.

Desert scrub with khejri, kair, jal, pilu, ber, murlai, khimp, seniya jharberi, and grasses like giramana, anjan, dhaman, drongo, buzzard, partridges, quails, shrikes, cuckoo, shrike, treepie, shikra, vultures, eagle etc.

Black buck, chinkara, desert fox, desert cat, mongoose, hedgehog, desert hare, gerbil, monitor lizard, saw-scaled viper, cobra.

Typical helmets & houses of Vrishnois who religiously protect antelope & trees.

Whole year.

There is no forest land legally & one can see hundreds of antelopes in cultivated crops.
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<td>bhurat, makda, sporo – bulus etc.</td>
<td>sandfish, sandboa, Indian courser, lagger, eagle, rough-legged, buzzard (hehak), lapwing, partridges, godawan &amp; tilore, Imperial sand grouse; sometimes wolf is seen.</td>
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2. **Shahbad** 177 F.11 (17) Rev.3/79 dated 27.7.1979

In Kota district 70 kms from Baran & 120 kms from Kota. Hilly with flat tops & broad valleys Mixed Miscellaneous forest with dhok, salar, dhavra, khair, Leoprd, tiger, (occasionally), sloth bear, wild boar, Saharias scheduled tribe inhabit the area

Novem - I used to be a very rich area for tigers. June
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Upto 37 Godawans seen in the area.
No legally constituted forest land.
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<td>4. Barrod</td>
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<td>F.11 (7) Rev/8/80 dated 17.5.1980</td>
<td>In Alwar district. 50 kms. from Alwar, 6 kms. from Behror midway Rest House.</td>
<td>Plain &amp; flat area. Scrub forest with grassland. Main spp. babul, kair, khejri, pilu &amp; grasses</td>
<td>Indian Bustard etc.</td>
<td>Bluebull, jackal, bats, jungle cat, mongoose, hare, shrews, cobra, monitor lizard, partridge, bush, quail, sand grouse, peafowl, great grey shrike, drongo, common babbler, hawk</td>
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| 5. | Ramgarh | 250 | F.11 | In | Hilly | Dry deciduous | 'Tiger', Sloth | Novem-
|    |      |     | (32) | Bundi | with some flat | forests with | bear, wild | ber to |
|    |      |     | Rev./8/79 | district | plains | dhok, jhinja, | boar, |        | June. |
|    |      |     | dated | 25 kms. | tendu, | Ficus, spp. | chinkara, |        |    |
|    |      |     | 19.1.1980 | from | kadam, | khair, dhak | blue bull, |        |    |
|    |      |     |       | Bundi. | charuel, | godal, kadam, | chital |        |    |
|    |      |     |       |       | arunj etc. | and a host of | sambhar, |        |    |
|    |      |     |       |       | etc.      | grasses. | fox, hare, |        |    |
|    |      |     |       |       |          |          | jackal, |        |    |
|    |      |     |       |       |          |          | monitor |        |    |
|    |      |     |       |       |          |          | lizard, |        |    |
|    |      |     |       |       |          |          | drongo |        |    |
|    |      |     |       |       |          |          | paradise |        |    |
|    |      |     |       |       |          |          | flycatcher, |        |    |
|    |      |     |       |       |          |          | pale |        |    |
|    |      |     |       |       |          |          | harrier, |        |    |
|    |      |     |       |       |          |          | redheaded |        |    |
|    |      |     |       |       |          |          | merlin, |        |    |
|    |      |     |       |       |          |          | king |        |    |
|    |      |     |       |       |          |          | vulture, |        |    |
|    |      |     |       |       |          |          | red spur |        |    |
|    |      |     |       |       |          |          | fowl, wagtail |        |    |
|    |      |     |       |       |          |          | etc.  |        |    |
| 6. Mukam | 169 | Rev/8/80 dated 17.5.1980 | In district Bikaner 16 kms. from Nokha & 50 kms. from Bikaner. | Almost plain land with sandy soils | Thorn scrub with Khejari, khair, baonli, kumta, kakeda, aak, khimp, phut & grasses, giramana, dhaman. | Chinkara*, It is a vishoni area who protect the antelope religiously | Whole year | Annual fair is held. No legally constituted forests. |

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*Chinkara* is a species of antelope native to the Thar Desert of India and Pakistan.
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(a) Mean wind speed in Kms. per hour. (M) Predominant direction in the morning. (E) Predominant direction in the evening. (Var.) Variable. (C) Calm. The next predominant direction is also indicated when calm is mentioned. * - Total Station - Not considered for sub-divisional means.
### APPENDIX - X

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* Hill Station - Not considered for sub-divisional mean.
# APPENDIX - XI

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(a) Days with clear sky.
(b) Days with sky overcast.
(c) Mean cloud amount

* Hill Station - Not considered for sub-divisional means.
### APPENDIX - XII (a)

**MEAN CLOUD AMOUNT (OKTA) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 1730 HRS. IST**

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(a) Days with clear sky.
(b) Days with sky overcast.
(c) Mean cloud amount

* Hill Station - Not considered for sub-divisional means.
## APPENDIX - XII (b)

### MEAN NUMBER OF HOURS OF BRIGHT SUNSHINE PER DAY

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<td>4.8</td>
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</table>

(a) Normal Rainfall.  (b) Average number of rainy days (days with rain 2.5 mm or more).
### APPENDIX - XIV

**RAINFALL (IN MM) OVER PARTS OF DIFFERENT RIVER BASINS FALLING WITHIN RAJASTHAN STATE**

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1. River Mahi : Districts/Parts of districts within this Catchment :&lt;br&gt; <em>Rajasthan East</em>: Udaipur, Banswara, Dungarpur and Chittaurgarh :&lt;br&gt; 5.2</td>
<td>2.6</td>
<td>1.9</td>
<td>1.5</td>
<td>6.9</td>
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<td>14.0</td>
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<td>2. River Sabarmati : Districts/Parts of districts within this Catchment :&lt;br&gt; <em>Rajasthan East</em>: Udaipur and Dungarpur :&lt;br&gt; 1.5</td>
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<td>3. Streams of Kathiawar : Districts/Parts of districts within this Catchment :&lt;br&gt; <em>Rajasthan East</em>: Sirohi :&lt;br&gt; 4.2</td>
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<td>1.4</td>
<td>2.8</td>
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<td>278.5</td>
<td>249.1</td>
<td>78.4</td>
<td>9.0</td>
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<td>2.8</td>
<td>710.8</td>
</tr>
<tr>
<td>4. River Luni : Districts/Parts of Districts within this Catchment :&lt;br&gt; <em>Rajasthan East</em>: Udaipur, Sirohi and Ajmer :&lt;br&gt; <em>Rajasthan West</em>: Jodhpur, Pali, Jalore, Barmer and Nagaur :&lt;br&gt; 4.3</td>
<td>4.8</td>
<td>3.1</td>
<td>2.2</td>
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<td>33.9</td>
<td>119.7</td>
<td>142.7</td>
<td>51.8</td>
<td>5.8</td>
<td>1.4</td>
<td>1.8</td>
<td>380.5</td>
</tr>
<tr>
<td>5. River Sailaj between Bhakra Dam site and the Beas Excluding the Beas :&lt;br&gt; Districts/Parts of districts within this Catchments :&lt;br&gt; <em>Rajasthan West</em>: Ganganagar :&lt;br&gt; 9.4</td>
<td>10.1</td>
<td>6.5</td>
<td>5.3</td>
<td>4.8</td>
<td>25.9</td>
<td>69.4</td>
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<tr>
<td>------</td>
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<td>--------</td>
</tr>
</tbody>
</table>

6. **River Yamuna upto its confluence with River Chambal (Excluding Chambal)**

   **Districts/Parts of districts within this Catchment:**
   - **Rajasthan East:** Jaipur, Sawai Madhopur, Sikar, Bharatpur, Alwar and Jhunjhunun:
   - **Rajasthan West:** Ganganagar
   
   | 12.4 | 9.1 | 7.1 | 4.7 | 9.6 | 53.2 | 187.3 | 187.7 | 102.8 | 14.0 | 2.2 | 5.6 | 595.7 |

7. **River Chambal upto Kotah Dam site**

   **Districts/Parts of districts within this Catchments:**
   - **Rajasthan East:** Kota, Jhalawar, Chittorgarh, Bundi and Sawai Madhopur
   
   | 9.7 | 51.8 | 2.8 | 2.3 | 7.6 | 106.7 | 316.7 | 296.2 | 157.2 | 17.8 | 12.5 | 6.3 | 941.6 |

8. **River Chambal from Kota Dam site to its confluence with River Banas (excluding River Banas)**

   **Districts/Parts of districts within this Catchment:**
   - **Rajasthan East:** Kota, Bundi, Jhalawar, Sawai Madhopur and Jaipur
   
   | 9.5 | 5.0 | 3.6 | 3.1 | 8.2 | 86.6 | 328.2 | 292.5 | 136.4 | 13.3 | 8.8 | 6.0 | 901.1 |

9. **River Banas**

   **Districts/Parts of districts within this Catchment:**
   - **Rajasthan East:** Ajmer, Bhilwara, Chitorgarh, Jaipur, Sawai Madhopur, Tonk and Udaipur
   
   | 7.2 | 4.7 | 4.7 | 2.9 | 7.9 | 58.5 | 223.3 | 221.6 | 96.4 | 9.9 | 2.6 | 4.7 | 643.9 |

10. **River Chambal from its confluence with River Banas to its confluence with River Yamuna**

   **Districts/Parts of districts within this Catchment:**
   - **Rajasthan East:** Kota
   
   | 10.2 | 7.4 | 4.7 | 2.8 | 9.1 | 82.5 | 319.0 | 266.9 | 131.6 | 15.2 | 7.9 | 7.4 | 864.3 |

11. **Thar parkar Desert**

   **Districts/parts of districts within this Catchment:**
   - **Rajasthan East:** Ajmer, Jaipur and Sikar
   - **Rajasthan West:** Barmer, Bikaner, Churu, Ganganagar, Jaisalmer, Jodhpur and Nagaur
   
   | 6.8 | 6.2 | 4.8 | 3.5 | 9.3 | 29.3 | 102.9 | 103.0 | 43.8 | 4.9 | 1.0 | 3.9 | 319.5 |
APPENDIX - XV

DEPRESSIONS/STORMS AFFECTING RAJASTHAN STATE DURING 1891-1970

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<td>West</td>
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</tr>
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<td>-</td>
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</tr>
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</tr>
<tr>
<td>May</td>
<td>-</td>
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</tr>
<tr>
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<td>10</td>
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</tr>
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<td>18</td>
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<td>October</td>
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<tr>
<td>November</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>December</td>
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<td>Total</td>
<td>151</td>
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CHAPTER II

PEOPLE

POPULATION

During 1991 Census, Rajasthan was the ninth largest State amongst the various States of India having a population of 4,40,05,990 (2,30,42,780 males and 2,09,63,210 females) and contributed around 5.2 per cent to the total population of the country. The largest contribution to the population of Rajasthan was made by its Jaipur district (10.75 per cent). There was a wide range of variation in the contributions made by other districts. While Jaisalmer district contributed only 0.78 per cent, the share of Udaipur district was around 6.57 per cent, the rest of the intervening districts contributing between 1.49 per cent (Sirohi) to 5.97 per cent (Ganganagar).

Density

Rajasthan is sparsely populated and the density of population per sq. kilometre is only 129 persons (1991 census). The density of population varies from district to district and ranges from a mere 9 persons to a sq. kilometre in the desert district of Jaisalmer to 336 in Jaipur district. Density ranges from 44 in Bikaner to 121 in Nagaur lying in the sandy tracts and from 127 in Sirohi and Ganganagar to 326 in Bharatpur according to 1991 census.

Sex Ratio

There were 2,30,42,780 males and 2,09,63,210 females at the time of 1991 census. The sex ratio in Rajasthan was 919 females per 1000 males. Fifteen districts namely, Jhalawar (918), Ajmer (918), Tonk (923), Jhunjhunun (931), Churu (937), Jalore (942), Nagaur (942), Bhilwara (945), Sikar (946), Sirohi (949), Chittaurgarh (950), Pali (956), Udaipur (965), Banswara (969) and Dungarpur (995) had comparatively higher sex ratios. The remaining 12 districts namely Jaisal, Jodhpur and Barmer (891), Bundi (889), Kota (887), Bikaner (885), Alwar (880), Ganganagar (877), Sawai Madhopur (854), Bharatpur (832), Jaisalmer (807) and Dhaulpur (795) had lower sex ratios.

The sex ratio in the urban areas of Rajasthan as a whole is rather low (879).
Age Structure

During 1971 census, about 50.3 per cent of the total population of Rajasthan belonged to age group 15 to 59. The bulk (44.2 per cent) of the rest consisted of infants in the age group 0 to 14. The old persons, in age group 60 and over, constituted the remaining 5.5 per cent. At the district levels, the proportion of persons in age group 15 to 59 varied from 47.1 in Ganganagar and Churu districts to 55.1 per cent in Bhilwara; in age group 0 to 14 from 39.2 in Bhilwara to 47.7 in districts of Ganganagar and Banswara; and in age group 60 and over from 4.3 in Dungarpur to 6.1 in Alwar, Jhunjhunun, Sikar, Pali and Jhalawar districts.

There has been a noticeable change in the pattern of Rajasthan's age structure. The age group 15 to 59 has gone down from 61.8 in 1901 to 50.3 in 1971. The proportions in the age group 0 to 14 have gone up from 33.7 in 1901 to 44.2; and, in the age group of 60 and over from 4.4 in 1901 to 5.5 in 1971.

During 1981 Census, it was found that 51.46 per cent of the population belonged to the age-group 15 to 59, while 42.43 per cent consisted of the infants in the age group of 0 to 14 years and the remaining belonged to the age group of 60 years and above.

Rural-Urban Components

Around 82.4 per cent of the population in Rajasthan (21,222,045) resided in villages during 1971 census. Over a quarter (26.0 per cent) of this rural population was found in 7817 villages having a population size of 500 to 999 persons while around other quarter (26.0 per cent) lived in 4008 villages of size group 1000 to 1999 of population. Of another quarter, which lived in larger sized villages, 20.7 per cent was found in 1524 villages having population between 2000 to 4999, and 5.4 per cent in 165 villages having 5000 to 9999 persons. The remaining portion of the rural population lived in small villages - 17.4 per cent resided in 11,010 villages of population size 200 to 499 and 4.4 per cent in very small villages (8771) having a population of less than 200 persons.

At the district level, the strength of population living in villages varied from 58.6 per cent in Bikaner to 95.6 per cent in Jalor district - nineteen districts having rural population even higher than the State average (82.4 per cent).

Fifteen districts in Rajasthan namely, Bikaner, Churu, Jhunjhunun, Alwar, Bharatpur, Sawai Madhopur, Sikar, Ajmer, Jodhpur, Nagaur, Pali, Barmer, Jalor, Sirohi and Dungarpur had more than 73 per cent of their rural population living in villages having 500 to 5000 persons. In the remaining eleven districts also, more than half of their population resided
in villages of this category. It was observed that distribution of population in villages having 200 to 500 persons varied from 6.2 per cent in Jalore to 34.4 per cent in Jhalawar, and, in the villages having less than 200 persons, the variation was from 0.6 per cent in Jhunjhunun to 12.3 in Jaisalmer district. The range of variation of distribution of population was from 1.1 to 15.1 per cent in case of villages of population size 5000 to 10,000 in districts Dungarpur and Pali respectively (district Bikaner being conspicuous by the absence of population living in such category of villages. Only seven districts namely, Ganganagar, Jaipur, Sikar, Barmer, Bhilwara, Chittaurgarh and Kota had rural population living in villages of 10,000 persons and even above but the proportionate strength of rural population living in such category of villages ranged only between 1.2 per cent in Ganganagar district to 2.3 per cent in Bhilwara.

17.6 per cent of the population in Rajasthan (45,43,761) belonged to the urban areas. There were, however, six districts namely, Bikaner (41.4), Ajmer (37.6), Jodhpur (31.9), Jaipur (30.1), Churu (29.6) and Kota (24.1) which had higher urban components, the remaining districts ranging from a meagre proportion obtaining at Jalor (4.4) to around 17 per cent in Jhunjhunun, Sikar, Tonk and Sirohi districts. At the lower administrative level, 74 tahsils were conspicuous by the absence of urban population, 45 had higher and the remaining 77 had lower proportions than the State average (17.8). Seven major towns- Jaipur, Jodhpur, Ajmer, Kota, Bikaner, Udaipur and Alwar form the nuclei of urban concentration, while the rest of the urban population resided in other one hundred fifty towns of various population sizes.

It is interesting to observe the changing proportion of the contributions made by various classes of towns to the urban population of the State over a period of last 70 years (1901-1971). The contribution of population living in towns having 100 thousand persons and above increased from 10.3 per cent in 1901 to 41.8 in 1971. The population living in towns having fifty thousand to one hundred thousand persons fell down from 15.7 to 10.7 per cent. And, so was the case with the populations living in towns below twenty thousand persons which dwindled from 57.7 to 27.0 per cent. The proportions of population living in the category of towns having twenty thousand to fifty thousand persons, however, increased from 16.2 per cent to 20.5 per cent during this period.

Rajasthan has a low degree of urbanisation and the extent of urban influence extended by the urban centres upon their surrounding areas is also generally low. Even the city of Jaipur supported only 4 neighbouring towns, Ajmer city three towns, Kota 2, Bikaner 4 and Alwar influenced 2 neighbouring towns. In 1971, Jodhpur and Udaipur cities did not have any town in their sphere of influence.
During 1981 Census, the rural population of State constituted 78.95 per cent of the total population residing in 34,968 villages while urban population formed about 21.05 per cent residing in 201 urban centres. More than half of the rural population (53.05 per cent) resided in 7803 villages having population range of 1000 - 4999; 22.46 per cent in 8537 villages with population between 500-999 persons; while 13.12 per cent in 10,425 villages having population between 200-499 persons. Of the remaining 11.37 per cent, 7.60 per cent resided in 321 villages (population range 5000-9999) and a mere 2.89 per cent in 7861 villages with a population range of less than 200 persons. Barely 0.88 per cent resided in 21 large villages having a population range of over 10,000 persons.

The percentage of rural population varied from 57.20 per cent in Ajmer district to 93.78 per cent in Banswara district. Twenty districts had rural population higher than the State average (79.95 per cent). Fifteen districts namely, Bikaner, Churu, Jhunjhunun, Alwar, Bharatpur, Sawai Madhopur, Sikar, Ajmer, Jodhpur, Nagaur, Pali, Barmer, Jalore, Sirohi and Dungarpur had more than 50% of their rural population in the villages falling in the population range of 1000-1999 and 2000-4999. Only 11 districts had villages in the population range of 10,000 and above. The proportion of population living in such villages varied from 0.61 per cent in Udaipur district to 5.01 per cent in Jaisalmer district. The distribution of population in villages having less than 500 persons varied from 3.78 per cent in Jalore district to 36.21 per cent in Jhalawar district.

As far as urban component was concerned, six districts, namely, Ajmer (42.80%), Bikaner (39.48%), Jaipur (36.56%), Jodhpur (34.77%), Kota (31.93%) and Churu (29.22%), recorded higher population than the urban component of the State which was 21.05%; the remaining districts ranging from a mere 6.22% in Banswara to 20.74% in Jhunjhunun district. The urban population dwelt in 201 towns (Class I-11, Class II - 10, Class III - 55, Class IV - 101, Class V - 23 and Class VI - 1). It is significant that two-third of 66.42% of the total urban population was concentrated in 11 class I towns i.e. Jaipur (9,77,165) Jodhpur (5,06,345), Ajmer (3,75,593), Kota (3,58,241), Bikaner (2,56,057), Udaipur (2,32,588), Alwar (1,45,795), Ganganagar (1,23,692), Bhilwara (1,22,625), Bharatpur (1,05,274) and Sikar (1,02,970).

In 1991, 3,39,38,877 or 77.1 per cent of population was rural while 1,00,67,113 or about 23 per cent was urban.

Growth of Population

The population of Rajasthan was only about 10,300 thousand in 1901 which grew to around 25,800 thousand by 1971. The history of the growth of population during this period indicates that almost all that was added
to the population during 1901-11 was offset by the epidemics and war which occurred during the decade 1911-21. About 1,455 thousand were then added during 1921-31, around 2,116 thousand during 1931-41, and about 2,107 thousand during 1941-51. The two decades, however, which followed were very crucial and were responsible for the addition of 4,185 thousand during 1951-61 and an all time high figure of 5,610 thousand during 1961-71. Thus, while the first five decades (1901-51) added only 5,678 thousand persons to State's population, the last two decades (1951-71) added as many as 9,795 thousand persons. The rate of growth was as rapid as 26.2 per cent for the period 1951-61 which got further accelerated to as high as 27.8 per cent for the decade 1961-71. During 1971-81 decade and 1981-91 decade, the growth was 32.9 per cent and 28.0 per cent respectively. The table given below depicts the growth of population during the last ninety years (1901-1991):

<table>
<thead>
<tr>
<th>Year</th>
<th>Per cent</th>
<th>Year</th>
<th>Percent</th>
</tr>
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<td>-</td>
<td>1951</td>
<td>15.2</td>
</tr>
<tr>
<td>1911</td>
<td>6.7</td>
<td>1961</td>
<td>26.2</td>
</tr>
<tr>
<td>1921</td>
<td>6.3</td>
<td>1971</td>
<td>27.8</td>
</tr>
<tr>
<td>1931</td>
<td>14.1</td>
<td>1981</td>
<td>32.9</td>
</tr>
<tr>
<td>1941</td>
<td>18.1</td>
<td>1991</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Very interesting patterns are observed at the level of the districts regarding the growth of population during 1901 and 1971. Districts of Churu, Barmer, Banswara and Ajmer have their growth history similar to the State as a whole, as they also added to their population one and a half times more during the last two decades than what they had added in the five earlier decades. Districts of Ganganagar, Bikaner, Sawai Madhopur, Jaipur, Sikar, Tonk, Jodhpur, Nagaur, Bundi and Kota belong to the group where growth during the period 1951-71 was observed to be double than their growth during the earlier fifty years. The trends in the growth of population in Alwar and Bharatpur districts were remarkable; while only 9000 persons were added to the population of district Alwar during 1901-51, there was an addition of around 5,00,000 during 1951-71. In Bharatpur district also, while 11,000 persons were added during 1901-51, as many as about 6,00,000 were added during 1951-71. The remaining districts namely Jhunjhunun, Jaisalmer, Pali, Jalore, Sirohi, Bhiwara, Udaipur, Chittaurgarh, Dungarpur and Jhalawar displayed a pattern where the additions to their population during 1901-51 and the period 1951-71 were more or less equal.
The census (1961-71) indicates that twelve districts recorded higher and the remaining fourteen lower growth rates of population than the Rajasthan State average (27.8 per cent) as would be seen from the statement given below:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Districts with higher growth rate (per cent)</th>
<th>S.No.</th>
<th>Districts with lower growth rate (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Banswara</td>
<td>1.</td>
<td>Alwar</td>
</tr>
<tr>
<td>2.</td>
<td>Nagaur</td>
<td>2.</td>
<td>Sikar</td>
</tr>
<tr>
<td>4.</td>
<td>Ganganagar</td>
<td>4.</td>
<td>Sawai Madhopur</td>
</tr>
<tr>
<td>5.</td>
<td>Bundi</td>
<td>5.</td>
<td>Chittaurgarh</td>
</tr>
<tr>
<td>6.</td>
<td>Churu</td>
<td>6.</td>
<td>Udaipur</td>
</tr>
<tr>
<td>7.</td>
<td>Jaipur</td>
<td>7.</td>
<td>Tonk</td>
</tr>
<tr>
<td>8.</td>
<td>Dungarpur</td>
<td>8.</td>
<td>Jalore</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.</td>
<td>Jaisalmer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14.</td>
<td>Ajmer</td>
</tr>
</tbody>
</table>

Several pockets in various districts, however, recorded even higher growth rates - notable cases being Ghatol (40.2) and Banswara (41.8) tahsils of district Banswara; Jhayal (55.5) and Nagaur (56.6) of district Nagaur; Ladpura (64.0) and Ramganj Mandi tahsils of district Kota; Sangaria (43.1), Hanumangarh (80.9), Suratgarh (80.9), Nohar (47.5), Bhadra (41.9) and Anupgarh (63.2) tahsils of district Ganganagar; Bundi (44.8) tahsil of district Bundi; Taranagar (40.1) tahsil of district Churu and Jaipur (47.8) tahsil of district Jaipur.

There were several pockets too, on the other hand, which recorded meagre growth rates such as tahsils Chohtan (9.1) and Sheo (3.4) of district Barmer; and tahsils Padampur (4.3) and Raisinghnagar (4.4) of district Ganganagar. Indeed Karanpur tahsil of district Ganganagar even recorded a decrease of 4.5 per cent.

The following table shows the district-wise decennial growth rate (per cent) of population during the last two decades i.e. 1971-81 and 1981-91 respectively:
S.No. | District       | 1971-81 | 1981-91 |
------|---------------|---------|---------|
 1.   | Churu         | 38.4    | 37.3    |
 2.   | Udaipur       | 30.6    | 22.4    |
 3.   | Ganganagar    | 45.6    | 29.0    |
 4.   | Alwar         | 26.1    | 30.2    |
 5.   | Nagaur        | 29.0    | 31.2    |
 6.   | Jodhpur       | 44.8    | 27.5    |
 7.   | Kota          | 36.6    | 32.1    |
 8.   | Sawai Madhopur| 28.6    | 27.2    |
 9.   | Sikar         | 32.0    | 33.3    |
10.   | Ajmer         | 25.5    | 19.6    |
12.   | Bhilwara      | 24.2    | 21.4    |
13.   | Jhunjhunun    | 30.3    | 29.2    |
14.   | Churu         | 34.8    | 30.5    |
15.   | Pali          | 31.3    | 16.4    |
16.   | Chittaurgarh  | 30.4    | 20.2    |
17.   | Barmer        | 44.4    | 28.1    |
18.   | Bikaner       | 48.0    | 42.4    |
19.   | Banswara      | 35.4    | 30.2    |
20.   | Jalor         | 35.2    | 26.4    |
21.   | Tonk          | 25.2    | 24.1    |
22.   | Jhalawar      | 25.8    | 21.7    |
23.   | Dungarpur     | 28.7    | 28.0    |
24.   | Bundi         | 30.8    | 25.5    |
25.   | Sirohi        | 27.9    | 20.5    |
26.   | Dhaulpur      | 27.2    | 27.9    |
27.   | Jaisalmer     | 44.8    | 41.3    |

**RAJASTHAN** | 32.9 | 28.0 |

**LANGUAGE**

Population by Linguistic Groups

Rajasthan is a predominantly Hindi speaking State and about 91 per cent of its population speaks Hindi and its local dialects. Of the remaining, a little over 3 per cent speaks Bhili/Bhilodi tribal language, about 2.5 per cent Urdu, around 2 per cent Punjabi and about 1 per cent speaks Sindhi as would be seen from the table given below.\(^{13}\)
Language | Population (Number) | Percentage strength
---|---|---
Hindi | 2,34,80,495 | 91.13
Bhili/Bhilodi | 8,37,802 | 3.25
Urdu | 6,50,947 | 2.58
Punjabi | 4,69,976 | 1.82
Sindhi | 2,40,550 | 0.93
Gujarati | 36,866 | 0.14

According to 1971 census, Marwari is the most predominant of the local dialects and is spoken by about 16 per cent of population, followed by Rajasthani (about 8 per cent) and Mewari (about 3 per cent) as would be observed from the table given below:

Dialects (No.) (Percentage strength)
---|---|---
Marwari | 41,91,641 | 16.27
Rajasthani | 19,79,382 | 7.68
Bagri-Rajasthani | 1,84,456 | 0.72
Mewari | 8,12,164 | 3.15
Harauti | 3,34,350 | 1.30
Dhundhari | 1,55,039 | 0.60

Among other important dialects Harauti accounts for 1.3 per cent, Bagri-Rajasthani 0.7 per cent and Dhundhari 0.6 per cent. Marwari is spoken mostly in Jalore (77.1 per cent), Sirohi (73.5 per cent), Pali (70.9 per cent), Jaisalmer (70.8 per cent), Barmer (55.2 per cent), Nagaur (48.5 per cent), Bikaner (43.3 per cent) and Jodhpur (41.6 per cent) districts. Rajasthani is important in Churu, Bikaner, Barmer, Jodhpur, Nagaur, Jaisalmer and Sikar. Speakers of Bagri-Rajasthani are concentrated in district Ganganagar, of Mewari in district Chittaurgarh, Bhilwara and Udaipur, of Harauti in Kota and Jhalawar districts and the speakers of Dhundhari in Jaipur district.

Rajasthani

Historically the evolution of Rajasthani may be linked up with Shaurseri Prakrit. This was originally the language of Mathura region and was extant
in the west including Gujarat and Saurashtra. This western form developed some peculiarities. From Shaurseni Prakrit developed two major forms of Apabhramsha- the eastern Madhyadesiya called ‘Shaurseni’ and the western called ‘Gurjar’ or ‘Gurjari’. The word ‘Gurjar’ implies geographical territory and not any caste, clan or tribe as some believe. Old Rajasthani developed from the popular Gurjar Apabhramsha current in the western parts of the country including present Rajasthan and Gujarat with Saurashtra.

Braj Bhasa, Bundeli etc., developed from Shaurseni Apabhramsa. The early Rajasthani developed and began taking a definite linguistic pattern during the eleventh century, about 1050 A.D.

The early Rajasthani and early Gujarati were identical till bout 1450 A.D. The separation started thereafter. To this common language (from 1050 to 1450 A.D.) various names such as Maru-Sorath, Old Western Rajasthani, Old Gujarati, Old Rajasthani and Maru-Gurjar have been given. The name Maru-Gurjar is more appropriate as it indicates the language of both the States - Rajasthan and Gujarat. The literature of these 400 years is, thus a common heritage of both the languages, Rajasthani and Gujarati.

Scholars have pointed out two forms of Rajasthani during the fifteenth century - the western (including Marwari, Mewari and Vagadi or Bagadi) and the eastern (including Dhundhadi or Jaipuri and Hadauti). The characteristic of the eastern form is the use of genitive postposition ‘kau’ (कौ) as in Achaldas Khichi ni Vachanika of Gadan Shivdas but this is also found in the western form in Dhola Maru ra Duha and Sabad Vani of Jambhaji (1451-1536 A.D.).

The name ‘Rajasthani’ is comparatively new and has been universally accepted. Its old and popular names were - Maru Bhasa, Marubhum Bhasa, Marudesiya Bhasa, Maru Vani etc. According to Dr. Grierson (Linguistic Survey of India), there were about twenty dialects of Rajasthani which he grouped under five major heads: Marwari (60,88,389), Middle-eastern (29,07,200), North-eastern (15,70,099), Malwi (43,50,507) and Nimadi (4,77,777) and others including unidentified (9,07,288). Taking the figures of the Census of India, 1891, he says that the minimum number of Rajasthani speakers in India must be 1,58,42,087. Prior to him in 1898, Rev. Mecalister pointed out as many as 15 forms of speeches in the erstwhile Jaipur State alone- (Specimen with a Dictionary and a Grammar of the Dialects Spoken in the State of Jeypore, Allahabad Mission Press, (1898).

In the Census of India 1961 (Vol.I, India, Part II-Language Tables) as many as 73 speeches of Rajasthani (spoken in Rajasthan and Malwa) have been mentioned as shown below:

It is apparent that the names have not been given on any sound basis. On an analysis we find that (1) out of these, the speakers of 46 speeches, there were less than 1,000; (2) of 9 speeches, there were less than 1,000; (3) of 4 speeches, there were less than 50,000 (4) of 2 speeches there were less than 1,00,000; (5) of 8 speeches there were less than 10,00,000 and (6) of 4 speeches there were more than 1 crore and less than 10 crore. In the Census of 1961, Rajasthan has been given as the mother tongue by 1,44,93,018 persons.

Branches of Rajasthan

Following are the main branches of Rajasthan:- Marwari-Mewari, Vagadi or Bagadi, Jaipuri or Dhundadi- Hadauti, Mewati-Ahirwati, Malwi and newly emerged Ganganagar (or Uttaradhi i.e. belonging to the north).

Marwari-Mewari

Marwari is the most important and main dialect of western Rajasthani. It is spoken with slight variations in the erstwhile states of Jodhpur, Bikaner, Jaisalmer, Sirohi, Shekhwati region of Jaipur, part of Kishangarh and Ajmer-Merwara, some parts of Punjab and Haryana around the district of Ganganagar. A few characteristics of Marwadi are: The use of ra, ra, ri (र, र, री) in the genitive case, use of mharo (महरो) tharo (तारो) in singular, first and second person pronoun, the use of hai (हे) (also chai (चै) in prose) in the present tense, ho (हो) in past tense and yun, sun (यून, सून) in future tense, use of Nai (नई) in the dative and sun, un (उन) in the ablative cases. V (व) is written and pronounced in two ways. In one, V (व) is written in usual Nagari script and other a dot below the curve (व). This rule has been followed throughout in the old manuscripts. V (व) is a labio-dental and W (व) is a bilabial sound and are akin respectively to
V and W of the Roman script. But this difference is fastly fading away now a days.

Of all the dialects of Rajasthani, the area of Marwari is vast and large. Slight phonetic variations in speech and minor differences in form are found in different regions including Jodhpur, Bikaner, Jaisalmer, Shekhawati and Ganganagar. This is only natural, and is true of other dialect regions as well.

Of all the branches, Marwari has the oldest, richest and a varied and unbroken literary tradition. It achieved the form of a poetic speech and the position of standard central language. It held this position for about 500 years upto 1950 or so. (from 1450 A.D., as prior to it, Gujarati and Rajasthan were identical). It is also most prominent even now. Poets and writers of all the regions adhered to it for standardization, wider acceptance and appeal. Except for style, there is no difference in the language of poems of Suryamall Mishran (Bundi), Sagaram of Jaisalmer, Ramnath Kaviya of Alwar (village Satawat), Opa Adha of Sirohi (village Pesbwa) and Shankardan Samaur of Bikaner (village Bobasar, Sujangarh). It is significant that these poets flourished during the nineteenth century. In vats (stories), khyats (histories), and other prose- writings too this standardization is equally conspicuous.

Mewari — It is spoken in the areas of the erstwhile Udaipur State (except some areas in south-east) and its neighbouring regions. An inscription of the Kirtistambh (tower of victory) erected by Maharana Kumbha of Mewar (1433-1468 A.D.) shows that he also used Mewadi in his four dramas. This is the first reference to the use of this dialect. Use of Mewari is also found in the literature created in the seventeenth century and afterwards. Shri Gumansinghji & Maharaj Chatusinghji were well known Yogi and Bhakt poets of the Modern Period (1850 A.D. onwards) whose works are in Mewari.

Vagadi (Bagdi) — It is spoken in the areas of the erstwhile states of Dungarpur and Banswara. This region is surrounded by Gujarat, Mewar and Malwa. Hence impact of Gujarati and Mewari is found. The region is inhabited by Bhils and others. The Bhils inhabiting the jungles and owning their fields have been maintaining their cultural heritage and linguistic pattern. There is, therefore, slight difference in the Bhili of these persons and Vagadi as such which is used by all other inhabitants including the Bhils who have come into their contact. In Bhili ch (ModelProperty)
 and chh (ModelProperty) are pronounced as s (ModelProperty) and s (ModelProperty) is pronounced as h (ModelProperty) as in Jodhpuri and other dialects). There is more similarity than diversity in the two. There are three genders in Vagadi (Bagdi) but only two-masculine and feminine in other speeches of Rajasthani. Except folklores there is not much literature in Vagadi.
JAIPURI-HADAUTI — Jaipuri is also called Dhundhadi. It was spoken in the erstwhile Jaipur state (except its Shekhawati region), Kishangarh (some parts), Tonk, Lawa and eastern parts of Ajmer-Merwara. In Dhundhadi chhai (छै ) is used for present, chho (छो ) for past and la (ला ) for future tenses. Kodai (कोडै ) (where), Indai, andai (आॅ, अडै ) (here) etc., are profusely used. Ko, ka, ki (को, का, की ) are used in genitive case, nai ( नै ) and kai ( कै ) in dative case and sun, sain ( सौ, सै ) in ablative case. In the end of a word ‘S’ ( स ) is very often added (khan gayos? Mains to aindai chho (खच गवॉस्स्मैस्स तॊ एडैछो ) (where did you go? I was here), but the meaning remains the same. In qualitative and quantitative adjectives, there is a tendency to add ‘K’ (क ) in the word end. For example, katrok (कतरोक) (how much), kasyok (कस्योक) (how).

Many works of the Dadupanthi tradition are in Dhundhadi. Others have also contributed to it.

HADAUTI — It is spoken in parts of erstwhile States of Bundi, Kota, Jhalawar and adjoining areas. It is surrounded by the speech Nagarochal and Donghong in the north, Sopuri or Sipari in the north-east, Bundelkhandi and Malwi in the east and south-east, Malwi-Sodwadi in the south-west and Mewari and Khairadi in the north-west. Apart from folk literature, there is not much old literature in Hadauti.

MEWATI—AHIRWATI — Mewati is mostly spoken in the Alwar region and some parts of Bharatpur. In Mewati ‘न’ ( न ) or ‘नौ’ ( अनौ ) are used to make plural, as also ‘नौ’ (अनौ) like Marwari. Ka, ki, ko (का, की, को ) are used in genitive case and ku, kun, konai and lu (लू, लू, कोनैलू) in objective case. The last one, namely lu (लू ) is typical of Mewati. Many works of the Charandasí tradition are in Mewati besides folklows.

AHIRWATI — It is spoken in the tahsils of Bahrur, Mundawar and western parts of Kishangarh and Alwar district and northern parts of tahsíl Kotputli of Jaipur district. Vowel ‘a’ (अ) is often changed to ‘ा’ (आ ), i (ई ) and ‘ू’ (ू ). Sun, san, se (सू, सौ, से) as auxillary verb in present tense, thi, tha (थ, था ) in past tense and go, ga, gi (गो, गा, गी ) in future tense are used. Ka, ke, ki, ko (का, के, की, को ) are used in genitive case. The literature of Ahirwati is mostly in oral tradition.

GANGANAGARI — Another variation of speech which may be called Ganganagari (or Uttaradhi, i.e. belonging to the north) has emerged in Ganganagar district and adjoining areas of Haryana and Punjab. Its development was very rapid due to movement of people from neighbouring areas to the new vocational situations created by the construction of Gang
canal and, later, on account of the exodus from Punjab during 1947. Mixture in speech is usually a consequence of meeting of different people on common grounds. Ganganagari may be treated as subdialect of Marwari. In its accentuations and aspirated sounds, there appears to be some impact of Haryani and slightly of Punjabi. The difference also lies in the use of genitive case which is formed by go, ga, go (गो, गा, गी ). In the future tense of verb sun, syun ( सूं,स्यूं) and go, ga, gi (गी, गा, गी) are used.

From the point of view of nature and internal linguistic structure, there is more or less uniformity in almost all the branches of Rajasthani. A few points may be mentioned below:

1. The words ending in ‘o’ (ओ) are masculine. Such words will be plural by adding ‘a’ (आ) or ‘an’ (अं). Words of feminine gender also are made plural by adding ‘an’ (अं).

2. Words ending in ‘o’ (ओ) is a universal tendency, as compared with words ending in ‘a’ (आ) in Khadi Boli.

3. The pronouns (first person and second person) in genitive case, singular ‘mha’ (म्हा) and ‘tha’ (था) forms are found.

Many classical folk-songs are popular throughout Rajasthan. These and similar other points establish the oneness of Rajasthani language. It may, however, be mentioned that practically no attempt has been made to show inherent uniformity in the above branches of Rajasthani.

Rajasthani has been recognized as a literary language by the Sahitya Akademi (National Academy of Letters, India) New Delhi.

SCRIPT — The script of Rajasthani is Devanagri, also called Shasti by common people. The trading community uses this script in a slightly different form without lines on top of letters and vowel marks in its indigenous accountancy, book-keeping, letters and hundis etc. This scriptory style is called Modiya or Mundiya. This economises effort and works as a sort of shorthand but might lead to mis-readings as well. The writing style of Nagari script in administrative offices had assumed the designation as Kamdari. The Jains have also evolved a calligraphy of their own in their manuscript writing. (For further reading, see Selected References at the end of this chapter)

RELIGION AND CASTE

Principal Communities

Inhabited by all the principal religious communities found in India, Rajasthan remains to be overwhelmingly predominated by the Hindus. They constitute as much as 89.63 per cent of the total population in the State in 1971.
Such figures for 1981 census are as under:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Religious Community</th>
<th>Population</th>
<th>Percentage of population in the State.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Hindus</td>
<td>3,06,03,970</td>
<td>89.32</td>
</tr>
<tr>
<td>2.</td>
<td>Muslims</td>
<td>24,92,145</td>
<td>7.28</td>
</tr>
<tr>
<td>3.</td>
<td>Christians</td>
<td>39,568</td>
<td>0.12</td>
</tr>
<tr>
<td>4.</td>
<td>Sikhs</td>
<td>4,92,818</td>
<td>1.44</td>
</tr>
<tr>
<td>5.</td>
<td>Buddhists</td>
<td>4,427</td>
<td>0.01</td>
</tr>
<tr>
<td>6.</td>
<td>Jains</td>
<td>6,24,317</td>
<td>1.82</td>
</tr>
<tr>
<td>7.</td>
<td>Other religions &amp; persuasions</td>
<td>3,543</td>
<td>0.01</td>
</tr>
<tr>
<td>8.</td>
<td>Religion not stated</td>
<td>1,074</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

The Muslims have been reported to be the second largest community. They form only 6.90 per cent of the total population in the State in 1971. The Jains, the Sikhs, the Christians and the Buddhists are other important religious communities in Rajasthan who together constitute a little over 3 per cent of the population. There is a negligible number of people, who are following other religions and persuasions, and those who have not stated their religion.

The following table shows the population of religious communities found in Rajasthan during the census of 1971:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Religious Community</th>
<th>Population</th>
<th>Percentage of population in the State.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Hindus</td>
<td>2,30,93,895</td>
<td>89.63</td>
</tr>
<tr>
<td>2.</td>
<td>Muslims</td>
<td>17,78,275</td>
<td>6.90</td>
</tr>
<tr>
<td>3.</td>
<td>Christians</td>
<td>30,202</td>
<td>0.12</td>
</tr>
<tr>
<td>4.</td>
<td>Sikhs</td>
<td>3,41,182</td>
<td>1.33</td>
</tr>
<tr>
<td>5.</td>
<td>Buddhists</td>
<td>3,642</td>
<td>0.01</td>
</tr>
<tr>
<td>6.</td>
<td>Jains</td>
<td>5,13,548</td>
<td>1.99</td>
</tr>
<tr>
<td>7.</td>
<td>Other Religions &amp; Persuasions</td>
<td>4,339</td>
<td>0.02</td>
</tr>
<tr>
<td>8.</td>
<td>Religion not stated</td>
<td>723</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

The Hindus are distributed fairly all over Rajasthan and are predominant in all the districts. Their proportion to the total population varies from 75% in Jaisalmer district to over 95% in Dungarpur district. They are divided into numerous castes, sub-castes and tribals. It includes generally the worshippers of Brahma, Shiva, Sakti, Vishnu and a large number of gods and goddesses besides the followers of the Arya Samaj, Ram Krishna Mission etc.

The Muslims form the second largest community in 22 districts out of 26 districts in Rajasthan.

The Jains too are quite numerous (5,13,548) in the State, constituting about 2 per cent of the total population. They are divided into two major sects, viz. the Digambaras and the Shwetambaras. The Digambaras in the State are traditionally divided into Terahpanthis, Beespanthis and Gumanpanthis but these divisions are becoming increasingly less significant and the Digambaras are treated as an undivided group. The Shwetambaras, on the contrary, are divided into Mandir Margis and Sadhu Margis including Terahpanthis and Sthanakvasis.

In 1971, Sikhs constituted 1.33 per cent of the total population of Rajasthan. The community of Sikhs in the State who, by and large, believes in ten Gurus and the Granth Sahib has small sub-sects constituted by those who either do not believe in all the ten Gurus i.e. Udasis, Minas and Ram Raiyas or believe that the line of succession continued even after Guru Gobind Singh and recognise a living Guru e.g. Nirankaris and Namdharis. However, also there are two major divisions of the Sikhs constituting the orthodox hair and beard growing Khalsa and the clean shaven Sahaj Dhari.

The Christians including the Roman Catholics, Methodists, Anglicans and other Protestant denominations, are distributed all over Rajasthan. However, they constituted a merge 0.12 per cent of the total population in the State in 1971.

The Buddhists and the people following other religions and persuasions form a negligible proportion of the population. So is the case with people who have not stated any religion.

CASTES

The social structure in Rajasthan, which has been both "feudal" and "conservative" is highly caste structured. Thus, not only the Hindus, but members of other religious groups and sects living along with the Hindus also are treated as "castes" for many purposes. Practically speaking, these non-Hindu communities even themselves regard as divided into several "caster" or "sub-caste" groups. It is true that they cannot be regarded as
castes or sub-castes in the technical sense of the term. But in the local socio-cultural context many an attribute of the caste system is associated with them, particularly at the in-group and out-group inter-actional levels.

Since the caste-wise data are not available in the census reports after 1931, it is difficult to make an exhaustive list of castes and sub-caste groups existing presently in the State. However, early census reports, and some other attempts made in this direction throw some light on this aspect. Broadly, the present Hindu community is divided into caste Hindus and the Hindus belonging to the Scheduled Castes and Scheduled Tribes.

Apart from various castes categorised as agriculturalists, artisans, servants etc. the traditional caste clusters like Brahmans, Rajputs, Vaisyas continue to be very important in Rajasthan.

The Brahmans, who enjoyed the highest position in the traditional caste structure have been reported to be divided into various sub-castes in the erstwhile princely States of Rajasthan. Major Walter in the Gazetteer of Marwar has sub-divided the Brahmans of Marwar into the following:-


The Brahmans were not only confined to their normal priestly functions of learning and teaching but were also engaged in agriculture, cattle rearing, trade, diplomatic assignments and military services.

The Rajputs, have been traditionally entrusted with the administration and military duties and they thus formed the ruling class, or classes associated with martial activities. Normally, the Rajputs have been divided into three classes, namely (1) landholders, (2) cultivators or tillers of the ground, (3) servants, agents and the like. The landholders include the old hereditary aristocracy.

The Rajputs are originally divided into two major branches, namely the Surya Vanshi or the Solar race and the Chandra Vanshi or the Lunar race. The Rajput Chiefs belonging to the six sub-branches, namely Rathore, Sisodiya, Chauhan (of the Hara & Deoria branches) Jadoon (of the Bhati branch), Kachwaha (also of the Naruka branch), and Jhala were ruling the various States, before the formation of Rajasthan. A detailed description of as many as 119 clans of Rajputs alongwith their numerous sub-clans has been attempted by M.A. Sherring.
The mercantile or trading class of Rajasthan known as Marwaris in general, being entrepreneur by nature and well-versed in accounts, carried on trade with great efficiency almost at every commercial centre in the country. Apart from their leaning towards trade, finance, and commerce, they were appointed on high posts of administrative or diplomatic nature.

Apart from the various branches of Vaishya caste of the Hindu community, the principal trading castes in the State belong to the Jain community. However, the major castes are the Agarwals, Oswals, Maheshwari, Bijaiburjis, Khandelwal, Dhusar, Sarogis, Srimalis, Palliwal, Forwal, Sri-Srimals, Vijaywargis, Bhattias, Lohanas, Arorahs, Bohras, Khondehwal, Nahar, Dilwaras, Khestri, Kathris, Nogdra, Narsinghpura, Bhutera and Khatrias.

The Kayasths, is yet another caste which has performed important role in the socio-administrative set up of the State. They have been the accountants and revenue officials. The local name for Kayastha in Marwar is Pancholi. They have also various sub-divisions. Some of the more known sub-divisions are Mathur, Bhatnagar, Srivastava, Saxena, Kulshresta, Nigam etc.

Next to the so called traditional upper castes, the agricultural castes comprising Jats, Kunbis or Kurni, Kalbi, Kirs, Mali, Pihils, Bishnois, Dhakad, Lodha, Kachi, Sirwi, Pithal, Kirar, Mehwati etc. have been reported to be important. The Bhat and the Charan are the traditional bards and genealogists. The Gujars have been the clan which followed the profession of herdsman apart from the Ahirs, Gayaris and Rebaris. The artisans and craftsmen in the State constituted several important castes such as Sunar, Lohar, Lakhera, Chipas, Patwa, Julaha, Ghanchas, Shikligar, Khati, Thathera, Kumbhar, Silawat, etc. The castes consisting of small traders include Tamboli, Teli, Ghori, Burhanja or Bhurji, Kulal, Sunga, Bisati, Manihar, Odi, mass, Rangrej, Darji, Dabgar etc. The Naths, Gosains, Nagas, Khaki, Ram Sanchi, Kabir Panthi, Desantari, Motesar etc. constitute the group of devotees and religious mendicants. Apart from Nai, Dhobi, Chobdar, Mahra or Kahar, Bari, the state had a class of hereditary servants known as ‘Chakars’ or Golas and Darogas. The Dholi, Jagri, Nat, Santhia, Kanjar, Rawal, Chirmar, Shikari, were the jugglers or acrobats or snake charmors or drum beaters. Chamar, Meghwal, Sargara, Sanjogi Shami, Mochi, Raiger, Dhank, Khatik, Bhangi, Dom, Dhanka, etc. have been the traditional low castes. The Thoris or Thaori, Chura, Sansi, Bauria and Moghya have been the castes engaged in criminal activities like robbery and theft.

However, a lot of change has taken place, particularly in urban areas in regard to the traditional caste structure, hierarchical positions of castes and their traditional occupations.
Though the Muslims do not recognise the caste system as such, but, socially, they too have been divided and adopt a kind of social hierarchy. At the top of their social order are the Ashrafs (Sharifs), constituted by Sayyads, Shaikhs and Pathans who include the men of piety and religious devotion and who have originally come from abroad. The next in order are the Dikhs or Converts from Hinduism which includes Khoja, Memon, Bohra, Halai, Kayam Khani, Malkane, Meves etc. They somehow maintain their respective hierarchical positions which they enjoyed before conversion. Those converts who did not leave their traditional occupation constituted the functional castes such as Momins, Kureshi, Ibrahimi, Idiris, Mansoori, Rajeen, Manihar, Teli, Ghosi, Lohar, Badai, Dhobi, Mirasi etc. At the lowest level of the social ladder, are the castes called Lal Baigo who engage themselves in lower types of occupation; the other higher Muslims do not maintain contacts with them.

The different groups constituting the Jain community do not maintain the hierarchical relationship as we find in the various castes and sub-castes among the Hindus. However, the community includes a number of endogamous groups, such as Khandelwals, Agrawals, Oswals, Porwals, Palliwallas, Bagarwals, Sarawagis etc.

SCHEDULED CASTES AND SCHEDULED TRIBES

The Census enumeration of 1971 reported that 27.95 per cent of the total population in Rajasthan belonged to the Scheduled Castes and Scheduled Tribes. Out of a total 7,201,086 persons belonging to this category 649,859 persons were classified as urban and 6,551,227 as rural. The following table gives the number and percentage of S.C. and S.T. to the total population in the State alongwith their rural-urban background:

<table>
<thead>
<tr>
<th>Category</th>
<th>Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.C.</td>
<td>16.46</td>
<td>12.81</td>
<td>15.82</td>
</tr>
<tr>
<td></td>
<td>3,493,437</td>
<td>582,143</td>
<td>4,075,580</td>
</tr>
<tr>
<td>S.T.</td>
<td>14.41</td>
<td>1.49</td>
<td>12.13</td>
</tr>
<tr>
<td></td>
<td>3,05,779</td>
<td>67,716</td>
<td>3,125,506</td>
</tr>
<tr>
<td>Total</td>
<td>30.87</td>
<td>14.30</td>
<td>27.95</td>
</tr>
<tr>
<td></td>
<td>6,551,227</td>
<td>6,49,859</td>
<td>7,201,086</td>
</tr>
</tbody>
</table>

During 1981, there were 58,38,879 persons (47,90,504 rural and 10,48,375 urban) belonging to the Scheduled Castes in the State which formed 17.04 per cent of the total population (17.71 per cent rural and 14.54 per cent urban). During 1991 census they numbered 76,07,820 (61,02,496 rural and 15,05,324 urban) forming 17.29 per cent of the total population of
the State (17.98 per cent rural and 14.95 per cent urban). Likewise, during 1981, there were 41,83,124 persons (40,27,168 rural and 1,55,956 urban) belonging to the Scheduled Tribes in the State which formed 12.21 per cent of the total population (14.89 rural and 2.16 per cent urban). In 1991, they numbered 54,74,881 (52,20,549 rural and 2,54,332 urban) forming 12.44 per cent (15.38 rural and 2.53 urban).\textsuperscript{35}

Scheduled Castes

The table under reference reveals that the Scheduled Castes constitute about 16 per cent, covering a population of 40.76 lakh in the State. The SC population is spread throughout Rajasthan. However, more than half of their population resides in eight districts namely Ganganagar, Bharatpur, Sawai Madhopur, Alwar, Nagaur, Kota, Ajmer and Jaipur.\textsuperscript{36} Of these, Ganganagar district has been reported to have the highest proportion i.e. 24 per cent.

Out of about 80 individual communities included in the category of Scheduled Castes, population-wise eight could be regarded as the major Scheduled Castes contributing 83 per cent of the total population of the SC in the State. These are called as Chamar or Bhambi or Jatav; Megh or Meghwal; Balai, Thori or Nayak; Koli or Kori; Khatik, Bairwa or Berwa; and Bhangi. Of these the community of Chamar or Bhambi or Jatav constituted as much as 39 per cent of S.C. population in the State. Megh or Meghwals and Balais rank second and third, with respective strengths of about 15 and 18 per cent. The strength of the remaining 5 communities ranges from 3 to 5 per cent.\textsuperscript{37}

The Scheduled Castes of Rajasthan have been grouped in 7 major categories\textsuperscript{38} in the following manner :-

(1) \textit{Castes traditionally associated with Leather}:

(2) \textit{Castes traditionally associated with Scavenging}:
   (1) Bhangi, (2) Mehtar, (3) Valmiki, (4) Chura.

(3) \textit{Castes traditionally associated with Crafts}:

(4) \textit{Castes traditionally associated with Music and Entertainment}:

(5) \textit{Caste traditionally associated with Crime}:
   (1) Bawaria, (2) Bagri, (3) Sansi, (4) Kangar, (5) Bedia.
(6) Miscellaneous Castes:


(7) Unidentified Castes:


Scheduled Tribes

The total population of the Scheduled Tribes is 3,125,506 constituting 12.13 per cent of the State population. The table mentioned above reveals an interesting fact that still (upto 1971) only 1.49 per cent, i.e., 67,716 persons belonged to the urban category. Unlike the SC which are fairly distributed all over the State, ST continue to concentrate in Banswara and Dungarpur districts where their percentage strength is 73 and 64, respectively. However, parts of Udaipur, Chittaurgarh, Bhilwara, Jaipur, Sawai Madhopur, Alwar and Kota districts are regarded as the traditional home for the two major tribes, called Bhils and Minas.

According to the census 1971, thirteen individual communities constituted the Scheduled Tribes in the State.39 Of these six cover as little as only 359 persons and hence they are very insignificant. It is the Bhils and the Minas, which are the two major tribes in the State; together these two constitute about 94 per cent of the S. T. population in the State. A detailed list of the Scheduled Tribes identified in Rajasthan has been included in the Scheduled Caste and Scheduled Tribe Orders, (Amendment) Act, 1956. However, the major Scheduled Tribes of Rajasthan are (1) Mina, (2) Bhil, (3) Garasia, (4) Sahariya, (5) Damor and (6) Bhil Mina.

The following table indicates the strength of the major Scheduled Tribes and their percentage distribution in Rajasthan, 1971.*

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Major Scheduled Tribes</th>
<th>Population in (000)</th>
<th>Percentage to total scheduled tribes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mina</td>
<td>1,532</td>
<td>49.0</td>
</tr>
<tr>
<td>2.</td>
<td>Bhil</td>
<td>1,403</td>
<td>44.9</td>
</tr>
<tr>
<td>3.</td>
<td>Garasia</td>
<td>52</td>
<td>1.7</td>
</tr>
<tr>
<td>4.</td>
<td>Bhil, Dholi Bhil, Dungri Bhil</td>
<td>35</td>
<td>1.1</td>
</tr>
<tr>
<td>5.</td>
<td>Sahariya</td>
<td>27</td>
<td>0.9</td>
</tr>
<tr>
<td>6.</td>
<td>Bhil Mina</td>
<td>17</td>
<td>0.5</td>
</tr>
<tr>
<td>7.</td>
<td>Damor or Damaria</td>
<td>15</td>
<td>0.5</td>
</tr>
<tr>
<td>8.</td>
<td>Others &amp; unclassified</td>
<td>44</td>
<td>1.4</td>
</tr>
</tbody>
</table>

MINA — The Minas (Meena), who have played an important role in the history of Rajputana, are divided into thirty-six sections, which are variously distributed.\(^{41}\) Historically Rajput Chiefs and the Mina Chiefs have remained very important, particularly in the northern parts of Jaipur and Alwar. Such Chiefs along with their kings and clans used to live usually on rocky elevations, or in thick forests. Such settlements, called Mewasas\(^{42}\), however, displayed varied character differing from place to place.

The Minas are divided into two major categories. (1) Zamidar-Mina who were steady and well-behaved cultivators, and (2) Chowkidar-Mina who, though were notorious as marauders in the last century, have however, now settled down to peaceful occupations. Presently the Minas are concentrating mostly in the rural areas of Jaipur, Sawai Madhopur and Udaipur districts showing a considerable improvement in terms of literacy and educational standards and attainments. Right from the beginning, the Minas are patriarchal and worship Shiva and Durga along with other Hindu Gods and Goddesses found at local level.

BHIL — As one of the largest and the oldest tribal groups of India, the Bhils are "Economically a group of settled agriculturists, socially a patrilineal tribe and traditionally a community of good archers."\(^{43}\) The name evidently comes from the Dravidian word Bhil, meaning bow and Bhil, thus represents Billa meaning bow-man. The Bhils speak a variety of dialects referred to generally as Bhilli.\(^{44}\)

The Banswara district claims to be the cradle of the Bhils.\(^{45}\) However, a large section of the community resides in the rural areas of Dungarpur and Udaipur districts.

The Bhils whom James Tod called Van Putras (sons of the forest) have like most other tribes their own well-developed social norms and customs in connection with sex, marriage, divorce and community life.\(^{46}\) Economically they are very poor and work mostly as cultivators or agricultural labourers.

Literacy is distressingly low. They are undergoing the process of discarding their age-old customs and superstitions and their traditional way of life. The various developmental programmes are helping them in breaking down their geographical isolation and exposing them to a new pattern of life. The Bhils are traditionally patriarchal and therefore the eldest male member enjoys right of esteem and plays important role in decision making in family.

GARASIA — The Garasia, akin to Bhils, are mainly found in the Sirohi, Udaipur and Pali Districts. The Garasias derive their name from
Sanskrit word 'Gras' meaning morsel or subsistence.\textsuperscript{47} It is said that the Chauhan Rajputs of Jalore when defeated fled to hills where subsequently they settled down. After overpowering the Bhils, the local inhabitants, parted with some subsistence in their favour. These Bil Grass-holders came to be known as Garasias.\textsuperscript{48} However, according to the Rajputana Gazetteer the word Garasia is "applied to a separate set or group of persons associated, though it may be ordinarily taken to denote a half between Bheel and Rajput\textsuperscript{49}. The Garasia, it seems are really an admixture of the Rajputs and the Bhils.\textsuperscript{50}

Tall and having a well built physique, the Garasias are mostly cultivators. Literacy is extremely low. Ease-loving and traditionally backward as they mostly are, now are changing to a new way of life in the relatively improved socio-economic conditions. Garasias are also patriarchal; polygamy is a very common practice among them.

SAHARIYA — One of the most backward and poor tribes of Rajasthan is constituted by the 'Wild Men', called 'Sahariya'. As 'bonded labour' who used to be born in debt and to die in debt, the Sahariyas used to provide free labour to the Mahajans or money lenders as a contribution to their indebtedness. Usually they are engaged in agricultural pursuits or in casual menial house-hold chores, or in looking after livestock.

Their main concentration is found in two important taluks of Shahabad and Kishanganj of Kota district. However, they are located also in the districts of Jhalawar, Udaipur, Dungarpur, Jaipur, Sawai Madhopur, Bharatpur and Churu.\textsuperscript{51} Traditionally regarded as untouchables by the caste Hindus, their customs and manners in many ways resemble the Hindus.

BHIL MINA — A small group (of about 17,000) of tribal community known as Bhil Mina are mostly located in Ajmer district. However, they are found also in Dungarpur, Banswara and Jaipur districts. Though they are a section of Bhil community but in order to improve their social status, they have started using the category Bhil Mina.

Engaged as cultivators or agricultural labourers, they mostly reside in rural areas. However, the literacy rate has been reported to be better among them in comparison to others.\textsuperscript{52}

DAMOR OR DAMARIA — Another small tribe who is originally said to have migrated from Gujarat is identified as Damor or Damaria on the Rajasthan Gujarat border in the Dungarpur district. Most of them are cultivators and reside in rural areas. Literacy among them is very poor.
Apart from the above mentioned major scheduled tribes in Rajasthan, various other small tribes like Kathodias, Dholi, Bhil, Dungri Bhil etc. are also found besides the nomadic and semi-nomadic tribes in Rajasthan.

CLASSES

The social stratification in Rajasthan remains to be caste based. The castes and the caste system continue to persist leading to a rigid stratification with an emphasis on status assigned by birth. The social structure in the State did not remain unaffected by the impact of factors and processes operating on Indian society in general, particularly after Independence, such as modernisation, urbanisation, industrialisation, sanskritisation, westernisation, secularisation, democratisation and constitutional and legislative reforms etc. Hence a parallel class based structure has begun to emerge and exist alongside the one based on caste. The emergence of classes has occurred at two levels (i) within the caste; and (ii) cutting across the boundaries of caste. The basis of the new class position is the achievements of the individual in terms of economic, political and like status. Also within the framework of the traditional caste system, the two major classes towards which people are becoming slowly conscious are the class constituted by the caste Hindus on the one hand and the other consisting of the Scheduled castes, Scheduled tribes and the other backward classes. However, despite emergence of class stratification, the caste continues to maintain its hold on its members with reference to marriage, occupational pursuits and commensal relationship.

General structure: Religious beliefs

The Hindus in Rajasthan are worshippers of Brahma, Vishnu, Siva and various other Gods and Goddesses. The Vaishnavism, Shaivism and Shaktism are the dominant cults being followed in Rajasthan besides the followers of Arya Samaj, Ram Krishna Mission etc.

The Vaishnavism which adores Radha and Krishna and Sita and Ram, has large number of following. Shaivism, the followers of which worship Shiva and the consort of Shiva in the form of Parvati, Shakti, Uma etc. has been the popular faith in the various erstwhile princely states of Rajasthan. Shiva's mount, Nandi is also an object of worship. The Shiva temples could be observed distributed in almost all cities and villages in Rajasthan. The frowning Durga or Sakti-Amba or Devi is worshipped all over, particularly by the class of warriors, namely the Rajputs.

The Brahma, the creator, is also one of the principal deities worshipped in Rajasthan. Pushkar has the most famous and one of the oldest temples of Brahma. Ganesh is, yet another deity very popularly worshipped in the
State. However, the temples of Bhairon ji, Bala ji, Ramdeoji and Sheetla Mata could be invariably seen in most villages of Rajasthan.

Apart from manifesting man's attitude towards God and sacred things, the religious beliefs and practices not only have provided encouragement to temple building activities etc. but has also been instrumental in giving rise to a number of superstitions and magical beliefs. Thus, the village 'Bhopa' is consulted for diseases and other problems by the villagers. The Bhopa (the oracle), the attendant of the deity is possessed with the spirit of the deity when invoked. A large number of temples and places of worship have been constructed all over the State, both in cities as well as the villages. Besides temples of Hindu Gods and deities having national character, such as Ram, Vishnu, Shankar or Mahadeo, Hanumaa and Ganesh, there are numerous shrines and abodes of local deities. Generally, crude and locally made images of these deities are installed, ceremonially, over raised platforms beneath the trees and besides the wells. The study of Giri Raj Gupta reveals that both male as well as female deities are worshipped; among the main female deities identified are: Dudia-Khari-Ki-Mataji, Sitala Mata, Lal Mata, Mari Mata; among the male deities are Bhairuji, Thakar Saheb, Sagasji, Tejaji, Goraji, Bholaji, Jindji and Syamji. The names of local deities worshipped and their importance differ from region to region. Various diseases are believed to be curable by worshipping a deity, or by the use of Jantar Mantar. Cases like snake bite, small pox, madness, barrenness of women are dealt with the help of mantras. The people are very much sensitive about the omens, particularly when they begin some important work. A married woman with a pot full of water on the head, a male or a female sweeper, a Jat etc. are considered to be the good omens while starting on a journey. Conversely, a woman with empty pitcher, a cart load of firewood, a dog wiggling its ears, a cart running across the path, the sound of sneeze etc. are considered to be bad omens. The folk literature is full or such examples.

The belief in ghosts, evil spirits, witches and other superstitions are very popular. Snake, horses, peepal tree, bad trees etc. are worshiped.

The belief in sorcery and witchcraft is so strong that many villages have their sorcerers. The sorcerers practice Jhara-Phoonk to remedy common ailments, and to treat those who are under the influence of evil spirits. The tribal peoples like Bhils, Garasiyas etc. believe in several such practices. Certain spirits, such as ruined old palaces, bavadis, tanks, old trees, cremation grounds and the graveyards are considered to be haunted by profane spots and dissatisfied souls of the dead. People fear visiting these spots alone and at odd hours. Some of the temples in Rajasthan like
Mahandipur ka Balaji and those located at Padampura, Tijara have gained much fame as centres of treatment for such diseases.

Apart from Hindus, the Muslims and to some extent the Jains also are not unaffected by such beliefs and practices. The Muslims use various types of Dora, Ganda, Tabij etc. to cure diseases and to find out solutions to their various problems. The belief in evil spirits (Bhoot, pret), auspicious or inauspicious marks or omens find mention in popular sayings as well as in folk songs.

Manners and Customs

The chivalry and valour of the people of Rajasthan, the close knit community ties to face the hostile nature of this desert and semi-desert land with cyclical droughts and famines, and the culture-contact on account of its thick and frequent relationship with the Mughal Court etc. are some of the important geo-physical and psychic-cultural factors that provide a basis for the variety of manners and customs followed by the people in Rajasthan. A detailed description of this aspect is difficult to be attempted here because of numerous and varied nature of manners and customs being followed by the various castes and communities in the State.

It is interesting to observe that the people of Rajasthan, particularly Rajputs who cherish their bravery and glorious record and share a heroic cultural heritage, are sophisticated and cordial in their manners and etiquettes.

They are tolerant and have respect for each other. In fact, the social life in the villages is organised around such traditions and values. There are various institutions which encourage mutual aid and collective life. The ‘Nouta’ system which is popular in most of the communities in the state is an example of mutual help at the time of expensive occasions. It is imperative for the kinsmen, relatives, friends and community members to deposit some money as gift in response to the invitation which one receives at the time of birth, marriage and death etc. Similarly, the ‘Agta System’ where the villagers have collective off from work to be enjoyed-collectively on a fixed day, may be ‘Amavasya’ or ‘Purnima’. Gossip and discussion on local affairs at ‘Hatai’ or ‘Chaupal’ in the evening is a part of day to day routine of villagers in order to share the pleasures and the sorrows of each other. The sharing of same Chilam or Hukka (a smoking pipe) is an indication of friendly or fraternal ties and gestures. And to debar a person from sharing the ‘Hukka Pani’ is the indication of community punishment to such person. Also there are well developed table manners: for example, generally a Choki (a low stool) is used to place the food,
and a patiya (piece of cloth) or a patta (made of wood) is used by the partakers to sit upon, hands are washed before taking meals.

The various customs observed among the Hindus in general are the same followed by and large among the community in India. It is customary to observe the various traditionally prescribed Sanskaras among the Hindus. Of course, in some cases, these are being discarded on account of changing values and outlook of people. However, among the Hindus, a large number of traditional customs and ceremonies are followed at different occasions such as Garbadhan (conception), Jat karma (birth), Namkaran (naming ceremony), Panghat poojan (well worship), Anna praasan (first mealing), Jharoola or Mundan (Head Shaving), upanayan (the rite of initiation), Vivah (Marriage), Anthyayasthi (The Death Ceremony), Shradha etc. A complete series of traditions, customs and ceremonies are followed at the time of birth, marriage and death. There seems to be uniformity to a particular level in the performance of the various rituals but there are noticeable differences in matters of details in various castes and communities.

The Jains and Sikhs, by and large, share the Hindu customs and traditions with certain modifications. But the Muslims in the State in general perform different rituals. A variety of ceremonies are performed, such as the 'Chhati Ceremony', Khatna, Naming, Bismillah and Mayyat (Death) ceremony.

Inter-Caste Relations

The inter-caste relations in the state reveal a marked degree of hierarchy as well as inter-dependence. The caste system being a "network of relationship between separate and distinct castes\textsuperscript{59}, mutual interdependence is inherent in the system. This can be observed in economic, social, cultural and other fields. Traditionally, the restrictions and taboos followed in the caste system with regard to marriage, commensality, occupation, ritual observance etc., by and large, regulate and define the inter-caste relationship in the state also. The castes are vertically divided and social and ritual distance is maintained accordingly. As such both forms of inter caste relations, namely cooperative and non-cooperative tension oriented relationship could be observed in the state.

The continuance, of the traditional Jajmani system in the state, explains the very cordial and functional relationship found among the various castes. Under this system each caste group is expected to offer certain standardized service to the families of other castes. The relationship of artisan castes, services rendering castes and priestly castes with agricultural castes is popularly described as the Jajmani system. The Jajmans are the patrons of these groups which require their services and /or goods in agricultural
pursuits and in socio-cultural activities. For these services the payment is generally made in kind, occasionally in cash.\(^{50}\) Under this system, the traditional low caste people offering their services to their Jajmans are locally known as 'Kamins'. The castes to be treated as 'Kamins' differ from region to region. However, the Jajmani system which was popular at one point of time in the urban communities also is loosing its hold in view of the rapid socio-economic changes.

Similarly the traditional rigid pattern of inter-caste relationship is also undergoing considerable changes. Industrialisation, urbanisation, political and legal changes, spread of education, increase in social awareness etc. have brought about significant changes in the inter caste relationship in day to day life. The increasing tolerance towards inter-caste marriage, occupational mobility, lessening of socioreligious rigidities, are some of the examples of shift from the traditional pattern in the state particularly in the urban communities.

The gradually increasing inter-caste tensions is another recent development in the inter-caste relationship in the state. Political awareness, class consciousness, casteism, breaking down of the Jajmani system, role of caste in politics, reservation for Scheduled Castes and Scheduled Tribes etc. are some of the factors that may be encouraging tensions in the intercaste relations.

New Religious Leaders and Movements

The various leaders and movements from within the Hinduism, in their quest to reform and modify the all assimilating Sanatan Dharma gave rise to several new ideas to suit the new conditions. The process accelerated in view of the introduction of Islam and its consequences. There have been several attempts to scrap the complex institutions and dogmas which lost stuff of life. An early impact of Bhakti Movement in Rajasthan, to some extent, has paved the way to denouncing idolatory, caste system, meaningless rituals and preached instead for devotion through singing, dancing and reciting. The Bhakti movement in Rajasthan made its appearance in the early mediavel period.\(^{61}\)

A lead in this direction was taken by Goga ji in Bikaner division. Other important heros, saints and mystics who had everlasting impact in Rajasthan include Tejaji, Pabuji, Mallinath, Deoji, Dhanna, Jambha, Raidas, Mira Bai, Dadu Dayal, Charan Das, Lal Das, Movji, Ram Charan and others.\(^{52}\)

Some of the important movements include the Kabir Panth, Dadu Panth, Ram Santh, Vishnoi, in the beginning and, later on the Brahma Samaj, Arya Samaj, Radha Swami Satsang etc. However, some of the cults
of recent origin started by Jai Gurudeva, Bhagwan Rajneesh, Bal Yogeshwar, Brahma Kumari, Sai Baba, Maharshi Mahesh Yogi, Swami Chidananand etc. have very limited impact. These are confined to urban centres.

Among the Muslims, the Tabligh movement under the religious command of Nizamuddin Aulia of Delhi aiming at perfect Islamisation had some impact on Muslims in Rajasthan. The Daudi Bohras of Udaipur demanding various religious reforms is another movement.

SOCIAL LIFE

Property and Inheritance

The inheritance of property among the Hindus is generally guided by the Mitakshara rule of the customary Hindu Law of Inheritance, whereby the property of a deceased person is inherited equally by all his sons. The Jagirdar class of Rajputs, however, follow the rule of primogeniture.

The Hindu Succession Act of 1956 has however widened, this scope by conferring the right to property to all the daughters and the widow of the deceased person as well. However, so far, it is observed that the daughters normally do not assert on the legal right to claim their share in their father’s property. It may be attributed to the prevalence of dowry system as well as customary responsibilities of brothers towards their sisters and their offspring. So is the case of widows who still rarely exercise this right. It may to some extent be due to continuance of Joint Family System.

Inheritance among Muslims is governed by their personal or the Shariyat Law, whereunder alongwith the surviving sons, the widow(s) and the daughters also get a share in the property.

As almost all families in Rajasthan are patriarchal in form, the reckoning of descent and transfer of property takes place in the male line.

Joint Family System

The ‘bond of jointness’ in terms of mutuality of rights and obligations could be considered a unique characteristic of the joint family in Rajasthan as in other parts of the country, apart from the other characteristics such as jointness in terms of income, property, residence, kitchen and, normally, a greater generation depth.

Looking to the increasing number of small size families resulting from shift in the place of residence, it appears that the traditional joint family in Rajasthan is breaking down, or it is disorganising. It is true that the joint family system is losing its rigid control over the individual and radical changes are taking place in its traditional form because of various factors. The growing individualistic tendencies, impact of western values, secular
education, industrialisation, urbanisation, legal, economic and social reforms, change in status and role of women, family quarrels etc. could be considered as the factors mainly responsible for bringing about structural and functional changes in the joint family in Rajasthan. But this does not lead us to conclude that joint family is no more important in Rajasthan or that it is entirely a thing of past. Still a large number of joint families are existing in both urban and rural sectors of Rajasthan. Despite residing separately due to circumstantial pressures, these newly established nucleus units are still joint with 'bond of jointness' which is basic to the idea of joint family, and thus continue to maintain its close link with the old joint family. Infact, it is still unheard that a new family is established at a new place of residence just after the marriage. It only suggests that the utility of joint family is valued still and the norm has not changed in favour of the completely nuclear families.

Matriarchal System and Other Forms of Inheritance

The matriarchal system whereby reckoning of descent and property inheritance takes place in female line is not common in Rajasthan. As already observed, traditionally the property is inherited in the male line. Nevertheless, in the absence of a male child, the property is inherited by the daughters or other kins.

Adoption

Those who do not have any male child are permitted to adopt a male child to continue the line of succession in the family. After the ceremony of adoption, the child becomes the legal heir of the adopter. Sometimes, a document to this effect is executed by the adopter to be produced at the time of dispute, if any.

Traditionally, a male child of the similar gotra, or brother's son is preferred to be adopted in Rajasthan. There have been several instances where in the absence of a son, the adopted son has become the heir to the throne in the erstwhile princely States. The ceremony of 'Goad Lena' (adoption) is very simple. The child to be adopted is brought to the family, and in the presence of the Biradari (community) including close relatives, friends, and panchas of the village, the adopted boy is anointed with vermillion and a coloured turban is placed on his head. Some rituals are performed to solemnise the act of adoption, which are followed by a small feast.

The right to inherit the property is also granted to any body by way of executing a will in favour of such person even without adopting him as son. In the absence of any male or female child by fact of birth, or adoption or the deceased leaving no will behind himself, the nearest kin have their claim on the property of the deceased.
MARRIAGE AND MORALS

Among the Hindus, Vivaha (marriage) is generally considered obligatory for every person - male or female, unless, of course, he or she has taken a vow of celibacy. Traditionally the 'vivaha' or marriage is not only a social institution to regulate the sexual life of a person but also a religious 'sanskar' through which every man and woman must pass at the proper age and time. Those, who fail to get married are looked down upon by society; they are not considered to be 'perfect men or women'. Unless, of course, one who chooses the course of sainthood. Women who adopted roles which fall outside the normalcy of life pattern did not marry, like Devadasis, prostitutes, Nagaravadhus and were accorded different status.

Customarily the marriage is arranged by the parents in Rajasthan. A number of positive and negative traditional restrictions determine the area of mate selection for marriage. However, marriage is usually performed within the same caste or sub-caste. The Bhat, Charans or Purohits have been the traditional match makers. The Nais were employed as messengers and to collect background information. Traditionally, the horoscopes of the boy and girl are tallied by the family priest to determine the feasibility of marriage between them. A short cut to the above rigid process in vogue these days is, to tally the names and their rashis. The job of selecting mate is now being undertaken to some extent, by matrimonial advertisements, particularly in urban areas because of the growing impersonal type of relations, and dispersion of caste or community groups. Traditionally, among certain cultivating castes of the State such as Jat, Gujar, Mina, etc. it was the duty of the boy's father to search a bride for his son. But now a days, generally, among almost all castes, the girl's father looks for a bridegroom for his daughter. It is the mother of the girl who puts increasing pressures on her husband to find out a suitable match for the daughter.

Although banned by law, a very large number of child marriages are performed every year in the rural and tribal areas. This is evident from the figures reported in the census reports. However, the actual cohabitation of the bride & bridegroom starts after the completion of the 'Gauna' or Muklava (home taking) ceremony. This sometimes takes place even after 2-3 years of the marriage. A propitious day is selected, in consultation with purohit and the bridegroom visits the wife's family and the bride finally leaves to live with the husband. A majority of the child marriages are solemnized on 'Akshya Tritya' which is considered to be an Abruju Muhrat.

The marriage ceremony is performed on some auspicious day as suggested by a priest after consulting the 'Panchang'. A complex of interesting and colourful ceremonies, suitable to the joyous and gay occasion.
of marriage, are arranged. Generally speaking, the marriage is an expensive affair but the actual expenses normally incurred vary on the basis of the economic status of the family.

The marriage is preceded by betrothal ceremony called ‘Sagai’, ‘Tilak’ or ‘Tika’. Traditionally, the major consideration governing the choice of a mate, both in case of the boy or the girl, used to be either his or her family background or his or her physique and looks, or both. A considerable change is discernible in this regard. For example occupational status, educational qualifications, general status of the family, ability to offer dowry (in case of selection of bride) etc. are some of the major considerations coming into vogue particularly among the higher castes.

Among the Muslims, the rules of ‘Nikah’ or marriage are defined by the ‘Sharviyyat’ in general, and the local traditions in particular. The ‘Mehar’ (the dower) is still an important consideration of marriage contract among the Muslims.

Monogamy

Monogamy - the form of the marriage in which one man and one woman are allowed to marry each other at one time, is the most commonly accepted and practised form of marriage in Rajasthan. However, the marriage can be terminated by death, divorce, or annulment, after which another marriage can take place.

Permission for second marriage is given to divorced women or widows in some communities where the custom of widow marriage is in vogue. Thus, this could be taken as some sort of ‘successive monogamy’ or ‘serial monogamy’ among the communities enjoying laxity about divorce. The practice of ‘Nata’ is also common in Rajasthan through which a divorced woman or a widow may start living with a new husband; this is known as ‘Nata Baithna’. However, she does not enjoy the same status as that of a ‘Beata’, that is, a customarily married wife. The custom of ‘Nata’ is common among most of the traditional lower castes in Rajasthan.

Polygamy

Conceptionally, polygamy is a form of marriage in which a man or woman is married to two or more mates at one time. Thus, it includes polyandry, i.e. a woman marrying two or more men at one time, and polygyny, i.e. a form of plural marriage in which a man takes two or more wives at one time.

POLYGyny — Most of the communities in Rajasthan prescribe monogamy but some communities while exalting monogamy, yet have permitted polygyny. Although it is banned by law, marrying more than
one wife has been permissible among the Rajputs, the Bhils, the Meenas and other communities. There are ample evidences in history that kings, courtiers, members of wealthier classes and sudras were polygynous. The multiplicity of wives was not only due to the fashion of the age, or privilege of aristocracy or prerogative of chiefs due to frequent warfare but was also considered essential to beget a son, if the first wife was barren. Besides wives, it was customary for Rajput princes to keep a large number of women in their harems. So much so that after Independence as many as 60,000 women were released from these harems and were encouraged to marry men of their choice and start a new life. The practice of keeping women as concubines was fairly common among Rajput kings and jagirdars. The concubines belonging to different categories were called Khawas, Darogi and Goli.

Apart from the Rajputs, Bhils and Meenas, the custom of polygyny is prevalent among the Jats, Gujars, Darogas, Dhobies, Dhanakas, Malies, Chamars, Raigers and various other scheduled castes and tribes.

Among the Muslims, polygyny is permitted by their personal law. However, barring a few exceptions, and that too normally confined to well-to-do families, the polygyny is not common among Rajasthani Muslims. Due to increasing awareness among women and economic pressures, the practice of polygyny is being discouraged, and there is a marked shift in favour of monogamy.

POLYANDRY — Polyandry as a form of marriage permitting a woman to have more than one husband at a time, is not common in Rajasthan; not even among the tribals. However, the custom of senior and junior levirate is in vogue which permits a woman to marry the elder or younger brother of the deceased husband. This is found in only those communities which permit widow marriage. The provision of levirate or 'Niyoge' is primarily for the widow whose husband dies without bearing her a son. The system of levirate or Niyoga, however, is looked down upon among the traditional higher castes in Rajasthan.

Traditional restrictions on marriage alliances

Marriage being a religious and social obligation, a number of prescriptive and prohibitive norms, besides incest taboos, are observed in Rajasthan in regard to selection of mate such as caste & sub-caste endogamy, sgotra, spravar & spind, exogamy anuloma and pratiloma.

Caste and sub-caste restriction

Like in other parts of northern India, traditionally, exogamous, endogamous, hypergamous and hypogamous restrictions are followed among
the Hindus in Rajasthan. Endogamy i.e. marriage within one’s own group is practised at caste and sub-caste levels by the members of all the castes in Rajasthan irrespective of their traditional high or low position in the social structure. Nevertheless, it could be observed that inter-caste or inter-religious marriages were not altogether unknown in Rajasthan. However, barring a few exceptions, on account of purely impulsive or imperative, considerations, the general norm has been to follow endogamy.

The varna hypergamy (Anuloma) turning into Kulin Vivah is another important restriction followed particularly among Rajputs. It was imperative for a Rajput girl to marry a husband belonging to either her equal, or preferably, to a superior class. So much emphasis has been given to this restriction that it is the ambition of almost every Rajput to add distinction to his family pedigree by forming alliances with illustrious houses. Also as a consequence, the custom of ‘female infanticide’ prevalent among Rajputs in recent past is no secret.

It is interesting to observe that the traditional custom of caste hypergamy, prescribing for a woman to marry in her own social stratum or into the higher stratum, has resulted into the practice of selecting husband possessing superior status in terms of educational qualifications, economic position, occupation, family background etc. Hypogamous (pratiloma) marriages are not liked by people belonging to any community in Rajasthan.

Exogamy

Besides endogamous rules, the exogamous restrictions related not only with gotra but the spravara and spinda rules also are followed in Rajasthan for controlling the choice of mates. According to rules laid down in Hindu Dharm Shastras, persons who are gotra, spinda or spravara are not eligible for marriage. Gotra which probably meant herd, and which later on had come to denote the ‘family’ or ‘clan’, is the exogamous group and, hence, marriage within one’s own gotra is considered to be incestuous among the Hindus in Rajasthan.

As a sequel to above restrictions, the field of matrimonial selection is further limited by banning marriage within certain degrees of kinship both on the maternal and paternal sides, particularly among the traditional higher castes. Although the number of generations to be avoided differs from caste to caste as a rule, however, marriage is banned among chachera or the family of the paternal uncle, mana or the family of maternal uncle, pusher or family of paternal aunt and mausera or the family of maternal aunt. Also village exogamy in rural areas and total exogamy among tribals is in vogue in Rajasthan.
Marriage with maternal uncle or his son

Marriage with maternal uncle or his son is prohibited or considered as incest according to various norms prevalent defining exogamous boundaries of the area of mate selection among Hindus in the State.

Among Muslims also, theoretically, there are norms which restrict marriage among close or direct kin. All such alliances are traditionally considered to be vait or void marriage and do not come into the category of a ‘Nikah’ or valid marriage. However, as a matter of practice marriage with maternal uncle’s son or for that matter daughter of a khalo or a maternal aunt is accepted among Muslims in Rajasthan.

Marriage Customs and Rituals

Marriage customs, rituals and ceremonies in Rajasthan are almost the same in principle as in the rest of northern India. Marriage is considered to be one of the important ‘sanskaras’ after which the couple enters the ‘Grahasht Astra’ according to traditional beliefs, or establishes the family of procreation in the modern sense. A large number of major and minor social and religious customs and ceremonies are performed to solemnise the marriage. Indeed, some of these traditional customs have been discarded completely or partially or some new practices are being adopted due to the change in values and world-view of the people belonging to different castes and communities in Rajasthan particularly in urban areas.

A detailed description of the numerous customs prevalent is difficult to be attempted here, chiefly because of their variety and fluid and flexible nature. S.L. Srivastava in his comparative study of regions in Rajasthan and Eastern U.P. has described the following rites being performed in connection with the marriage:

(a) Betrothal: Sagai or Baracchha or Phaldan; Tika or Tilak.

(b) Post Betrothal: Lagan; Pila-Chaval; Bhai Neotana, Baub sankadi or Lagan Dharana; Brahmin Bindauri, Ghee Pilana, Urd-Chaur Chhoona, Chulha Balana, Urd ka Dhoiya Dhona, Matimangara, Kobbar ki Sait Karana, Dhoudhi Bandhana.

(c) Rites of the Preceding Day of Wedding: Chak Poojana; Bhat Dena; Neota; Tham or Mado Gadana; Hardi Uthavana; Sich Pona, Mantri Puja; Kalasha Gothana, Dootha or Doolhan ko Choomana, Lava Bhoojana.

(d) Rites observed upto the arrival of the bridegroom in the bride’s village: Suhag Mangana; Kunwarhat Utarana; Nikasi, Tootyan.
Rites observed after the arrival of the bridegroom in bride's village:
Samela or Sivan Bhet Deva; Aguni Dena or Kunwar Baro Dena or Telvan; Kunwari Chhol Bharana or Tagpat Dalana; Sivala Pujan or Dwar Pujan; Bind or Doolha ka Tilak Karana; Phera or Biyah; Kunwar Kaleva or Khichari Khana; Rangbhari Lana or Mohphil or Shishthachar; Byayi ka Jinnar or Samadhi ka Bhat; Bida.

Rites observed after the arrival of the bride in the bridegroom's village:
Paisara or Chaturthi ke Din ki Rasam. 76

However, some of the generally accepted customs and ceremonies related to marriage in Rajasthan could be described by categorising them as those connected with Sagai (Engagement), Vivah (marriage), and Gauna (home taking), in the succeeding order.

SAGAI (ENGAGEMENT) — Before the marriage is solemnised, various preliminary ceremonies are observed. When the process of match making is complete, a sort of symbolic declaration of the decision is made through the sagai or engagement (Betrothal ceremony). In some communities, negotiations of dowry (in case of upper castes) are made before taking a final decision in the matter. A variety of ceremonies differing from community to community are performed to indicate the final approval of marriage proposal.

Traditionally, the eldest male member of the girl's family or the father of the girl puts a 'tilak' on the forehead of the boy and presents him a turban, a coconut, some coins (preferably silver coins), clothes, green fruits and dry fruits, sweets, a pair of 'paan', and in some cases, a gold chain and other gifts. In some communities, two Jhadsahi Rupay (silver coins) or two Mohars (gold coins) and sixteen takas (eight annas or fifty paisa) for traditional 'Kamins' (who offer services to the family under Jajmani system) and a pair of 'paan' are presented to the boy in a simple ceremony at the girl's house. Also, the custom of offering 'Milani' (cash presents) by the girl's parents to the parents of the boy and, or other important relatives is in vogue in some communities. In turn, in some families, a set of ornaments, a pair of clothes, sweets, dry fruits and cosmetic goods are sent for the girl. Now a days, the girl is later on invited to the boy's residence to offer her these presents by the boy's parents. This custom is known as 'Ladhi ka Dastoor'.

In some communities, Tika or Tilak is a major pre-marriage ceremony. On an auspicious day, the bride's brother or father, or any other representative is sent to the prospective bride-groom's house with cash, clothes and sweets etc. as gifts. A vermilion mark is put on the forehead of the bride-groom and gifts are offered to him in the presence of his
relatives and friends who are invited to the ceremony. A feast is arranged to celebrate the occasion; in some communities opium is distributed. In some cases only tea or cold drinks alongwith some snacks are served particularly in urban areas.

**Vivah (Marriage)** — The family priest is consulted to fix the Muhurat—the auspicious day and time of marriage. The intimation of the Muhurat is sent to the father of the boy through a formal communication, called ‘Lagana Patrika’ a letter sprinkled with turmeric paste and vermilion alongwith a coconut and other articles. The parents of the boy and the girl send invitation to their relatives and friends through a printed paper or card known as Kumkum patrika. Some of the scriptural rites (vedic vidhi) which are performed in succeeding order include the Kanya- dana, the vivaha- homa, the pani-grahana, the agni-parinayana, the ashmarohan, the laja-homa and the saptapadi. In addition to these, a varied nature of ceremonies of customary nature are also arranged in Rajasthan.

As marriage is one of the most gay and jubilant occasions, the preparations start long before the marriage day. The house is white washed or painted and decorated with traditional motifs. The purchases for marriage start with the purchase of some auspicious things like ‘Moom’ or ‘Dhana’. Some of the important ceremonies observed are the following:

**Bindayak —** The ceremony of Ganeshji Notha (invitation to Lord Ganesh) is performed on any Wednesday to mark an auspicious beginning to the marriage ceremony. Lord Ganesh is invited to marriage by a formal invitation and his blessings are sought for successful completion of the marriage rituals and ceremonies, Kankan dora, a thread with ‘lak’ and iron rings and little rice is tagged to the hands of the bride and bride-groom after worshipping of Lord Ganesh. Two small boys, one each as the bride’s and bridegrooms’ assistants are drafted as ‘Bindayak’ to assist or protect the bride or bridegroom.

**Nikasi (Marriage Procession)** — The bridegroom is taken to the bride’s house in a very colourful procession (Nikasi or Barat) either a day before the marriage, or on the same day, at an appointed hour. The bridegroom, dressed decorously in a bright yellowish or pinkish safa (Head gear), a matching sherwani (long buttoned-up coat), a choudidhar payjama (trousers) and Deshi Juti (local made shoes), goes riding on an equally decorated mare’s, back. In some communities, the groom carries a sword with him. Generally, a band, decorated elephants, horses, camels, lavazamins (hired persons in a colourful traditional dress), and a group of traditional musicians add colour to the marriage procession. In some communities, particularly in urban areas the mare or elephant is now being replaced
by a decorated car. In some communities, it is fashionable to have Atish bazi (fire works) while on the way to bride's place.

**Kalash (The Reception of Barat)** — The barat (marriage party) is given a rousing and warm reception when it arrives at the bride's house. As a token of respect, the eldest male member from the bride's family presents rupees two or five to the eldest male member of bridegroom's family which is known as milani, the members of the marriage party are received by offerings of garlands and 'itra' (scent).

The bride's mother and other ladies of the house receive the bridegroom at the main entrance. After making Tilak on his forehead Kalash (earthen or metal pot) and Arti are performed. The bridegroom or in some communities his father, puts a silver coin in the Kalash.

**Toran Ceremony** — The toran (a sort of wooden crown having 5 or 7 wooden birds on the top and sometimes carrying an image of Lord Ganesh in middle), hangs on the main gate and is touched by the bridegroom with the sword 'or Chatiya (a stick) that he carries himself. The ceremony is symbolic of the bridegroom's and his accompanynts gaining an entry to the bride's citadel (residence), that is their victory over the bride's herd.

**Varmala** — Amidst the showers of flowers by the people present there, the ceremony of 'Varmala' is performed in which the bridegroom is garlanded by the bride who in turn reciprocates by offering a garland to the bride who is also clad in colourful, traditional dress befitting the occasion. This ceremony is most popular in urban areas but now it is being adopted in rural areas also particularly among higher castes.

**Phere (Marriage)** — After the reception of the Barat, the bridegroom is conducted to the Vivah Mandap (a courtyard or a temporary erected structure) when some of the scripture rites are performed with recitation of mantras by the priest. In succeeding order, they include

(i) The Kanya-dan: giving away of the daughter by parents or gaurdian and acceptance by the bridegroom, promising the father of the bride not to fail the girl in her pursuits of dharma, artha and kama.

(ii) The Vivaha-homa: offering oblations to the sacred fire at which the bride joins the bridegroom by grasping his hand making the offerings (which is kindled symbolically as a divine witness and sanctifier of the sanskara).

(iii) The panigrahan: a very important rite in which the bridegroom is asked to place his hand on the hand of the bride and hold it. Locally this is called the Hathlewa.
(iv) The Laja-homa: the rite in which the bride offers to gods the sacrifice (homa) of fried grain which are poured in her hands by her brother. This is symbolic of her prayer to release her from the parental bonds. The bride, thus, prepares herself to leave the parental home and go to the family of the bridegroom.

(v) The Agni-parinayan: another very important ceremony in which the bride and bridegroom walk around the nuptial fire amidst the chanting of mantras.

(vi) The Ashmarohan: (the mounting the stone) - with the helping hand of the groom, the bride treads on the stone as he is made to recite the mantras asking her to be firm like a stone in her resolve to follow the path of Dharma.

(vii) The saptapadi: considered to be the most important rite which marks the completion of marriage. The bride and bridegroom go round the sacred fire seven times; till the sixth round, the bride is considered to be the daughter of her parents; it is only after the completion of 7th round (or the 4th in some communities) that she is treated as to have become a member of the groom's family. The ceremony is known as 'phera' in Rajasthan. The bride leads in the first six rounds, (or three rounds in some communities) and the bridegroom in the rest.'

BIDA (DEPARTURE) — The 'bida' ceremony marks the farewell to the bride as well as the bridegroom and his party. Generally the newly wedded couple is made to sit on the palang (bed given by the girl's parents) and a pair of clothes are presented to the bride and bridegroom both, alongwith the performance of various rituals. While leaving her parents' house the bride stops at the main entrance and throws moong on her parents and other kin present there, who step ahead one by one for the final parting embrace. The scene of 'Beti ki Bidai' (the departure of a daughter) is highly emotionally charged, and the parents and others present, particularly ladies find it very hard to hold their tears back.

AASHIRVAD SAMAROH — After the marriage a ceremony called Aashirvad Samaroh is a popular innovation. The young couple is made to sit on a decorated stage or platform. The relatives and friends of both the sides are invited to bless the young couple. Hot or cold drinks with snacks, are served to the guests. Amidst illuminations, some light entertainment programme - consisting of songs and dances and orchestra recitals, is usually arranged.

The newly wedded couple is received with joy and gaiety at the door to the bridegroom's place. Right at the Doorstep, the grooms' mother,
sisters and other ladies welcome the couple with Kalash and Ari. The sisters symbolically block their entry as a token assertion of their rights in their brother's household. They demand gifts (cash or kind) and give way only after their demands are satisfied.

JIMAN (MARRIAGE FEAST) — The marriage feast (Jiman or Jonar) is an important aspect of marriage celebrations to which relatives and friends are invited. Rajasthan is known for its huge feasts to which quite often invitations are extended to the whole village, or to all the members of a particular caste. The feast given to one's relatives and friends is called 'Manda' or Priti-Boj'. But when a feast is arranged by the bride's parents for the marriage party, it is known as 'jan' or 'Jiman Barat'. Traditionally the menu for Priti Boj and Jiman Barat differs. Generally in Priti Boj, the varieties of food served are limited while the menu for Jiman Barat includes large varieties of sweets & namkans depending on the status of the caste and its rural urban background. The traditional menu for marriage feasts includes Lapsi, Halwa, Malpua, Laddu, Barfi, Kachori and in some parts rice or rice preparations along with or without puri and subzi (vegetables). Each caste or community used to follow more or less a fixed menu depending on its hierarchical position in a local region.

GAUNA (HOME TAKING) — In view of prevalence of child marriages in Rajasthan the actual cohabitation of the couple starts only after the Gauna ceremony is performed. Till then, the girl stays with her parents. When the girl attains puberty, the bridegroom is invited with some of his friends and relatives to take away the bride. The custom is very popular among rural people where child marriage is still fairly common. However, in some areas, the Gauna is also known as 'Muklawa'.

Marriage among other communities

The ceremonies performed during a Jain and Sikh marriage are patterned after the Hindu marriage, though, it differs in form in some minor details.

Among some of Jains, the various vedic rites are not observed, and marriage is performed in accordance with the Jain Vivah Sanskar Vidhi. In such marriages neither the Brahmin priest is invited to perform the rituals, nor the vedic text is used. A community member or a Jain pandit performs the rituals.

A Sikh wedding is described as Anand Karaj - the ceremony of bliss. The important difference is that the religious texts which the Sikhs use are again not vedic but from Granth Sahib. A Sikh marriage takes place before sunrise or in the early hours of dawn. When the morning hymns are over, the pair are asked to sit in front of the Granth where
the priest first tells them of the obligations of married life. The professional singer (ragis) sing the hymns from the Granth. The bridegroom followed by the bride have circumambulations (lawan) round the Granth four times and they are declared as husband and wife.

The mangani or the betrothal ceremony is performed before the Nikah or marriage among the Muslims in the State. On this occasion, a pair of clothes and ornaments are sent for the bride by the father of the boy. In turn, the next day, the girl's parents also send a Safa or Turban alongwith some gifts for the boy. The bridegroom goes in procession wearing a Suhra (nuptial garland) and an apparel presented by the bride's father. After going to the mosque for the Namaz and offerings, he goes in a procession to the bride's house on horseback or mounted on an elephant. He is received and offered reception in a Majlis. After obtaining permission of the bride's father in presence of a Vakil and others as witness, the ceremony of Ijab and Kabul (offer and acceptance) is performed. The amount of the Mchar (dower) is settled and the Qazi adminsters the Kalma to the bridegroom. The bride is given farewell alongwith dowry, depending on the status of a person, after a sumptuous feast given to the bridegroom and his party by the parents of the girl.

**Dowry system**

The lavish expenditure on various ceremonies connected with marriage is a matter of prestige and sort of conventual necessity, particularly for the traditional higher castes in Rajasthan. Cash and articles of daily use and comfort are given in marriage by the father of the girl.

The amount of dowry taken or given in a marriage is a status symbol of a person or a family. So much so that a sort of exhibition of dowry received or given is arranged and kin and friends are invited to have a look at the various articles included in the dowry. Despite promulgation of the law, discouraging dowry, in 1961, the practice continues to operate in some cases in a very cruel and oppressive manner even today. It is largely impossible for most parents to pay a huge dowry in order to get a good match for their daughter. It is customary in certain sections to demand and negotiate dowry, specially the cash part of it, from the bride's father before making a final selection of the match. The unbearable burden of dowry has virtually ruined parents who are forced to take loans, or sell property, for the marriage of their daughters.

At the same time, the prestige and status and sometimes, adjustment of the newly wedded girl in her inlaws' house is greatly determined by the amount of dowry she had brought with her from her parents. It is because of dowry that birth of a daughter in the family is looked upon with disfavour.
Evils like child marriage, female infanticide, suicide by, or murder of, newly married girls, indebtedness, polygny unmatched marriages, breaking down of, or mal-adjustments in, families, low status of women in general etc., could be, to some extent, considered as outcome of the prevalence of the custom of dowry in Rajasthan. The cases of dowry deaths are often highlighted by the newspapers.

An interesting, and somewhat paradoxical change in people’s attitude towards the dowry system is observable. With the spread of education, love marriages, inter-caste marriages, late marriages, public opinion against dowry etc., the consideration of dowry is becoming less significant, on the one hand, in the process of mate selection. In some castes, through the caste associations or other voluntary organisations some rules have been framed to bring about reforms and impose restrictions particularly among higher castes. One of the castes like Pushkarna Brahmin, are arranging marriages in a collective manner to save expenditure involved in marriage. While on the other, the size of the amount taken as cash and the list of articles to be included in dowry are considerably increasing even among the educated classes.

Apart from ornaments, clothes, bed, utensils etc., which are traditionaly given to a bride, an unduly large number of comfort and luxury items are added, such as radio, fan, sofa set, dining table, dressing table, refrigerator, T.V., almirah, sewing machines, scooter and even a car; sometimes, a bungalow or a piece of land may also be given, depending upon the economic status of a person. The amount given in cash too has increased in the same proportion. The dowry system is commonly practised in almost all the important religious communities of Rajasthan like Hindus, Jains, Sikhs and Muslims. However, on the contrary, in some of the castes, the custom of bride price is prevalent in Rajasthan.

Inter-caste and sub-caste marriage

Inter-caste and inter-religious marriages are not altogether unknown in Rajasthan. A number of inter-caste and inter-religious marriages have been recorded. Also, it is well known how rulers and aristocrates in Rajasthan had for socio-psychological, economic, and strategic reasons, entered in such marital alliances in mediaeval period. However, even in those days, such alliances were considered deviations from tradition, and feelings of aversion were expressed against them. Inter-caste and sub-caste marriages are not still very common in Rajasthan. At normative level, the caste strictly adheres to the rule of endogamy, and different caste groups do not reveal any sign of the loosening of their endogamous boundries. Nevertheless, whatever inter-caste marriages are being
performed today do indicate a change in the attitude of people, and an increasing acceptability of such marriages, albeit their number may be very small. However, romantic love, economic independence of women, increasing education, co-education, impacts of western values, industrialization and urbanization, legal facilities, dowry system, creative role of reform movements and other such factors have let to inter-caste marriages amongst some people in urban Rajasthan.

The 'Arya Samaj' in the State has played an leading role in performing such marriages. For want of empirical data in regard to the exact number of inter-caste marriages performed, say over the past two and a half decades (that is, since the promulgation of the Special Marriages Act, 1954), it may not be feasible to attempt any trend-setting generalization. Nevertheless, it may be said that among the educated and the enlightened few the breaking down of the endogamy barriers is being welcomed; even among the masses a sense of indifference, if not tolerance towards incidents of inter-caste marriages is emerging.

Civil Marriages

The phenomenon of civil marriage is still rare, though not completely absent in Rajasthan. However, the data about some districts, available in district gazetteers of Rajasthan, do suggest that the number of civil marriages performed are negligible which only leads us to conclude that the traditional practices along with their pomp and show, though very expensive, continue to be preferred by the people in general.

Marital Age

The Hindu Marriage Act 1955, as amended in 1976, prescribes that the minimum age of marriage for boy is 21 years and for girls 18 years. In practice, however, there is no fixed age for marriage yet in Rajasthan. A great variation in this regard could be observed in various categories of caste and communities, depending upon their place of residence, such as urban, rural or tribal. Therefore, it is extremely difficult to say anything specific, or to make a generalisation in this regard. The only rule that seems to have been generally followed upon by the people of all castes and communities belonging to Rajasthan is that the age of the bride must be less than that of the bridegroom.

Child marriage, though banned by law is common among the rural and tribal people. Thousands of such marriages are performed on one single day i.e. 'Akshaya Tritiya', every year.

Sometimes, for instance among Saharias, the marriage is settled when the child is still in the womb of the mother. The census tables do indicate
the large number of girls and boys found married before the legally prescribed limits of 15 and 18 years (now 18 and 21 years) for girls and boys, respectively. The child marriage is also followed among Muslims in Rajasthan.

Among Hindus the evil of child marriage is found very commonly among the scheduled castes and scheduled tribes.

The position is much different in some of the comparatively enlightened and educated communities like Brahmans, Rajputs, Kayasths, Jains etc. particularly among those who belong to urban sector. The late marriages (i.e. marriage after the age of 22 years in case of girls and 25 years for boys) are also not uncommon among urban upper and middle classes.

In any case, with the spread of education, competitive economy, impact of urbanisation and modernisation, loosening caste and religious rigidities, legal and social reforms etc. the number of child marriages is considerably declining. The age group 15 to 18 for girls and 20 to 23 for boys seems to have been widely accepted in the communities which no longer are following the practice of child marriage.87

Marriage of Widows

The marriage of widows is generally not favoured in Rajasthan. If at all, such marriage is done it does not seem to possess the sacramental character of the first marriage. According to traditional beliefs, a maiden is given in marriage only once, and, as such, no regular rites of marriage are observed when a widow is married. Such marriages are known as 'Nata' in the State, and are permitted only in the traditional lower castes or tribes, for example the Meena, Bhil, Nai, Mali, Dhobi, Kumhar, Koli Dhanka and the like. As mentioned elsewhere among many lower castes the custom of junior or senior levirate is prevalent in Rajasthan which expects a widow to marry the younger or elder brother of the deceased husband. If she wants to marry some other man, the children by the first marriage are retained by the family and the widow forfeits all her rights in the property of the deceased husband. In some such cases the new husband makes compensation to the younger brother of the deceased husband.

The marriage morals among communities like Brahmans, Rajputs and Vaishyas do not appreciate 'Nata'. 'Johar' (in Rajputs) or 'Sati-pratha' which warranted a wife to burn herself with the husband, have been given up.
The widow marriage is found among Muslims and Sikhs also. Among Sikhs, particularly amongst the peasantry, the custom of taking widows under protection by simply casting the mantle (chaddar) is prevalent. It is not permitted among the Jain community of the State.

However, legalising the widow re-marriage by the Hindu Widow Remarriage Act, 1956 and with increasing social awareness, emphasis on ethical justifications of widow marriage, pathetic conditions of widows, breaking down of joint families, discarding of dual standard of morality permitting man to remarry and forbidding woman to remarry etc., are some of the factors and conditions which are bringing about change in conventional attitude of people towards widow marriage in Rajasthan. May be only as exceptions, there are cases when widows have been married in ceremonious manner and have been accepted by communities which traditionally did not allow such marriages.

Divorce

Divorce has been fairly common in the lower strata of the society, particularly in the communities which permit 'Nata'. Much before the enactment of the Hindu Marriage Act of 1955, permitting divorce legally, the dissolution of marriage was allowed in mediaeval period on certain grounds. such as mal-adjustment, mutual antipathy, mental and physical disparity between the couple, wilful desertion, conviction for infamous crimes, habitual drunkenness, impotency and insanity. However, among Brahmins, Kastriyas and Vaisyas, indissolubility of marriage has been greatly emphasised. Customary divorce is very common and easy among Muslims in Rajasthan. The Sikhs practice it in a very limited way. Among Jains, however, traditionally, the marriage is taken to be irrevocable.

The decline in orthodox religious beliefs attached to the concept of marriage, economic independence of women, increasing possibilities of remarriage, ideas of equality of men and women and legalising divorce by the Hindu Marriage Act, 1955 etc. could be thought of as some of the conditions and reasons conducive to divorce in Rajasthan, as elsewhere. Even then only a very few cases are reported to have been instituted in the district courts in various districts in Rajasthan seeking divorce. It may be attributed to the rigidities of the requisite conditions for the grant of divorce under the law, or to the continuity of orthodox ideas about the sacramental nature of marriage. However, the number of cases seeking legal divorce is gradually increasing.
Prostitution and Traffic in Women

The early literature reveals that the prostitutes acted as singers and dancers not only in royal courts but also in public functions of both secular and religious character. The prostitutes known as 'Tavayafs' were patronised by the Kings, Nawabs, Jagirdars and other aristocrats. It is said that the royal princes used to be sent to learn 'Tahjeeb', (manners & etiquettes) from these Tavayafs who were very sophisticated and polite in their behaviour. A large number of women as 'Pardayatans', used to be kept in 'Janan Khanas' maintained by the erstwhile State rulers. The red light areas including the brothels and dancing halls existed in the major cities. The 'Randis' or 'Dancers' were invited to sing or give dance performances at the time of marriage and other joyous occasions.

The introduction of the Suppression of Immoral Traffic Act, 1956 providing for the suppression of brothels and trafficking in women, legally brought to an end the institution of prostitution in Rajasthan. The red light areas or 'bastis' were got vacated. The efforts to eradicate the evil completely seem to have met partial success as some of the fallen women still carry on the profession clandestinely. This may be attributed to lack of efforts to rehabilitate the involved women and difficulties in finding a honourable status for such women in the society. The available data about the cases of trafficking in women or prostitution detected and convicted hardly throw light on the extent of the evil because of the legal problems involved in the process of detection and convictions in such cases.

With the evils of growing urbanisation and industrialisation, the clandestine forms of prostitution in the form of 'call girls' has started showing its ugly head, though the number of reported cases is negligible.

Drinking

Drinking wine or liquor has been very popular in Rajasthan, particularly among communities which are non-vegetarian in their food habits. The use of country liquor has been prevalent among the people of scheduled castes and scheduled tribes as well as among poor sections of the society, at large. Wine was served on marriage and other joyous occasions in various communities in Rajasthan. Foreign liquor locally known as 'English Wine' is mainly consumed by the higher strata of the society. Communities like Brahmins, Vaishyas including Jains etc. traditionally abstain from drinking of wine.

Opium is yet another of the prevalent intoxicants which is in common use in various communities of Rajasthan. It is a common custom to give
a small dose of Amala (solid form of opium) even to a very small child by the working mothers belonging to the lower classes. The Bhang, in the form of Thandai, is popularly consumed by the communities which traditionally abstain from taking wine.

Apart from these, the other beverages mostly used by villagers in Rajasthan include tabacco in hukka or pipe, tabacco in chillam, beedy, cigarette, ganja tari etc. The use of drugs and narcotics like LSD, morphine, codeine etc. have been started, though scarcely so far, by young students belonging to urban areas. The drinking of tea and coffee is very common among all communities in the State.

Gambling

Gambling with dice as an indoor game has been known since olden times in India and there are evidences that regular gambling houses in Rajasthan were maintained even in the early mediaeval period. Though banned by law now, the institution of gambling still persists clandestinely in Rajasthan. Playing cards with money at stake is a very common pastime and leisure time activity. Generally ‘flash’, paplu, rummy, bridge etc. are the card games played for this purpose in clubs and private houses. Gambling on diwali night is almost a pastime.

Apart from these, the various cases detected by the police and reported in the newspapers from time to time reveal that gambling is one of the important activities in the underworld. The reported cases of gambling violating the local and special laws related to Gambling Act was 667 involving 2141 persons who were arrested under the above Act in 1976. The practice of ‘Ank Lagana’ (Stake numbers) is very common which is also known as Matka. Gambling on possibilities of rain, election contests, results of sports events, etc. is also common among people indulging in gambling. The satta (gambling) on purchase and sale of silver or edible oils etc., was, at one time, very popular although it is now banned by law.

HOME LIFE

Type of Dwellings

The type of dwelling units built in the State vary with the locality, the stage of development, and the class and culture of the community to which the inhabitants belong. Therefore, the description of dwelling units should not be taken to apply to the generality of houses or the dwelling units built today, particularly to the houses built by the dwellers belonging to the higher income group in cities. Infact, the house construction and the type of dwelling units could easily be classified in to rural and urban
houses, belonging to upper and lower classes, traditional and modern and so on. The houses constructed in traditional manner still constitute the substantial proportion of houses utilised by the present day members of the community. Hence, it would neither be correct to say that the traditional pattern of house construction or typical Rajasthani housing pattern has been entirely given up nor it is appropriate to state, that modern pattern of housing has been completely adopted by the urban dwellers. A significant section of the population of Rajasthan belonging to tribal subculture is still maintaining, to same extent, its traditional dwellings.

The study published by the superintendent of census operation called "Glimpses of Rural Rajasthan" describes elaborately various type of housing patterns found in Rajasthan. According to the description mentioned, the rural Rajasthan lives mostly in what are called shapeless clusters of huts. In Western Rajasthan, these occur along with villages of dispersed type and in the southern parts of the State, these are linear type of clusters. Isolated home steads are observed in the tribal regions.

The majority of the houses in the rural sectors are kutch and are built of material locally available. Generally mud mixed with dried grass is used for making walls and the thatched roof is made of bamboos, grass and twigs. At some places the use of unbaked bricks and fired tiles is also popular. However, the well-to-do farmers in rural areas have started constructing pucca houses imitating the style of house constructions found in the city areas. Also, alongwith rich farmers, money lenders and former Jamidars have the privilege of having pucca houses. The pucca houses are made of stone. The walls are made of stone (blocks and lime) and for roof slabs are used which are available in plenty in Rajasthan. The construction of 'Haveli' (big house) has been one of the cherished desires of traditional Jagirdars and other rich people. Havelis in Jaisalmer and those found in whole of the Shekhawati area are well-known for their huge structures and architectural designs. The construction of small windows, Jharokha, Chabutra, Chowk, Poli do reveal many interesting dimensions of feudal and aristocratic culture.

In the tribal regions, particularly in the forest areas houses are built mostly of wood, leaves and grass. If bamboo is available, it is used alongwith mats which are used for walls and roofs.

The housing pattern in the urban areas differ completely from the traditional rural pattern. It has two distinct types of dwelling units. One which is generally used by the members of lower income group and which are found abundantly in the slum areas in the city. The Kutch huts in rural areas and "Jhuggi Jhonpari" in urban areas resemble very much.
However, for roof tops, the use of tin sheets is also popular in cities. On the contrary major cities of Rajasthan indicate the accelerated rates of development so far as housing is concerned. The pucca houses made with stone, lime and brick block etc. is very common alongwith multistorey houses made of RCC material (cement and iron). Due to the efforts of Urban Improvement Tursts, Rajasthan Housing Board, Housing Cooperative Societies etc. the house building activities have accelerated to a great extent.

Decorations and Furniture

The ladies of Rajasthan who are well known for their ‘mehandi’ decorated palms, are also fond of fanciful designs being painted on the walls. The main entrance of the house is decorated with paintings on both the sides in water colours. In the villages the walls are sometimes decorated with designs made in cow-dung. Flower petals and leaves pasted imaginatively add designs and colours. Even in the urban areas, we find paintings made by professional artists on the pucca houses. Generally flowers, birds, animals, a watchman, barat procession with camels and elephants etc. form the major themes of these paintings. It is customary to get the wall repainted on the marriage occasions, particularly at the time of the marriage of a girl. Religious sermons, couplets and phrases etc which are considered auspicious, are also written on the walls. The tradition continues in the urban areas with slight modifications and refinements. Some families use small motifs and patterns painted on small sheets and paper pasted on the door. The calendars and pictures duly framed and the wall hangings representing handicrafts of Rajasthan are also used as wall decorations.

The floors of huts are decorated with various kinds of designs, locally known as "Mandanas". The women in rural areas decorate their floors with various motifs drawn in freehand with lime or white earth after coating the floor with cow-dung. Usually, the carrel motif is painted crimson (that is, deep red) with the use of red earth or red ochre. The floors and walls are a part of ritual decoration on festivals and other ceremonial occasions. Generally the designs change in accordance with the season, occasion or festival.

Life in Rajasthan reveals two markedly different traditions of life styles chiefly due to acute poverty conditions, on one hand, and the aristocracy of nobles on the other. Thus expensive furniture could be observed in the well-to-do houses, while the common masses have only crude type of bedsteads. The elaborately carved wooden articles such as chairs, tables, sofa-sets, dressing tables, arm chairs, beds, chaukies,
glass-door, almirahs etc. adorn the houses of the rich, while the common people have only cradles, stools, cot etc.

"The house-bold goods include the winnowing fan, a pestler and mortar, and a hand mill; trays of different types and designs, a cage for keeping eatables, earthen and metal pots, various kinds of hearths, water-pot stands, khothis (grain containers), various kinds of lamps and lamp shades, hoochka (water tobacco-pipe)".

Dress & Ornaments

The people of Rajasthan, men and women, are fond for ornaments and colourful garments.

DRESS — In fact the costumes of Rajasthan are known for the variety of designs produced by the local craftsmen with their skill in weaving, tying and dyeing and block printing. The dresses for men include dhoti, angarkha and pag or phenta or safa or pagri or head gear. Dhoti (untailored piece of cloth of about 4.5 metres to 5 metres) is fastened around the waist with elaborate plaiting. Angarkha or kurta is generally used as a shirt. The head gear is the important item of the male costume. The style of tying and wearing the turban and its colour differ from region to region and is indicative of caste, class or community of a person. Generally the 'safa' style is common among Rajputs and the 'pagari' with business community. However, the use of small size safa has been common among the people belonging to different castes and professional groups. White Gandhi cap is also in use but it is indicative of the dress of political leaders or worker. The buttoned-up coat or sherwani or a jacket is generally worn over the shirt particularly in the winter season. The villagers use a woollen blanket or a shawl.

The women's dress is ghagra (skirt), kanchali (a half sleeve abbreviated blouse, bearing the mid rief uncovered), odhani or loogadi which is about 2.2 metres and 2.5 metres in length. Costumes worn by women at festive occasions are often embellished with embroidery and gota work (silver border). For the daily use also, pure cotton but colourful dresses are used which indicate their aesthetic sense. The tie & dye clothes are particularly popular in Jaipur and Kota. Traditionally colourful tie and dye saris like lakharia, chundari, peela and ghat are the saris or odhanis which are worn at specific occasions and traditional festivals by married women. The women in the cities wear long bodice or blouse, saree (five meter long cloth) and petticoat of several folds. The young girls have started wearing Salwar or Payajama or Chudidar, Shirt and a Chunni.

Like men and women even the small children have a fancy for colour and design and for traditional motifs. However, the menfolk in the urban
areas have by and by started adopting the European garments and dresses particularly the literate class who have started wearing pants, shirts, shoes etc. The buttoned-up short coat (The Jodhpuri) is included in the official dress in Rajasthan.

The traditional Muslims still maintain their dress pattern which is a little different from Hindus. Muslim males wear a round turban, an ajarak (a cloth about 2 yards long) on the shoulder which is spread on the ground during 'namaj', a full sleeved but collarless kurta upto knees and tehmad (a long sheet of cloth usually printed and worn loosely round the waist).

The Muslim women wear the paijama, a long kurta, usually half-sleeved, an odhani and when going out of gates a ghagga which resembles a flowing gown being gathered up at the waist and put on like a coat as it is open in front and has close fitting sleeves. The burqua system is also observed. However, the Muslim community is not completely unaffected by change. The literate and higher and middle class male Muslims in the city have started adopting the European dresses but still by and large women folk continue to maintain their traditional costumes.

Jootis (boot shaped foot wear) made from locally cured leather by local cobbler are in use as foot-wear. Jodhpur is famous for its 'Mojadi' or 'Jooti' (boat shaped shoe). Attractive Jooti's are embroidered with silk and gold thread.

ORNAMENTS — The people of Rajasthan are very fond of ornaments and traditional jewellery in addition to their colourful costumes. The quality and the weight of the metal or material used for ornaments was indicative of the class or caste of a person in the traditional society. For instance, the golden ornaments were used by the upper castes and the ornaments made of silver and other metals were generally used by the lower castes.

A gold or silver necklace, balevara, adorns the neck of men-folk. The silver or golden ring (anghuthi) for the fingers and murki (golden rings) for the ears are used as ornaments to further enhance the personality of man. In cities a thin chain of gold is used as necklace and golden buttons and cuff-links are used for shirt or kurta.

A pair of jhumkas (earrings), nathadi (nose ring) or long with a real or imitation jewel studded on it; a bor, borla or rakhri made of gold with jewels and kadas (silver rings for legs) and chutki (for toes) were considered to be the signs of wedlock and it was almost essential for a married woman to own and don these ornaments. The rakhdi, borla, chand or sheesh-phool are in vogue for the fore-head; nath or nathdi or long for the nose; jhalas, jhumkas, bali or kaddis for ears; hansli or khungali or
kanthi or kantha, mala, har, balewara for the neck; baju-bund or kada for the arms; gajra, bungri, gokhru alongwith bangles for the hands; hath-phool for the back of the palm; anghuthi or challa for the fingers; kanagati for the waist; kada, nevri, tanka, tarde, pajeb for the legs; and bichhia or chutki for the toes are generally the ornaments used by a woman in Rajasthan. In some of the tribal communities like Garasias, the ivory chuda is used by the married women and lackh chuda by the unmarried ones. A detailed list of ornaments used by women is given below:

**ORNAMENTS OF A RAJASTHANI LADY**

<table>
<thead>
<tr>
<th>1. Forehead</th>
<th>Sheesh-phool, Nor, Teeka, Tilli palka, Lad.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Head</td>
<td>Sarbhang, Rakhadi, Memand, Shakarpara, Patti, Dora</td>
</tr>
<tr>
<td>3. Nose</td>
<td>Long, Nath, Bullak, Khanta</td>
</tr>
<tr>
<td>4. Ear</td>
<td>Jhali or Jumka, Karanphool, Dorna, Sankalia, Toni, Tops.</td>
</tr>
<tr>
<td>5. Teeth</td>
<td>Rakhan, Meka</td>
</tr>
<tr>
<td>7. Body</td>
<td>Hansuli, Har, Necklace, Kanthi, Madaliya, Seediya</td>
</tr>
<tr>
<td>8. Hand</td>
<td>Bajuband, Bangadi, Churries, Pahunchi, Ghokhru, Gajia, Hathphool, Muthia</td>
</tr>
<tr>
<td>9. Fingers</td>
<td>Anguthi</td>
</tr>
<tr>
<td>10. Waist</td>
<td>Kanakati or Kardhani, Kandora, Jhara.</td>
</tr>
<tr>
<td>11. Legs</td>
<td>Paijeb, Payal, Kada, Janjeeri, Pagpan, Bichiya, Challa, Toda, Tankas, Beddis, Amla.</td>
</tr>
<tr>
<td>12. Arms</td>
<td>Bhujband, Kokan, Kada</td>
</tr>
</tbody>
</table>

Intricately designed bangles adorn the arms. The lac bangles with tinted red are worn by all married women.

In the tribal areas, the bangles and armlets of various kinds, made of coconut shells, ivory, lac, brass etc. are in use. The tribal women are specially fond of beads, and heavy brass ornaments particularly for the legs. Cotton bands are often used in making armlets with small pieces of metal.

Apart from the ornaments the menflok with beards and, or moustaches, and women folk with a wide variety of hair style with ornaments or beautiful hair pins tucked in, further enhance the beauty. To decorate their palm, the women apply Mehandi or Henna paste in various designs. Sindoor (a red powder) is used in between the hair parting towards forehead by a suhagan (a married woman whose husbands is alive).
Food

The climatic conditions and traditional culture determine the food habits and the type of food consumed. As such there are plenty of sub-regional, seasonal, caste and class variations in nature and type of food consumed in particular and food habits in general like the use of vegetarian and non-vegetarian food. However, the staple food of people in Rajasthan consisted of grains and stuff which are produced locally. Bajra, maize and jowar constitute the main staple food in Rajasthan alongwith wheat and barley. Bajra is common in the western and southern western parts of Rajasthan, whereas maize and jowar are common in Udaipur and Kota divisions. In Jaipur district, both jowar (sorghum) and bajra (pearl millet) are eaten besides the wheat, maize and barley. Rice is an important food in Banswara and Dungarpur districts. Besides cereals like moong (green gram), urad (black gram ) and moth are eaten very commonly.

The traditional dishes of curry or dal, choorma, bati, gugri, rab, rota, chach-rabari, Dhokla, badi, (mangodi), Khichya, Papad, Khis, Pote, Khakra, Panchkuti, etc. are still in common use. The Rajasthaniis are known to be fond of eating sweets alongwith highly spiced food. Lapsi, Halwa, Kheer, chogni ka laddu, barfi, misri mawa, rabri, murki or kangan, danna, or bundi, jalebi are sweet dishes very commonly used particularly at the time of festivals and festive occasions. The namkins include seva, pakori, kachori, samosa, papad, etc.

Though the common people in Rajasthan still retain their old menu but the change is under way in the food habits of the people belonging to urban areas.

Generally, Rajasthanis take only two square meals a day, normally consisting of moti roti, or roti, fulka, or chapati, and paratha, generally with raw onions, green mirch or chutney (particularly in the rural areas), dal and one or two green vegetables, depending upon the status of the consumer. Breakfast, in its modern sense, is almost unknown, although the ruralites almost invariably take ‘chach-rabri’ first thing in the morning; the urbanites, on the other hand, usually take some milk with sweets and namkins. Of course, tea is now rapidly and extensively replacing the ‘chach-rabri’ and the milk.

Consumption of non-veg food has a culture - particularly in caste and religious context. Thus Muslims in general, and the Rajputs, Kayasthas, Jats, and traditionally some castes and tribes among the Hindus are consumers of non-veg food. The normal item used is mutton. Interestingly the use of egg is gradually extending itself to the traditionally vegetarian
communities and castes particularly in the urban sector. The western food habits and table manners generated through the hotel and restaurant culture, can now be observed in the urban communities particularly among a select class of people, though their number is very small.

Amusements and Festivities

The people of Rajasthan with their rich traditions of merry-making, collective ways of amusements and entertainments, festivities, fairs and festivals etc. have not only supplemented the less hospitable nature but have also added colour, interest and zest in life in this rather dry and desert land. The princely and aristocrat's patronage to various sources and forms of entertainments coupled with close association with the Mughal Emperors, amply encouraged and nurtured the creative traditions of folk entertainments and mirth. Various types of indoor and out-door games, folk dances, folk songs, folk poetry, folk dramas or theatrical performances, folk acrobats, puppet shows, fairs and festivals, occasional picnic etc. formed the major sources of entertainment, leisure time activities and pastime. Also wrestling, boxing, hunting, boating, swimming, bird and animal fight, and various other martial games and sports constituted the favourite amusements of kings and nobles in particular, and the common people in general. The literature and historical records are full of facts and fictions about such activities of the royal princes. The aged and the old, still recollect and recount pleasant memories of major festive or mirthful events, likings & dislikings of kings and princes etc. However, a considerable change is noticeable in the nature of sources of amusements and entertainments for children, youth and old. The cinema, radio, T.V. modern theatrical performances, games and sports activities, club activities etc. constitute some of the sources of entertainment in towns.

Indoor Games

A variety of indoor games are popular in the State, such as chess (shatranj), choupar, cards and carom, apart from pasu (dice), changoo, no kanti (nine pebbles), Ganjifa (consisting of 40 cards round in shape and about 3 inches in size). Among children in the towns, games like trade, ludo, chinese checker, cards, snakes & ladders etc. are quite popular. Playing 'Pacheta' (a pebbles game) is widely prevalent among the girls, both in villages and towns.

Outdoor Games

A variety of out-door games are enjoyed by the children, such as toy-carts, wheeled sticks, gillidanda, sitolka, dari-sota, hide and seek, sat-tali, merry-go-round, chor-sipahi, possama, bol meri machali, kita pani, Raja
Raja Palki Jai Kanhaya lal ki, langdi-tang etc. Patang bazi (kite flying) is considered a good pastime not only for young children but also for grownups and old; kite dangal (matches) are also arranged for recreation. The Makar Sankranti day is celebrated as a festival of kite flying in some parts of Rajasthan.

Some of the prominent games played, particularly in urban areas, include cricket, hockey, foot-ball, kho-kho, baseball etc. Kabbaddi and volley ball are the games which are enjoyed both by rural as well as urban communities. Regular competitions and matches are organised for all such games and sports by different organisations in the State.¹⁰¹

Wrestling and boxing which had blessings of ruling princes earlier, are still good pastime. The tradition of ‘akharas’ or ‘vyayam shalas’ continue to be maintained to some extent. The institutions which provide training for judo, karate as well as for the ‘yoga’ have recently sprung up in some of the towns of the State.

Martial sports, such as archery, swordsmanship, cudgelling, stickmanship, pathe-bazi which have been much coveted amusements for the youth, particularly the princes of Rajasthan,¹⁰² are losing their importance with the decline of traditional aristocracy in the State. So is the case with hunting and animal fights. Boating and swimming, however, are still quite popular. Swinging is enjoyed by ladies and couples, particularly in the rainy season.

Traditional Sources of Entertainment

The rich traditions of art, music, song, dance, drama, acrobatics etc. from an important source of entertainment which flourished under feudal patronage. In fact the creative urge of ruralities and tribals resulted into the spontaneous and indigenous folk forms; the town dwellers whose life was centred around the court, contributed to the rise of the classical forms of music dance etc. This ultimately gave rise to various artistic intricacies and expertise, leading to the emergence of various professional and performing groups and communities.

The folk dances of Rajasthan, both of the professional and the spontaneous categories, are enjoyed by the people. Some of the popular indigenous dances of Rajasthan have been bandha, kalpa, godi, chhechari, ghumara, ger, gavari¹⁰³, terh-tal, and chirmi.

Folk songs alongwith their folk music are very spontaneous and common means of mass entertainment. Groups of women and/or men-folk clad in colourful costumes and singing folk songs for the whole day or night on joyous occasions, fairs, festivals and even at work in the field
or the home, is a very common sight. Of the most important daily chores of a village woman in Rajasthan, one consists of covering distances, often quite long, on foot and fetching water in pitcher balanced on head. For this purpose they usually go in groups, and both on their way to and from the well or pond etc. and also at the ‘panghat’, they indulge in gossiping and/or singing which brings them much mirth and amusement. The rural men folk, on their part, usually assemble, almost every evening, at the ‘chaupal’ where over repeated rounds of ‘chillam tambaku’ (traditional from of smoking) they indulge not only in gossip but, frequently, discuss and exchange views and information about important events and matters. Thus amusement is mixed with business. Songs sung at various religious and social occasions by ladies form an important source of pleasure. Rajasthan is still proud of its best traditions of singing ‘taand’ by Mirasis, a muslim community, and folk music by Langas of Jaisalmer. Some of the Rajasthani ‘Lok-geets’ are dhumal, gumar, banjari and gohari.

Several musical instruments are played, including vinas, bansuri or flutes, clappers, drums (tabla-dholak), sitars, tanpuras, pipes, horns, trumpets, harps, lertes, syres, ravan hattha, apana, etc. The duf or dafl or chung is played at the time of ‘Holi’ in phagun.

Folk musical instruments include dandia, ghanta, ghanti, ghadiyal, thali, tasli, tinkora, manjeera, thola, jhanjh, chipiya, chudiyan, kartal, ramjhol, lejem, morchang, ghodlio, tholar, ghuhrnu, chang, daf, kharjari, dholak, ghera, madal, dhal, naggara, deru or shak, damru, dhora, damama, kundi tasa, kamat, matki, pabuji ra mata, algoji peli, toto, nad, satara, swnnai, pungi, murala, mashak, shankh, singhi, bargu, turhri, bhongal, karna, bamiya, nafani, ekata, du-tara, cho-tara, nisan, tandoora, janter, rabanb, ravan hatha, chikara of meos, chikara of garasias, jagiya satangi, dedu pasli ri sarangi, singhi sarangi, kamayacha, sarinda, apang, duchko, mangnia, sarangi.104

The Nautankies, another very popular medium of stage performance, laying emphasis upon the beating of ‘nagaras’ and spirited dances, form yet another source of entertainment. The ‘Ram Leela’ and the ‘Ras Leela’ involving full length plays, which continue for days together are the other very popular media of folk entertainments. Such performances are now being arranged, at large scales, in the urban sectors also. The ‘Gali Bazi’ and ‘Jogi Jogan ka Tamahas’ are other forms of stage performance which also provide recreation.

Professional entertainers like jugglers (bajigars), snake charmers and puppeteers move from place to place and provide entertainment to both villagers as well as the urban dwellers.105 Puppet shows are very popular not only in Rajasthan but in the whole of northern India. The Bhats, who
generally reside in Nagaur district, and known as ‘Kathputli Walas’, are a community of artists who generally leave their native places in winter and move to towns and other places to perform puppet shows in order to earn some money. The puppets are made of wood, duly painted and wrapped in befitting Rajasthani costume. The performer controls the puppet by his nimble fingers, and speaks dialogues on behalf of the puppet to narrate the story, using a peculiar whistling device, beats of *dholak* and songs. To stage a performance a couple of cot, a bed sheet and a lantern or a petromax are needed. Generally, the historical themes, along with some comic effects form the contents of the performances. The Bharatiya Lok Kala Mandal of Udaipur, and the Sangeet Natak Akademi of New Delhi are trying to preserve and develop this folk art in various ways.\(^{106}\)

A museum of puppets has been established at Udaipur by the Bharatiya Lok Kala Mandir which has a wide collection of large variety of puppets found in Rajasthan and elsewhere.

Yet another important activity concerning folk entertainment is the acrobatics. The Rajasthani acrobats, called ‘Nats’ perform many feats, including the rope dance. With the beating of the drums, the “Nat” boy or girl would climb over a rope held taut and display breath taking acrobatic feats. The Bhand, Nakkals, Kavals and various other communities continue to entertain people by their specialised traditional arts. Apart from these, the various aspects of oral tradition such as folk songs, ballads, epic plays, folk tales, myths, legends, proverb, riddles etc. are important sources of recreation or amusement to the people.\(^{107}\) The folk songs through their enchanting tunes and interesting themes alleviate physical fatigue and provide relief by lessening the dull drudgery of manual labour. For instance, the village women sing songs while weeding the field and the men while drawing water from the well for irrigating the land.\(^{108}\) A large number of folk songs depicting various themes are popular among people in Rajasthan.\(^{109}\) Rajasthan is known for its colourful folk dances the description of which appears elsewhere.

Rajasthan has equally rich tradition of folk poetry and folk tales. *Pabuji-ki phad* is, in fact, a folk poetry set to music by the ‘Bhopas’. It is an eulogy describing the life and deeds of Pabuji who belonged to the Rathore clan of Marwar, and was worshipped like a God by the Nayaks, Rabari, Bhomias and others. The ‘Phad’ is an illustrated scroll of cloth, usually nine metres long and one and half metres wide, depicting the heroic deeds of Pabuji which from the content of the poetry. Both the Bhopa and his wife throw light on different pictures of the ‘phad’ while singing and dancing. There is a long list of professional communities of
entertainers that includes Dholi, Mirasi, Langha, Dadhi, Mangniyar, Kamod, Bhopa, Bhat, Jogi, Kalbelias, Meo.\textsuperscript{110}

The telling of tales by the old to the young, particularly children, combines the dual purpose of providing entertainment and the transmission of cultural traditions. The old ladies narrate the stories and tales related to festivals even to the younger ladies. The folk narratives related to Dhola Maru, Moomal and Kachhiba etc. are very popular.\textsuperscript{111}

The poetic 'Khyals' on the other hand, are mostly dramas with a social theme and have great potentialities both as a means of folk entertainment and representation of popular taste. The 'Khyals' are staged on an open, spacious plain or a platform, wherein two principal actors have a question-answer session on the stage, and, in poetical dialogue, they successfully display what would require many actors to perform.\textsuperscript{112} Over 200 khyals have been enlisted which still form a source of popular entertainment for thousands of villagers.\textsuperscript{113} The popular folk dramas relate, for example, to popular stories like Dhola Maru, Sultan Nihalde, Bhabrihari, Amar Singh Rathore and so on. Painting on hand-made paper with traditional colours have been very popular pastime as well as a profession. Rajasthani painting has distinctive styles subdivided in various schools known as Nathdwara, Kishangarh and Bundi.

The Contemporary Sources of Entertainment

The most popular medium of recreation in the present day cities and towns is cinema. The following table reveals the number of cinema houses and their seating capacity in Rajasthan during 1973-74 to 1977-78\textsuperscript{114}. The period under reference marks the increase in the total number of cinema halls from 172 in 1973-74 to 197 in 1977-78. Similarly, the seating capacity has been reported to have increased from 93098 in 1973-74 to 102310 in 1977-78.

<table>
<thead>
<tr>
<th>Year</th>
<th>No of cinema Houses</th>
<th>Seating Capacity</th>
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<tr>
<td></td>
<td>Permanent</td>
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<tr>
<td>1973-74</td>
<td>117</td>
<td>49</td>
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<td>1974-75</td>
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<td>1975-76</td>
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<td>1976-77</td>
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<td>1977-78</td>
<td>135</td>
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The transistor or radio is used not only as a means of communication but also as a source of amusement by both urban as well as rural and
tribal people of the State. Small-size transistors hanging on the shoulders of a farmer, a rikshawalla, or a truck driver is a common sight. T.V. programmes relayed by the Jaipur Door Darshan Upgrah Kendra are enjoyed by the people who reside in Jaipur city and the nearby villages and towns. The role of clubs as a source of recreation and pastime is very limited. A particular class of people do lead a club life in some of the cities where a few clubs exist. However, the number of clubs is increasing rapidly.

Occasional visits of circus parties, theatrical performances by local and visiting amature or professional groups, kavi sammelans and mushairas etc. provide opportunity of recreation to people, particularly in cities.

Places like Sariska game sanctuary and the Siliserh lake near Alwar, Ghana Bird Sanctuary, near Bharatpur, Game Sanctuary, Udaipur, Phoi Sagar Lake in Ajmer, the Nakki Lake in Mount Abu etc. attract large number of people for merry making and fun.

COMMUNAL LIFE

Pilgrimage Centres and Jatras

The people in Rajasthan worship and make offerings to large number of Gods and Goddesses, legendary heroes and spirits. This not only reflects their religious beliefs and inclinations, but also their devotion to super natural or super human beliefs or superstitions. For a large number of people going to temple or mosque every day to offer prayers or worship is a must. It is believed that the deities protect the worshiper from different calamities and bless them with success in their day to day activities. Therefore, one comes across a number of shrines, temples or mosques, pilgrimage centres or jataras, of local regional & national importance particularly of the three principal religious communities of Rajasthan, viz Hindus, Muslims and Jains.

It is interesting to note that 82,660 census houses in the State in 1971 have been reported to be used as places of worship. This represents 1.3% of all the census houses in the State. One can easily wonder at the existence of such a large number of the worshipping places like temples, mosques, guru dwaras, churches etc.

Some of the community-wise important pilgrimage centres and Jataras include the following :-

Hindus: Nathdawara (Udaipur), Puskhar (Ajmer) Kaila Devi (Karaull), Karni Mata (Bikaner) Sheetla Mata (Jaipur District) and Naraini Mata (Jaipur District).
Muslims: Dargah Khawaja Moin-Uddin Chisti and Galia Kot.
Jains: Shree Mahavirji (Sawai Madhopur), Nakora Jain Temple (Barmer), Dilwara temple (Mount Abu), Padampur (Jaipur district), Shree Paras Nath-Chul giri (Jaipur district), Rikhab Dev (Kesharia Nathji) Tijara (Alwar district), Ranakpur (Falana).

Dances

Like various other arts, dances in Rajasthan have both classical as well as communal forms. The classical dances are expressions of aesthetic beauty and refined form while the folk dances are spontaneous in character and sources of entertainment as well as sometimes the basis of survival or existence for some communities. The communal dances of Rajasthan have been classified by Devi Lal Samar into three categories in accordance with natural divisions of the region viz. hilly, desert and eastern plain including Shekhawati.115

The Hilly Region

The hilly areas are predominated by Bhils and Meenas who are well known for their songs and dances.116 The most celebrated communal dance of Rajasthan is Ghoomer. It is performed only by women during festivals and on happy occasions like wedding and birthday. The beauty, grace and splendour of this dance is enhanced by the gorgeous ghagras of the dancers. When the dancers go in the spinning round, the skirt blows up revealing the ‘payal’ and the jhanjar and other ornaments, the Rajasthani women wear on their ankles. Alongwith the musical strokes of ‘Dholak’ and Majecra, the participants sing songs. The dance is dedicated to the goddess Parvati or Gauri as she is called in Rajasthan.

In striking contrast to the ‘Ghoomer’ the gher is a dance with fast tempo accompanied by elaborate musical instruments like dhol, nagara (kettle drums) and shahnai. It expresses the gaiety, the characteristic feature of these communities on festive occasions especially that of the Holi after the harvest. The dance is performed with beautiful coloured sticks with tiny bells attached to them. One man dances with a dholak in the centre of the group, while the other men sometimes dance with their weapons, swords and spears instead of sticks.117 Thus the Ger could be ordinary or Dandia Gher. The Garasia men also perform the Ger dance.

Neja is a musical dance-game of the Meenas in Kherwara and Dungarpur, usually performed on the third day after Holi.118 A coconut is tied on a big pillar at its top by women who hold small sticks and whips. When the men folk try to climb up the pillar, the women dancers
drive them away by striking their sticks and beating their whips on their backs.\(^\text{119}\)

Yet another dance popular in the hilly region is the Gauri dance performed by the Bhils of Udaipur. It is a purely religious dance, performed during Sravan & Bhadon to appease Bhairav.

The Banjara dance is performed by the Banjara, a nomadic tribe of Rajasthan. Similarly the Bagarias (another nomadic tribe) women also perform attractive dances with tuneful music. The chang is the most popular instrument used by them.

The Garva and the Valar dances are performed by the Garasias during Ganguar and Holi festivals. Garasias also use chang for their Holi-dance. The kalbelias, a community of snake-charmers and folk entertainers, perform Shankari, Indoni and Panihari dance. In Mewar, the Bhawai community performs the Bhawai dance by using 5 or 7 earthen pots on the head.

The Desert Region

The Ghoomar which is also known as Jhumar is extremely popular and is performed on festive occasions in Udaipur, Jodhpur, Kota-Bundi with lot of variation. The followers of Guru Jas Nath perform Agni Nratya (fire-dance) after making a bonfire to the beating of drums, the playing of the bher and the singing of a song. The terahtali is also a very interesting dance form popular in Deedwana and Pokaran performed by Kamads, a community of folk entertainers. The men play Ektara and sing and the women produce rhythmic musical notes from the manjiras tied on the various parts of the body. Yet another dance is the Kachhi Ghori, a Rajasthani version of the Dummy-Horse dance performed in other parts of the country.

The Eastern Region

As a result of cultural affinity with Uttar Pradesh, the eastern region in Rajasthan has a developed tradition of Ras Lila, Ram Lila, Nautanki and other such dance forms. They could be taken as dance dramas. The Gindar dance is popular in Shekhawati area in which both caste Hindus and Harijans participate at the stroke of Nagara. The attractive dances are performed by the communities like Kanjars, the Samsis, and the Nayaks, Chamars and Mehtars in Rajasthan.

FAIRS AND FESTIVALS

Rajasthan is the home of various colourful fairs and festivals.\(^\text{120}\) Most of these have a religious flavour about them. A most popular saying in
the State is ‘Saat Bar Noy Tyohar’ meaning that there are nine festivals on the seven days of the week and thus the calendar marks a long procession of mela (fairs) and tyohar (festivals) in Rajasthan. These are colourful and resplendent with pomp and splendour and are characterised by unusual mirth and gaiety.\textsuperscript{121} Some fairs and festivals are mythological in origin and are based on legends about gods and goddesses while others are in memory of illustrious persons or heroes with superhuman powers, revered and idolised by the people. As man by nature is fond of festivals, congregations and joint celebrations, the festivals thus culminate in fairs.\textsuperscript{122} Even a great historian like James Tod was much impressed by characteristically gay and colourful festivities of Rajasthan\textsuperscript{123} and described them in his own inimitable style. Rajasthan is also known for its cattle fairs.

Fairs

The average Rajasthani, particularly a villager, has a great fascination for the mela (fair). The fairs are held at several places in each district of the State all through the year. The numerous colourful and spectacular fairs, with their unique style of merry-go-rounds and swings, animal shows, folk songs, folk dances, acrobatic feats, magic shows, temporary shops and vendors etc. provide a gala opportunity of merry making and fun to the residents of this desert and dry region.

Looking to the large number of fairs held in Rajasthan, a very brief description of only some of the prominent fairs could be included here.\textsuperscript{124}

\textbf{Pushkar Fair}—The Kartik fair at Pushkar, eleven kilometers north-west of Ajmer, is a religious fair, held in observance of religious rites or to worship Gods and Goddesses. More than one lakh Hindus, who assemble here on kartik purnima for this fair take a dip in the holy lake to wash away their sins.

\textbf{Kaila Devi Fair}—The Kaila Devi Fair, is held at Kaila Devi in the Karauli sub-division of Sawai Madhopur District. As Kaila Devi is identified with Bhawani, a large number of animals are sacrificed to propitiate the Goddess. The principal devotees include Rajputs, Meenas and members of some other Scheduled Castes. The fair continues for about a fortnight.

\textbf{Sheetla Mata}—A largely attended Sheetla Mata fair is held at Seel-Kyan-ki-Doongri, a village in Jaipur district on Sheetla Asthami day. The devotees of Mata come in a very large number from far and near in their decorated bullock-carts and tongas. They worship the Goddess of small pox or Mata with ‘pua’ and ‘pakori’. However, fairs at smaller scale are held almost in all parts of Rajasthan, wherever, the Sheetla Mata temples exist.
KARNI MATA—The fair is held at the temple of Karni Mata at Deshnok in the Nokha tahsil of Bikaner District twice a year. It is known as the temple of mice, who roam freely in the temple unconcerned by the devotees who come there in large number.

BANESHWAR FAIR—Baneshwar fair is held in Aspur tahsil in Dungarpur district. The fair is predominantly attended by tribals like Bhils and some of the traditional low castes like Balais and the Chamars. The celebrations include the idol of Baneshwar Mahadeo and holy bath to Shiva Linga.

BANGANGA FAIR—The fair is held at a small place near the river about 11 km. from the historical town of Bairath in Jaipur district. Over 60,000 persons assemble on full moon day of Vaishak (April-May) annually to have a bath in the sacred stream which is believed to have been brought into existence by Arjun, one of the Pandavas. The Jats, the Ahirs and the Gujars are the major communities who attend this fair.

GOGAJI FAIR—The Gogaji Fair held in village Goga Medi in tahsil Nohar of Ganganagar district. The fair is celebrated in the memory of Gogaji, a renowned hero, who was a Chauhan king of Dadrewa. The place where Gogaji took samadhi is known as Goga Medi. Both Hindus and Muslims participate in the fair. Muslims pay their homage as the Johar peer and Kayam Khani Muslims regard him as their ancestor.

KAPIL MUNI FAIR—The Kapil Muni fair is held on Kartika Purnima every year in Kolayat near Bikaner. Nearly 60,000 people assemble here and great significance is attached to a lake which has fifty two ghats.

SITABARI FAIR—Sitabari is a place consisting of four tanks filled by natural springs, near Kelwara village in the Shahabad tahsil of Kota district. The tanks named the Sita Kund, the Laxman Kund, the Suraj Kund and the Bharat Kund are considered to be as holy as the Ganges. The fair which attracts thousands of devotees, is held from Baisakh Sudi Punam to Jeth Badi Amavasya.

SHRI MAHAVIR JI FAIR—Shri Mahavir ji Fair is one of the biggest fairs held in Rajasthan. Basically a mela of Jain community belonging to Digamber sect, it attracts a large number of the Meena, the Gujars and the people belonging to various other Hindu castes. The fair is held in Chandan Gaon village (now the place is known as Shri Mahavir ji), on the banks of the river Gambhir in the Hindaun tahsil of Sawai Madhopur district, where a beautiful temple of Shri Mahavir Swami, the twenty fourth Tirthankar of Jains is erected. The dark brown image of Shri Mahavir Swami which was dug out of a mound here, believed to have shown atishya
(miraculous powers), attracts large number of devotees all through the year.

**URS OF KHWAJA MOINUDDIN CHISHTI**—The Muslims from all over India and even from abroad assemble for the Urs of Khwaja Moinuddin Chishti at Ajmer. Over two lakh Muslim devotees pay homage to the memory of the saint at his dargah (mausoleum). Pilgrims make rich offering at the holy spot where the Khwaja is entombed in the dargah. The mushairas and Kawalis are arranged during the Urs to recite poems in honour of the Khwaja. Many non-Muslims also participate in the fair.

**GALIYAKOT URS**—Galiyakot is a small village on the banks of Mahi river in the Sagwara tahsil of Dungarpur district. The mausoleum of Syedi Fakharuddin, the venerated saint, attracts Dauhoodi Bohras from all over the country.

Apart from these, various other fairs like the Jeen-Mata Fair (Sikar district), the Annakoot fair (Udaipur district), the fairs of Teej and Gangaur (in Jaipur city), Ramdeo ji Fair (Jaisalmer district), the Veerpuri fair (Jodhpur district) are some of the other important fairs held in Rajasthan. A large number of seasonal fairs and local fairs are also held at various places in Rajasthan.

**CATTLE FAIRS**—The cattle fairs have their own importance. These not only provide an opportunity of purchasing and selling of cattle but also manifest the close affinity between man and animal. There is no region in Rajasthan without a cattle fair. The most colourful and the biggest of these are the Kartik fair at Pushkar, and Tejaji fair at Parbatsar in Nagaur. However, fairs held at Merta, Tilwara, Jharaapatan, and Gogamedi are also very prominent where the sellers and buyers from distant places gather and transact business.

**Festivals**

Besides the festivals like Diwali, Dasher, Holi, Rakshabandhan etc. which are celebrated in almost all parts of the country, various local festivals are also celebrated in Rajasthan with a spirit of great éclat and enthusiasm.

The cycle of festivals in Rajasthan begins with Teej which, in fact welcomes monsoon and the year commencing from this festival is rounded up with the Gangaur which heralds the spring. There is hardly a month which is not associated with some festival or other. Some of the important Hindu festivals could be described here.
TEEJ FESTIVAL.—The Teej festival is one of the local festivals celebrated in the rainy season on the third day of the second half of Sravan, the day on which Parvati was reunited to Shiva after long austerities. The women wear multi-coloured saris with zigzag patterns called Lahuria along with their traditional ornaments and jewellery. The disc shaped ghevar, sweet speciality of Rajasthan, forms the choicest dish on this occasion. Swings are tied to the trees and the ladies enjoy swinging amidst melodious tunes of folk songs and music.

In some of the important towns of Rajasthan, big fairs are held. A big procession with an image of Parvati is taken out. The most colourful of these is the Teej celebration in Jaipur where thousands of men and women from villages come to Jaipur to witness the procession.

DASHERA—Dashera which is celebrated on the 10th of the bright half of Asoj in commemoration of Lord Ram's victory over Ravana, has its own importance in Rajasthan particularly among Rajputs. It also marks the culmination of another festival called Navaratra - nine nights-held in honour of Durga, the warrior goddess. The Ram Lilas are performed almost at every place, small or big, in the State. Huge processions consisting of people in colourful costumes, caparisoned elephants, groomed horses etc. are taken out in Kota and Bharatpur. The Shastras are worshipped, symbolic of care and upkeeping of arms on Dashera day.

DIWALI—Diwali is the festival of lights celebrated in the month of Kartika with lot of fire works. In Rajasthan the festival is celebrated with great enthusiasm particularly among the Vaisyas or the business community. The festival is preceded by sweeping the houses and shops, cleaning and white washing them. The major celebration starts with Dhan Teras, followed by Roop Chaudas. Every part of the house is decorated with ‘mandanas’.

The houses, shops, streets and bazaars are beautifully illuminated during the night and the Goddess of Wealth Maha-Laxmi is worshipped on amavasya, the 15th day of Kartik. On the next morning, men dressed in their colourful garments pay visits to superior officers, friends and relatives for Rama- Sthvana. The greetings and best wishes are also exchanged by sending cards to each other.

The Annakoot (or Govardhan) is celebrated on the next day. On this day, the cows and bullocks are painted with Mehendi. Bhai Dooj marks the end of the chain of various festivals held on the occasion of Diwali. Brothers visit their sisters and offer presents to them. The Davat Pujan
(worship of pen) is celebrated in some of the communities particularly among Kayasths.

The Jains offer Laddus (sweet balls) to celebrate the pious day at Nirvan (Salvation) of Lord Mahavir.

GANGAUR—The people of Rajasthan celebrate Gangaur in the month of Chaitra. Gan is a synonym for Shiva and Gaur or Gauri means Parwati, the consort of Lord Shiva or Mahadeva. Parwati, in fact, symbolises everlasting Saubhagyavati (marital bliss) and un-paralleled and matchless attachment with the Lord. Thus, Gangaur is not only a religious festival, but also has a great cultural connotation. The observances of various rituals relating to festival starts on the day following the Holi and continue for 18 days. The unmarried girls worship Gangaur for being blessed with choice husband and married women for the welfare, health and long life of their husbands. It is almost obligatory to offer worship to Gangaur for a newly wedded girl in some communities.

Special celebrations are arranged at various places in Rajasthan viz. Bikaner, Jaipur, Jodhpur, Bundi, Kota, Jhalawar, Nathdwara and Ghevar and a pair of clothes are presented to married daughters by their parents.

MAKAR-SANKRANTI— Makar Sankranti is celebrated on 14th January, the day when the sun enters the sign of zodiac capricorn. Traditionally, charities are given to religious men. The cows are fed. At some places, people enjoy kite flying. Some preparations of sugar or gur mixed with Til (oil seeds) are made on this occasion, such as Gajjak, til papdi, til laddu etc.

HOLI—One of the most ancient and joyous festivals is Holi. It falls on the full-moon day of the month of Phalgun (February-March). Similar to other places, the Holika Dahan takes place at an auspicious time by letting off fireworks at the cross roads with cow-dung cakes and wood. Songs are sung in praise of Cupid, the God of Love. In fact, recitation of folk songs and performing of special Holi dances with the strike of Daf or ‘Chang’ start much before the day of Holi. On the following day of Dhulandi, the gay ritual of smearing Gulal and splashing coloured water starts which continues for the whole day. The women, generally stay at home and enjoy Holi, or watch the merry making down the streets from the terraces or balconies. The excessive use of liquor, Bhang or other intoxicants is most common particularly among people belonging to the lower strata. However, everybody big or small, old or young, high or low, male or female participates in merry making in one way or the other. Special sweets and other preparations are made at home for the occasion.
Rakhi—Rakhi or Rakshabandhan falls on the full moon day of Sravana (July-August). In fact, this is a festival of Brahmans who tie a pious thread on the wrist of their Yajmans to offer protection from evils and in turn, they get some Dakshina in terms of gifts and cash. Also, the sisters tie Rakhi (amulet) round the right wrist of the brothers and the brothers offer them some gifts and cash. The sacred thread of Rakhi not only expresses the love and affection of the sister towards her brother but it is also a symbolic reminder of the sacred duty of the brother to protect his sister in distress. Apart from these, some of the birth anniversaries like Janamastmi, Ram Nawami, Hanuman Jayanti, Buddha Jayanti, and national days like the Independence Day and the Republic Day are also observed as national festivals. Some of the studies made in villages in Rajasthan reveal that a large number of calendric festivals of national and regional importance are celebrated every year. For example, in Asalpur village, the following festivals are reported to be observed:


The unending cycle of festivals observed by Hindus in general have been rounded up in a form of table on the following page to give some idea about the number of festivals celebrated in each month of a year.

The major festivals being celebrated among the Muslims are Bara Wafat, Shabe-berat, Ramzan, Idul-Fitr and Idul Zuha and Id-i-Milad observed in commemoration of the martyrdom of Hussain.

The Muharram is the Muslim month of mourning which is concluded with a procession of tazias which are later on buried. The followers keep fast on that day and make beautiful tazias.
<table>
<thead>
<tr>
<th>English Calendar Month</th>
<th>Indian Month</th>
<th>Festivals</th>
</tr>
</thead>
</table>
| January                | Magh         | 1. Makar Sankranti  
|                        |              | 2. Basant Panchmi |
| February               | Phagun       | 1. Holi  
|                        |              | 2. Dhulandi  
|                        |              | 3. Gangaur  
|                        |              | 4. Sheetla-Ashtami  
|                        |              | 5. Ghudla  
|                        |              | 6. Navratri  
|                        |              | 7. Hanuman Jayanti |
| March                  | Chaitra      | 1. Akha Teej  
|                        |              | 2. Nirjala Ekadashi  
|                        |              | 3. Ganga Dashmi or Dussehra  
|                        |              | 4. Bat Savitri  
| April                  | Baisakh      | 1. Rath Yatra  
|                        |              | 2. Guru Poornima  
| May                    | Jeth         | 1. Raksha Bandhan  
| June                   | Asadh        | 2. Teej (Chhoti)  
|                        |              | 3. Nag Panchami  
| August                 | Sravan       | 1. Janmashtami  
|                        |              | 2. Anant Chaturdashi  
|                        |              | 3. Ganesh Chaturthi  
|                        |              | 4. Dussehra  
|                        |              | 5. Tej (Bari)  
| August                 | Bhadon       | 1. Goga Naumi  
|                        |              | 2. Rishi-Panchmi  
| September              | Asoj         | 1. Shradha Pitra-Paksha  
| October                | Kartik       | 2. Sharad Poornima  
|                        |              | 3. Navratri  
|                        |              | 4. Sharad Poornima  
|                        |              | 5. Dhan Teras  
|                        |              | 6. Karva Chauth  
| November               | Mangsir      | 1. Geeta Jayanti  
| December               | Paus         | 1. Mal  

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Bara Wafat is observed in the month of Rabi-ul-Awwal in honour of the Prophet Mohammed's birth and death. The Shab-i-Barat is celebrated in honour of the Prophet's ascent to Heavan in the night of the evening of the 14th of Saban month. The Muslims also offer alms to the poor and needy. Idul-Fitr marks the termination of sacred month of Ramzan when the Muslims keep fast and offer prayers. Mass prayers are held in the Mosques and feasts are arranged on this occasion. Also people go to the houses of friends and relatives, embrace each other and exchange Id-Mubarak. The Id-ul-zuha or Bakr-Id falling on the 10th of Zul-Hijja, the 12th month of the Muslim calendar is celebrated with sacrifice of animals. Also Id-i-Milad or the feast of Prophet's nativity is celebrated on the 11th of Rabi-ul-Awwal with great solemnity by Muslims with rejoicings and feasts.

A large number of festivals are observed among the Jain community in the State. However, the principal festivals include the Mahavir Jayanti, Paryusan and Samvatsari or Khsamawani.

On the 13th day of bright half the Chaitra, the Mahavir Jayanti is celebrated to mark the birth anniversary of Lord Mahavir, the twenty fourth or the last of the Jain Tirthankars. Many of the Jains keep fast on that day and big processions are taken out through the markets carrying the idol or picture of Lord Mahavir at several places in Rajasthan.

The month of Bhadrapad is considered to be most sacred among Jains and fasts are observed all through the month. The holiest period of 10 days in this month is called Paryusan. However, the exact days on which it is observed differ in the Digambers and the Swetambers.

Samvatsari (among Swetambers) and Ksamavani (among Digambers) mark the successful termination and observation of Paryusan Parva. The day is celebrated as the Jains' day of universal forgiveness. The Jains visit the places of friends and relatives and solicit forgiveness for any act of omissions or commissions which might have knowingly or unknowingly been committed by them. The Khsama Yachana (the forgiveness) is sought through letters, or cards which are sent to all known persons to whom it is not possible to reach personally.

Apart from these festivals, the Jains observe almost all festivals of Hindus celebrated in the State.

The Sikhs also participate in most of the Hindu festivals. However, some of the important festivals observed by the Sikh community in the State are the birth anniversaries of Guru Nanak and Guru Gobind Singh. The usual form is to take out the Granth Sahib in procession through the
city. Another prominent feature of Sikh celebration is the Guru Ka Langar (The kitchen of the Guru) representing the mass feeding of worshippers.

The Christians of the State celebrate the Christmas, the Good Friday, The New Year’s day and various other festivals similar to the celebrations observed by their counterparts in the country. The special services are offered in the Churches on these occasions.

Public Games

On account of the patronage provided by the former rulers of the princely States prior to the formation of Rajasthan and the active interest they took in games and sports like Polo, Cricket, Tennis etc. apart from hunting, wrestling, shooting, animal fights etc., a lot of public interest was generated. To witness various games and sports events was one of the favourite pastimes of these erstwhile rulers and a source of recreation for the people at large. At present the indoor games like the tash (playing cards), shatranj (Chess) and Chauper and out-door games like Kabbadi and Volley ball are very popular among ruralites. In addition to these, the games like Cricket, Foot Ball, Hockey, Basket Ball, Kho Kho etc. are very popularly played among the urbanites. Some of the games and sports activities and tournaments are arranged regularly every year at local, district, State, national and international levels. Also some of the special matches are organised from time to time. In the year 1979-80, the following events were held in the State: 130

International Events

(i) Cricket match between Pakistan and the Central Zone, Jaipur.

(ii) Hockey test match between women’s teams from Russia and India.

National Events

(i) National Cycling, Bikaner.

(ii) National Basket Ball, Jaipur.

(iii) National Sub-Junior Chess, Udaipur.

(iv) All India Body Building Competition, Jaipur.

(v) National Cycle Polo, Jaipur.

(vi) National Junior Soft Ball, Jodhpur.

(vii) National Junior Chess, Jaipur.

Some of the major games, tournaments and events held regularly in Rajasthan are the following: 131
(1) All India Nandi Memorial Basket Ball Tournament.
(2) Nehru Gold Cup Basket Ball Tournament, Bhilwara.
(3) Ogavlue Foot Ball Tournament, Ajmer.
(4) All India Arayan Foot Ball Tournament, Udaipur.
(5) Sadul Memorial Foot Ball Tournament, Bikaner.
(6) Ashok Foot Ball Tournament, Sawai Madhopur.
(7) Baldev Memorial Foot Ball Tournament, Jaipur.
(8) Sukhadia Cup Foot Ball Tournament, Udaipur.
(9) Rajendra Memorial Hockey Tournament, Bharatpur.
(10) All India Sevasram Cup Volley Ball Tournament, Udaipur.
(11) Major Shaitan Singh Kabbadi Tournament, Jaipur.
(12) Polo Tournament, Jaipur.
(13) Advani Memorial Basket Ball, Jaipur.
(14) All India D.C.M. Hockey, Kota.
(15) G.K. Sharma Memorial Foot Ball Tournament, Jaipur.
(16) Jai Narain Vyas Volley Ball Tournament, Jodhpur.

Recreation Clubs & Associations

The Rajasthan State Sports Council was constituted by the Government of Rajasthan in the year 1957, with a view to canalise the efforts encouraging the games and sports activities in Rajasthan. The major function of the Council is to provide financial and other assistance to organise various games and sports activities, offer free coaching facilities, and financial aid by way of allowances and stipends to the players. In the year (1979-80), it was also running 140 rural and 8 tribal games and sports centres. It operates through the various State level associations which are affiliated to the Council. In turn the State level bodies recognise the various district level associations.

The following were the State level associations recognised by the Rajasthan State Sports Council in the year 1978-79.

(1) Rajasthan Athletic Association.
(2) Rajasthan Badminton Association.
(3) Rajasthan Basket Ball Association.
(4) Rajasthan Cricket Association.
(5) Rajasthan Cycling Association.
(6) Rajasthan Foot Ball Association.
(7) Rajasthan Gymnastic Association.
(8) Rajasthan Hockey Association.
(9) Rajasthan Women Hockey Association.
(10) Rajasthan Olympic Association.
(11) Rajasthan Kabaddi Association.
(13) Rajasthan Lawn Tennis Association.
(14) Rajasthan Swimming Association.
(15) Rajasthan Table Tennis Association.
(16) Rajasthan Volley Ball Association.
(17) Rajasthan Weight Lifting Association.
(18) Rajasthan Wrestling (Indian Style) Association.
(20) Rajasthan Women Cricket Association.

Temporarily Recognised Associations

(1) Rajasthan Body Building Association.
(2) Rajasthan Boxing Association.
(3) Rajasthan Carrom Association.
(4) Rajasthan Chess Association.
(5) Rajasthan Cycle Polo Association.
(6) Rajasthan Hand Ball Association.
(7) Rajasthan Rifle Shooting Association.
(8) Rajasthan Soft Ball Association.
(9) Rajasthan Women Foot Ball Association.
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