CHAPTER-I

GENERAL

ORIGIN OF THE NAME OF THE DISTRICT

The name of the district is derived from its headquarters Sirsa. It is said to be one of the oldest places of North India and its ancient name was Sairishaka, which finds mention in *Mahabharata*, Panini's *Ashatadhayayi* and *Divyavadan*. In *Mahabharata*, Sairishaka is described as being taken by Nakula in his conquest of the western quarter.[1] It must have been a flourishing city in the 5th century B.C. as it has been mentioned by Panini.[2].

There are a number of legends about the origin of the name of the town. As mentioned earlier, its ancient name was Sairishaka and from that it seems to have been corrupted to Sirsa. According to a local tradition, an unknown king named Saras founded the town in 7th century A.D. and built a fort.[3] The material remains of an ancient fort can still be seen in the south-east of the present town. It is about 5 kilometres in circuit.[4] According to another tradition, the name has its origin from the sacred river Sarasvati which once flowed near it. During medieval period, the town was known as Sarsuti. It has been mentioned as Sarsuti by a number of medieval historians. The derivation of the name Sirsa, is also attributed to the abundance of *siris* trees [Albizia lebbock (Benth)] in the neighbourhood of Sirsa which seems quite plausible for it finds some corroboration also in Panini and his commentator. In ancient period Sirsa was also known as Sirsapattan.[5]

LOCATION, BOUNDARIES, AREA AND POPULATION

Location, and boundaries.—The district lies between 29° 14′ and 30° 0′ north latitudes and 74° 29′ and 75° 18′ east longitudes, forming the extreme west corner of Haryana. It is bounded by the districts of Faridkot and Bathinda of Punjab in the north and north-east, Ganganagar district of Rajasthan in the west and south and Hisar district in the east. Thus, it touches the interstate boundaries on three sides and is connected with its own state only on the eastern side.

Area.—With an area of 4,276 square kilometres, Sirsa is the third largest district in the state, the first and second being Hisar and Bhiwani respectively.

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1. *Mahabharata, Sabha Parva*, Ch. 32, V.6.
   *शैरीषर्क महेच्छचवर्शे चक्र महाद्युति: ।
2. Aggarwal V.S., Panini Kalin Bharatvarsha, p. 86.
3. *Imperial Gazetteer of India*, XXIII, 1908, p. 45.
4. *Archaeological Survey of India Report of a Tour in the Punjab and Rajputana in* 1883-84 by H.B.W. Garrick, Indian Edition, p. 9.
5. *Ibid.*

Population.—The population computed on the basis of 1981 census was 7,07,068 persons. Though areawise Sirsa is the third largest district, its population is the lowest in the state.

History of the District as an Administrative Unit

Sirsa seems to be in the administrative division of Hisar Feroza during Firuz Shah's reign. In the time of Akbar, Sirsa was one of the *dasturs* of Hisar Feroza Sarkar and much of its area lying in the present Sirsa district was covered by *mahals* of Fatehabad, Bhattu, Bhangiwal (Darba), Sirsa, Bhatner (or Hanumangarh, Rajasthan) and Puniyana (Rajasthan).[1] With the decline of the Mughal empire, the tract comprising Sirsa district came under the control of Marathas. The whole of Delhi territory of which the tract formed part was ceded by the Marathas to the British in 1810. Sirsa was part of the outlying district of Delhi territory under the charge of an Assistant to the Resident. In 1819, the Delhi territory was divided into three districts—the Central which included Delhi, the Southern including Rewari, and the North-Western including Panipat, Hansi, Hisar, Sirsa and Rohtak. In 1820, the latter was again sub-divided into Northern and Western and Sirsa along-with Hansi, Hisar and Bhiwani formed Western district (Hariana district and later known as Hisar district).

In 1837, Sirsa and Rania parganas were taken out of Hariana district and along-with Guda and Malaut parganas were formed into a separate district called Bhattiana. The pargana of Darba from Hisar district and the small pargana of Rori confiscated from erstwhile princely state of Nabha were transferred to Bhattiana in 1838 and 1847 respectively.[2] In 1844, Wattu pargana running up to Satluj was added in the Bhattiana district.[3] The whole of the Delhi territory along-with district of Bhattiana and Hisar was transferred to Punjab in 1858 and the district of Bhattiana was renamed as Sirsa.

In 1861, 42 villages of Tibi tract of Rania pargana were transferred to the then state of Bikaner.[4]

The Sirsa district which comprised three tahsils of Sirsa, Dabwali and Fazilka was abolished in 1884 and Sirsa tahsil (consisting of 199 villages) and 126 villages of Dabwali tahsil formed one tahsil and the same was merged in the Hisar district and the rest of the portion was transferred

1. J. Wilson, *Final Report on the Revision of Settlement of Sirsa District in the Punjab*, 1879—83, pp. 26—27.
2. *Hisar District Gazetteer*, 1892, p. 53.
3. J. Wilson, *Final Report on the Revision of Settlement of the Sirsa District in the Punjab*, 1879—83, p. 35.
4. According to *Hisar District Gazetteer*, 1892 (page 53), 42 villages were transferred to the Bikaner State, however, in the *Bikaner District Gazetteer*, 1972 (page 56), the number of villages as such was 41.

to the Firozpur district (Punjab).[1] There was no change till the Independence of the country except that a village was transferred from Sirsa tahsil to the then state of Bikaner in 1906.[2]

The entire area of the district was included in the new state of Haryana on November 1, 1966. In 1968, Sirsa tahsil was bifurcated into Sirsa and Dabwali tahsils. In 1974, three villages of Dabwali tahsil were transferred to Sirsa tahsil. On September 1, 1975, Sirsa and Dabwali tahsils were constituted into a separate Sirsa district with headquarters at Sirsa.

TOPOGRAPHY

The terrain of Sirsa district may be broadly classified from north to south into three major types, i.e., Haryana Plain, alluvial bed of the Ghaggar or Nali and sand dune tract. The topographic characteristics of the three types are briefly discussed below :

Haryana Plain.—The Haryana Plain is a vast surface of flat to rolling terrain, and extends southward to the northern boundary of the alluvial bed of the Ghaggar. It covers over 65 per cent of the area of the district. The elevation of the surface from east to west varies from 190 to 210 metres above the mean sea level. The most diagnostic feature of the Haryana Plain is the presence of palaeo channels which set the occurrence of sand dunes in this terrain unit apart from those in the dune tract. The plain is traversed by numerous dune complexes and shifting sands. It is not possible to discuss all the sand forms but details of some specific features are highlighted. For example, fixed sand dunes and dune complexes are generally oriented in north-west-south-east direction and rise from 2 to 13 metres above their base. The features are broad and possess rounded crests. Such features may be noted at Kheri,and in the area enclosed by Sirsa, Darbi and Burj Bhangu. Scattered hummocks– small rounded features of sand accumulation, are generally up to 2 metres high. Some, up to 8 metres in height, are rare occurrences. Dunes increase in propensity as one approaches the southern limit of the plain bordering Nali and sand dune tract.

Alluvial bed of the Ghaggar—Nali.—A clayey surface of almost flat, featureless plain bordered in the north and west by the Haryana Plain and in the south along the sand dune tract, is a manifestation of the misfit nature of the present day Ghaggar. Waterlogging is a serious problem in many parts of this flat surface of impervious clay of great thickness. At places, swamps support a high density of tall grass.

Sand dune tract.—This tract covers the southern most part of the district. The area is northward extension of the sand dunes of Hisar district and Ganganagar district of Rajasthan. The dunes are locally called *tibbas*. *Tibbas*

1. (a) *Imperial Gazetteer of India*, Vol. XIII, 1887, p. 19,
   (b) The Sirsa district was abolished by Panjab Government Notification No. 684, dated October 15, 1884 and since then the Sirsa tahsil had formed a sub-Division of Hisar district.
2. *Ibid.*

around Ellanabad are 9 metres high ; *Naugaza Tibba* at the border of Rajasthan is 17 metres high; *Tikonta Tibba* is some 14 metres high and the one south of Shahpuria is 13 metres high. All *tibbas* are broad based transverse ridges, some more than 3 kilometres long without a break. Linear to complex ridges, short to fairly long but narrow at the crests, and generally 2 to 5 metres high are also present throughout the sandy stretch of the land.

Drainage and Ground Water

The Ghaggar, the most important seasonal river in Haryana and the only river that flows through the district, enters the area near Ranga. It flows in narrow meandering course in south-westerly direction. The river bed is cut into the surface of Haryana Plain and is generally 3—5 metres deep. The river bed suddenly widens near Mallewala to over 1 kilometre, whereafter it continues to increase in width downstream. South-west of Saha, the river channel develops into a long finger-like wide lake due to its damming at Ottu from where two prominent canals take off. The Northern Ghaggar Canal follows a course north of the abandoned Ghaggar bed. The Southern Ghaggar Canal tends to follow gaps in fixed sand dunes and at times flat sandy terrain. The Ghaggar leaves the district and enters Rajasthan a little to the south-west of Kariwali. In its lowermost bed which is about 5 kilometres wide, some parts are extensively swampy and the channel itself makes a few long linear lakes. The swamps are marked by the growth of up to 3 metres high grass. The river bed is almost a flat featureless surface supporting many prosperous settlements.

Many palaeo channels most likely to be of the Ghaggar, may be noted in many parts of the Haryana Plain in Sirsa district. Palaeo channels are excellent for ground water exploitation. Not only is the ground water fresh in quality but is also available in large quantity. Due to recent developments in agriculture, many of the numerous abandoned channel depressions have been levelled down. However, many extensive abandoned channels still occur as long and wide depressions. These may be noted between Shahpur Begu and Arnian Wali ; at Ludesar and Nathusari-Kalan, amidst cluster of small sized sand dunes between Mehna Khera, Bhaudin, between Mamber Khera Major distributary and Rori branch of the Bhakra Canal System, between Giddar Khera and Jandwala and terminating south-west in the Rajasthan Feeder, between Sadewala and Bani distributaries and between Sheranwali (Shahidanwali) distributary and Southern Ghaggar Canal.

The volume of seasonal flow in the Ghaggar has not been assessed. However, the total discharge of the Ghaggar is estimated to be 2,159 million cubic metres.[1]

1. Government of India, Ministry of Irrigation and Power, New Delhi, *Report of the Irrigation Commission*, 1972, Vol. II, p. 425.

Ground Water.—The subsoil water is within 3 to 9 metres in the Nali tract. In most of the Haryana Plain the water table is generally more than 15 metres deep. In the sand dune tracts, the ground water is also very deep. In a narrow fringe of land adjacent to the Nali the water table is about 9 metres beneath the surface. Deep to very deep ground water is saline but in the Nali tract, the subsoil water is of the good to marginal quality. On the average, recharge to the ground water reservoir is high mostly from seepage from canals and irrigated fields. In 1973-74, the average rate of accretion to water table was estimated at 479.29 m. cu. m. as against 28.81 m. cu. m. of ground water draft.[1]

GEOLOGY

Quaternary formation comprising fluvial and aeolian deposits occupy whole of the district.

The aeolian deposits which are characterised by sand dunes are confined to the southern part of the district. The alluvial deposits are divided into two heads—newer and older. The former occurs usually in the active flood plains of the Ghaggar in the northern part of the district and are composed of sand, silt, clay and occasional gravel. Calcareous concretions in various proportions are found mixed with other constituents. The alluvial sediments are hetrogeneous in character. The quaternary alluvium is deposited on a basement of metamorphic and igneous rocks of pre-Cambrian age. The bed rock topography over which the alluvium rests, slopes towards the north-east.

MINERAL RESOURCES

Kankar and saltpetre are only minerals found in the district. Small deposits of *kankar* occur at several places in the sandy tract.

Saltpetre occurs in large quantities as an alkoline efflorescence at various places. It grows on the ground as well as on mounds. Cloudy weather or rainfall adversely affects its growth. A number of refineries exist in the area for the extraction of saltpetre. The important localities where saltpetre is extracted are in the central and northern parts of the district.

SEISMICITY

According to tectonic map, the district lies on Delhi-Lahore Ridge which is bounded by thrusts. No earthquake of any significance has originated in the zone in the past. It has, however, experienced earthquakes originating in the great Himalayan boundary fault and the Hindukush region. The notable Kangra earthquake of April 4, 1905 and Chamba earthquake of June 22, 1945 affected the district. The maximum intensity experienced was VI M.M.[2]

1. V.K. Sharma. *Ground Water Potential in Haryana, Geographical Review of India*, 1978, pp. 301—308.

2. M.M. intensity according to Modified Mercalli Intensity Scales 1931 denotes ; Felt by all ; many frightened and run outdoors. Some heavy furniture moved ; a few instances of fallen plaster or damaged chimneys. Damage slight.

and the district has been assigned to zone II in seismic zoning map of India where the maximum seismic intensity may reach VI M.M. For important structures founded on consolidated soil, a provision of horizontal acceleration of 4 per cent gravity and its 50 per cent regarding vertical acceleration would ensure a reasonable amount of safety.

FLORA[1]

The district, in the arid zone, comprises zerophytic type of flora. According to the recent classification by H.G. Champion and S.K. Seth the forest of this district fall under the description, Northern tropical forest desert thorn (68/CI type).

Flora is scanty and sparse and varies according to locality factors and soil type. In saline and alkaline part of the district, Mesquite is common alongwith *Farash* and *Jal*. In moist localities and irrigated areas are found *Shisham* and *Tut*. In sandy areas, *Jand*, *Rahera* and *Babool* are quite common. *Sarkanda*, *Khip* and *Phog* are also frequent in sandy localities.

Medicinal herbs found in the district are *Bansa*, *Indirain*, *Asgandha*, *Glo*, *Kharnthi*, *Ak*, *Bhakra and Dhatura*. Shrubs found in this area are *Hins*, *Karaunda*, *Puthanda*, *Bansa*, *Panwar*, *Babool*, *Karir*, *Phog etc.*

In village waste lands and uncultivated fields, tree species are scattered and are of little commercial value. With the increase of irrigation and due to land hunger, such lands are being broken up for cultivation. Grazing incidence is very heavy in these areas and they are in the last stage of retrogression. Such lands may be utilised for raising fodder grasses like *Anjan*, *Dhaman* etc. The forest areas are confined along the strips of rail, road, canal and drains. Of the compact areas, some are protected forests under state government while others are private forests managed by the Forest Department. Biological barriers in the form of trees and shrubs play a vital role in different operations of desert control. They are the cheapest methods of reducing wind velocity and to control the movement of sand. Soil erosion by high velocity winds is checked by raising biological barriers across the wind direction in the form of wind breaks and shelter belts. Such works are being done along canals, roads, railway lines and drains. Species which are being planted along these strips include *Kikar*, *Shisham*, *Neem*, *Bakain*, *Jand*, *Siris*, *Gulmohar*, *Farash*, *Khairi*, *Kana*, *Retz*, *Rahera.*

Afforestation works are done for sand dune fixation and preservation of moisture in the soils in available areas. In farm forestry scheme, plants are raised on the periphery of fields of the farmers to create wind breaks so that the crops are protected from desiccating winds.

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1. The full account of flora alongwith botanical names can be seen in the table-I at the end of the Chapter.

The important grasses found in the district are *Anjan, Dhaman, Dub, Kana* and *Dabh. Anjan Dhaman* and *Dub* are palatable fodder grasses which are dwindling on account of uncontrolled grazing. The grasses in waste lands are poor in quality and quantitatively inadequate for requirements.

FAUNA[1]

Mammals

The district is inhabited by a varied groups of animals. Primates are represented by the rhesus macaque of *bandar* and the common *langur.*

Big cats like tiger and leopard once abundant in the district are no more seen. The carnivore found in the district are, the Jungle cat, the small Indian civet, the common mongoose, Jackal and the Indian fox.

The grey musk-shrew or *chuchunder* and two species of bats, the common yellow bat and the Tickell's bat are usually seen. The five striped palm squirrel or *gilheri,* the Indian porcupine or *sahi,* the Indian gerbille, the common house rat and the common house mouse are the common rodents found. The Indian hare belong to the order lagomorpha is also found in the bushes.

Chinkara or ravine deer is seen in the district but its number is decreasing. Blackbuck and the bluebull or nilgai are found in the district. These are more common near Bishnoi villages where the shooting or killing them is prohibited.

Birds

Game birds.—A large number of game birds, some of them residential are found throughout the year while others are winter visitors. Various types of ducks and geese such as eastern Greylag Goose, Barheaded Goose, Brahminy Duck, common Shelduck, Pintail, common Teal, Mallard, Gadwall, Wigeon Bluewinged Teal, Shoveller, common Pochard, Ferruginous Duck and Tufted Duck can be seen at the Ghaggar and tanks during winter. Some other ducks such as Comb Duck, Cotton Teal, Spotbill Duck, Treeduck are found throughout the year at suitable habitat. Dabchick is also a residential bird.

Other game birds like partridges and quails are also common. Indian Black Partridges (the state bird) and Grey Partridges are common. Grey Quail is a winter visitor, while Black Breasted or Rain Quail, Jungle Bush Quail, Whistler and Rock Bush Quail, Little Bustard Quail, Indian Yellow Ledgged Button Quail, Indian Bustard Quail are resident species.

1. The zoological names can be seen in the table-II at the end of the Chapter.

Sandgrouse, namely the Indian Sandgrouse, has been noted as resident bird while large Pintail Sandgrouse, Spotted Sandgrouse, Imperial or Blackbellied Sandgrouse visit the district in winter. Their flocks, large and small, regularly visit favourite waterholes.

Among pigeons and doves, Bengal Green Pigeon is found in the vicinity of villages chiefly on Ficus trees and Blue Rock Pigeon occurs in almost all the villages. Western Turtle Dove is a winter visitor. Indian Ring Dove, Indian Red Turtle Dove, Indian Spotted Dove, Indian little Brown or Senegal Dove and Indian Emerald Dove are generally found in all cultivated fields.

Birds of Economic Importance.—Scavengers like Pariah Kite, Brahminy Kite, Whitebacked Vulture, King Vulture, Tawny Eagle, Greater Spotted Eagle, White eyed Buzzard Eagle, House Crow and Indian Jungle Crow, etc. keep the district cleared of dead animals by feeding on them. The Indian Scavenger Vulture besides feeding on dead animals, consumes a large quantity of human excreta. Predators like Blackwinged Kite, Indian *shikra*, lagger Falcon, Shahin Falcon, Redheaded Merlin and Kestrel are residential birds of the district. Others like Bootted Hawk Eagle, Eastern Steppe Eagle, Pale Harrier, Marsh Harrier, etc. visit the district in winter. These along with Spotted owlet and Eagle owl keep a check on the population of not only rodent pests but also various insect pests by eating them.

The challenge of insect pests is also met with the various insect eating birds, both resident and migratory. Swifts, such as Indian House Swift, Indian Palm Swift and swallows like Western Swallow, Indian Wire Tailed Swallow and Indian Striated Swallow consume insects as their staple diet. Shrikes or butcher birds as they are popularly called, feed upon insects. Shrikes found in the district are Indian Grey Shrike, Indian Bay Backed Shrike and Rufous Backed Shrike. Other insect eating birds are King Crow, Brahminy Myna, Indian Pied Myna, Indian Myna, Bank Myna and Northern Jungle Myna. Babblers, warblers and flycatchers of various species feed on different types of insects. Larks and wagtails feed on a considerable amount of worms in addition to insects. Rosy pastor and common Starling, both winter visitors may specially be mentioned for their role in destroying numerous insects including locust on a large scale and thus help in saving crops to some extent.

Colourful birds.—The colourful birds add beauty to the varied wildlife of the district. The most common colourful birds are Blue Jay, Northern Green Barbet, Coppersmith, Northern Goldenbacked Woodpecker, Indian Golden Oriole, Large Indian Parakeet, Rose-ringed Parakeet, Pied Crested Cuckoo, Koel, Common Crow Pheasant, Kingfishers such as Small

Blue Kingfisher, White Breasted Kingfisher, Indian Pied Kingfisher, Red-vented Bulbul, Indian Purple Sunbird, *Lal Munia*, Indian Spotted *Munia* and crested bunting etc. The national bird of India, the common peafowl is quite common.

Besides, such attractive birds as Hoopoe, Indian Small Green Bee-Eater and Indian White-eye or *Baboona* are also seen in and around villages.

Besides, different types of storks, cranes, ibis and egrets and lapwings are also found in the district. In the river-beds, one can see two species of terns.

Reptiles

Snakes.—The poisonous snakes like common Indian Karit, Russel's viper, *Phoorsa* and other snakes like Blind Snake, Indian Python, John's sand boa wolf snake, rat snake and sand snake are found in the district.

Lizards.—The common lizards can be seen in the houses. *Kirla* or *girgit* is found in the lawns and hedges and attracts the attention by changing its colours. *Sanda* is found in sandy areas. Besides, a few other types of lizards are found in bushes and areas of thick vegetation.

Tortoises.—Two species of tortoises are found in the district.

Frogs.—The common frogs found in the district are Indian Bull Frog, Indian Cricket Frog, Indian Burrowing Frog and common toad.

Fishes.—The different water courses of the district abound with many species of fish. The species important from the point of view of food and game are the featherback fish *parri, katla, mrigal, chunni, bata, siriha, ghally, mallee*, and the snake-head fish, *dolla* and *curd*.

CLIMATE

The climate of this district is characterised by its dryness and extremes of temperature and scanty rainfall. The year may be divided into four seasons. The cold season from November to March is followed by the summer season which lasts upto the end of June. The periods from July to about the middle of September and from the middle of September to October constitute the south-west monsoon and post-monsoon seasons respectively.

Rainfall.—Records of rainfall in the district are available for Sirsa only for sufficiently long periods. The details of the rainfall recorded at this station are given in Table I of Appendix. These details might represent the rainfall pattern for the district as a whole. The average annual rainfall in the district is 32·53 mm. The rainfall in the district increases

generally from west to east. About 72 per cent of the annual normal rainfall in the district is received during the short south east monsoon period, July to September, July and August being the rainiest months. There is significant amount of rainfall in the month of June, mostly in the form of thunder showers. In the rest of the year, there is very little rainfall. The variation in the annual rainfall from year to year in the district is very large. During the period, 1901 to 1975, the highest annual rainfall as recorded was 327 per cent of the normal in 1917. The lowest annual rainfall amounting to only 34 per cent of the normal was recorded in 1920. In the same period the annual rainfall in the district was less than 80 per cent of the normal in 24 years. The three consecutive years of such low rainfall occurred once, whereas the two consecutive years of such low rainfall occurred five times. Occurrence of such low rainfall in two consecutive years is quite common in the district. It can be seen from the Table II of Appendix that the annual rainfall in the district was between 100 and 600 mm. in 64 years out of 76 years between (1901—1977) for which the data is available.

On an average there are 20 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. The heaviest rainfall in 24 hours recorded in the district was 165.4 mm on September 22, 1917.

Temperature.—There is no meteorological observatory in the district. However, records of Ganganagar (Rajasthan) on the west-north west of the district and Hisar on the east-south east are available for a longer period. Hence the mean meteorological conditions prevailing at these stations may be taken as representative of those prevailing in the district in general. There is rapid increase of temperature after February. The mean daily maximum temperature during May and June which is the hottest period varies from 41.5°C to 41.7°C. On individual days the maximum temperature during the summer season may rise up to about 49°C. The hot scorching winds, which blow in summer add to the discomfort. Afternoon thunder showers which occur on some days bring welcome relief, though only temporarily. With the advance of the monsoon into the district, by about the end of June, there is appreciably drop in the day temperatures and the weather becomes cooler during the day time, but the nights are even warmer than those during the summer season. With the added moisture in the monsoon air, the nights are often uncomfortable. After the withdrawal of the monsoon from the district in the later half of September, the temperatures begin to decrease. The decrease in temperature is rapid after October and the drop in temperature after nightfall is particularly trying. January is generally the coldest month with the mean daily maximum at 21.1°C and the mean daily minimum at 5.1°C. In the cold season, the district is affected by cold waves in the wake of passing western disturbances and the minimum temperature drops down to about 3.3°C occasionally.

Humidity.—Relative humidity in the mornings is generally high during the monsoon season and during the period December to February, it is usually about 70 per cent or more. Humidity is comparatively less during the rest of the year, the driest part being the summer season with the relative humidity being about 30 per cent in the afternoons.

Cloudiness.—During the monsoon season, the sky is mostly moderately to heavily clouded. In the rest of the year, the sky is generally clear or lightly clouded. Cloudy sky prevails for brief spell of a day or two in association with passing western disturbances in the cold season.

Winds.—Winds are generally light in the district with some strengthening in force during the late summer and monsoon seasons. During the south-west monsoon season while winds from the south-west or west are more common, easterlies and south-easterlies also blow on some days. In the post-monsoon and winter season while south-westerly or westerly winds are more common in the mornings, northerlies and north-westerlies are predominant in the afternoons. In summer, winds are more common from the west or south-west in the mornings. In the afternoons they are mostly from directions between west and north-west.

Special Weather Phenomena.—Some of the depressions which originate in the Bay of Bengal in the south-west monsoon season, and which move across the central parts of the country reach the district during the last stages of activity and cause widespread rain before dissipating. An occasional post-monsoon storm or depression also affects the district. Thunder storms occur throughout the year but the highest incidence is during the monsoon season. Dust storms occur often during the hot season. Occasional fogs affect the district in the cold season.

ECOLOGICAL BALANCE

Ecology is the study of inter-relationship between organisms and their environment. Air, water, soil, plants and animals are the components of environment which keep on interacting with another to maintain mutual balance called "Ecological Balance". Holocentric concept of ecology and environment is not at all new in the district.

The people had been protecting animals and trees since long past, even in extremely varied physio-graphical conditions of the district. Animals and trees had been the subject of worship. The black buck (*'Hiran'*, *'mirg'*) and the ravine deer (*Chinkara*) could be seen in large number in the neighbourhood of Bishnoi village during the last century. The peacock (*mor*) was found

in the considerable number in villages which was regarded with a certain amount of veneration.[1]

A tirbaini or combination of the *nim, pipal* and *bar* trees growing together was specially sacred and to plant such a combination was an act of *pun.* The *kair* tree was also worshipped by women.[2]

Owing to dry climate and non-availability of plenty of water, the villages by and large were not under slum conditions. The village sites except in the canal area were as a general rule clean and the absence of local drainage or any large amount of moisture, kept the sources of water supply free from any great pollution during the 19th century.[3]

The people even now carry the same sentiments towards animals and trees. The deers can be seen roaming very frequently even today in some parts of the district. Killing of animals and birds are prohibited by the government. On religious grounds, the Bishnois do not allow to kill the deers in their fields. Peacock is the national bird while the Black Partridge is the state bird and both these birds are protected under the law. Tree worship is still prevalent in the district. *Pipal* has been declared as the state tree in Haryana. There is general awareness in the district to keep the environment worth living.

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1. *Gazetteer of Hisar District*, 1892, pp 19-20.
2. *Ibid* p. 74.
3. *Ibid* p. 14.

TABLE I
BOTANICAL NAMES

A—Trees

1.	*Jand*	*Prosopis cinerariea* (L) Druce
2.	*Rahera*	*Tecomalla undulata* (S)
3.	*Khairi*	Acacia senegal Wild
4.	*Beri*	*Zizyphus mauritian* M Lam Syn. *Z. Jujuba* (non Mill)
5.	*Raru*	*Acacia loucophloea Wild* (Roxb.)
6.	*Jal* or *Van*	*Salvadora oleoides Decne*
7.	*Bash*	*Ficus bengalensis* L
8.	*Peepal*	*Ficus religiosa* L.
9.	*Lasura*	*Cordia dichotema* Forst. f.
10.	*Imli*	*Tamarindus indica* L.
11.	*Barna*	*Cratavea nurvala*
12.	Mesquite or *Pahari Kikar*	*Prosophis chilensis* (Molana Stuntza)
13.	*Kikar*	*Acacia nilotica* (L) Willd
14.	*Neem*	*Azadirachta indica* Juss
15.	*Farash*	*Tamarix aphylla* (L) Karst
16.	*Shisham*	*Dalbergia sissoo* Roxb.
17.	*Siris*	*Albizia lebbeck* Benth.
18.	*Bakain*	*Melia azedarach* L.
19.	*Gulmohar*	*Delonix regia* (Boj). Raf.
20.	*Parkinsonia*	*Parkinsonia aculeata* L.
21.	*Pilkhan*	*Ficus infectoria*
22.	*Safeda*	*Eucalyptus*
23.	*Caster*	*Ricinus Communis* L.
24.	*Kana*	*Sacchacum bengalense*
25.	*Sarkanda*	*Erianthus munja* (Roxb) Jesus
26.	*Knip*	*Leptanenia hyrotechnica* (Forsk) Decne
27.	*Tut*	*Morus alba.* L.
28.	*Kachnar*	*Bauhinia racemosa* Lamk.

29. *Popular*	*Populus nigra* L.
30. *Amaltas*	*Cassia fistula* L.

B—Shrubs

1. *Hins*	*Capparis sepiaria* L.
2. *Karaunda*	*Carrisa ohaca* Stapf. ex. Hans.
3. *Puthkanda*	*Achyranthes aspera* L.
4. *Bansa*	*Adhatoda vasica* Nees
5. *Panwar*	(i) *Cassia tora* L.
	(ii) *Cassia occidentalis* L.
6. *Babool*	*Acacia Jacguemontii* Benth.
7. *Mallah*	*Zizyphus nummularia* (Burm.f.) Wight and Arn.
8. *Karir*	*Capparis decidua* (Forsk.) Edgew
9. *Phog*	*Calligonum polygonoides* L.
10. *Khip*	*Leptadenia pyrotechnica* (Forsk.)
11. *Ak*	*Calotropis procera* (Ait.) Ait.f.
12. *Amarbel*	*Cuscuta relfexa Roxb.*

C—Medicinal Herbs

1. *Bansa*	*Adhatoda vasica* Nees
2. *Indirain*	*Citrullus colcynthis* (L) schrad.
3. *Asgandha*	*Withania somnifera* (L) Dunal.
4. *Glo*	*Tinospera Cordifolia* Miers ex. Hock. f. Thoms Thoms.
5. *Kharnthi*	*Sida acuta* Burm f.
6. *Bkakra*	*Tribulus terrestris* L.
7. *Dhatura*	*Datura stramonium* L.

D—Grasses

1. *Anjan*	*Cenchrus ciliaris* L.
2. *Daman*	*Cenchrus setigerus* Vahl
3. *Dub*	*Cynodon dactylon* L. Pers.
4. *Kana*	*Saccharum bengalense* Retz. Jesw
5. *Dabh*	*Desmostachya bipinnata* (L) Stapf.

TABLE ii

ZOOLOGICAL NAMES

Mamals

Rhesus macaque or bandar	*Macaca mulatta* (Zimmermann)
Common langur	*Presbytis entellus* (Duffresne)
Tiger	*Panthera tigris* (Linnaeus)
Leopard	*Panthera pardus* (Linnaeus)
Jungle cat	*Felis chaus* guldenstaedt
Small Indian civet	*Viverricula Indica* (Desmarest)
Common mongoose	*Herpestes edwardsi* (Geoffroy)
Jackal	*Canis aureus* Linnaeus
Indian fox	*Vulpes bengalensis* (Shaw)
Grey musk-shrew or *chuchunder*	*Suncus murinus* (Linnaeus)
Common yellow bat	*Scotephilus heathi* (Horsfield)
Tickell's bat	*Hesperoptenus tickelli* (Blyth)
Five stripped paln squirrel or *gilheri*	*Funambulus Pennati* (Wroughton)
Indian porcupine or *sahi*	*Hystrix indica* (Kerr)
Indian gerbille	*Tatera indica* (Hardwicke)
Common house rat	*Rattus rattus* (Linnaeus)
House mouse	*Mus musculus* (Linnaeus)
Indian Hare	*Lepus nigricollis* (Cuvier)
Chinkara or ravine deer	*Gazella gazella* (Pallas)
Blackbuck	*Antilope cervicapra* (Linnaeus)
Bluebull or nilgai	*Boselaphus tragocamelus* (Pallas)

Birds

Eastern Greylag Goose	*Anser anser rubrirostris* (Swinhow)
Barheaded Goose	*Anser indicus* (Latham)
Brahminy Duck	*Tadorna ferruginea* (Pallas)
Common Shelduck	*Tadorna tadorna* (Linn.)

Pintail	*Anas acuta* (Linnaeus)
Common Teal	*Anas crecca crecca* (Linnaeus)
Mallard	*Anas platyrhynchos* (Linnaeus)
Gadwall	*Anas strepera strepera* (Linnaeus)
Wigeon	*Anas penelope* (Linnaeus)
Bluewinged Teal	*Anas querquedula* (Linnaeus)
Shoveller	*Anas clypeata* (Linnaeus)
Common Pochard	*Aythya ferina* (Linnaeus)
Ferruginousduck	*Aythya nyroca* (Guldenstadt)
Tufted Duck	*Aythya fuligula* (Linnaeus)
Comb Duck	*Sarkidiornis melanotos melanotos* (Pennant)
Cotton Teal	*Nettapus coromandelianus Coromandelianus* (Gmelin)
Spothill Duck	*Anas Poecilorhyncha* (Forester)
Tree Duck	*Dendrocygna Javanica* (Horsfield)
Dabchick	*Podiceps ruficollis capensis* (Salvadori)
Black Partridge	*Francolinus francolinus asiae* (Bonaparte)
Grey Partridge	*Francolinus pondicerianus interpositus* (Hartert)
Grey Quail	*Coturnix coturnix coturnix* (Linnaeus)
Blackbreasted or Rain Quail	*Coturnix coromandelica* (Gmelin)
Jungle Bush Quail	*Perdicula asiatica punjaubi* (Whistler)
Rock Bush Quail	*Perdicula argoondah* (Sykes)
Little Bustard Quail	*Turnix sylvatic dussumier* (Temminck)
Indian Yellowlegged Button Quail	*Turnix tanki tanki* (Blyth)
Indian Bustard Quail	*Turnix suscitator taigoor* (Sykes)
Indian Sandgrouse	*Pterocles exustus erlangevi* (Newman)
Pintal Sandgrouse	*Pterocles alchata caudocutus* (Gmelin)
Spotted Sandgrouse	*Pterocles senegallus* (Linnaeus)

Imperial or Blackbellied Sandgrouse	*Pterocles orientalis orientalis* (Linnaeus)
Bengal Green Pigeon	*Treron phoenicoptera* (Lathem)
Blue rock pigeon	*Columba livia* (Gmelin)
Western Turtle Dove	*Streptopelia orientalis meena* (Sykes)
Indian Ring Dove	*Streptopelia decaocto decaocto* (Frivaldszky)
Indian Red Turtle Dove	*Streptopelia tranquebarica tranquebarica* (Hermann)
Indian Spotted Dove	*Streptopelia chinesis suratensi* (Gemlin)
Indian little Brown or Senegal Dove	*Streptopelia senegalensis Cambayensis* (Gemlin)
Indian Emerald Dove	*Chalcophaps indica indica* (Linnaeus)
Parih Kite	*Mulvus migrans* (Boddaert)
Barahminy kite	*Haliastur indus indus* (Boddaert)
Whitebacked Vulture	*Gyps bengalensis* (Gmelin)
King Vulture	*Torgos calvus* (Scopoli)
Tawny Eagle	*Aquila rapax vindhiana* (Franklin)
Greater Spotted Eagle	*Aquila clanga* (Pallas)
White-eyed Buzzard Eagle	*Butastur teesa* (Franklin)
House Crow	*Corvus splendens* (Vieillot)
Indian Jungle Crow	*Corvus macrorhynchos culminatus* (Sykes)
Indian Scavenger Vulture	*Neophron percnopterus* (Linn)
Blackwinged kite	*Elanus caeruleus vociferus* (Latham)
Indian *shikra*	*Accipiter badius dusmunieri* (Temminck)
Laggar Falcon	*Falco biarmicus* (Temminck)
Shahin Falcon	*Falco peregrinus peregrinator* (Sundevall)
Redheaded Merlin	*Falco chicquera chicouera* (Daudin)
Kestrel	*Falco tinnunculus* (Linnaeus)

Booted Hawk Eagle	*Hierasaetus pennatus* (Gmelin)
Eastern Steppe Eagle	*Aquila nipalensis nipalensis* (Hodgson)
Pale Harrier	*Circus macrourus* (Gmelin)
Marsh Harrier	*Circus aeruginosus aeruginosus* (Linnaeus)
Spotted Owlet	*Athene brama* (Temminck)
Eagle Owl	*Bubo bubo* (Linnaeus)
Indian House Swift	*Apus affinis affinis* (J.E. Gray)
Western Swallow	*Hirundo rustica rustica* (Linnaeus)
Indian Wiretailed Swallow	*Hirundo smithi filifera* (Stephens)
Indian Striated Swallow	*Hirundo daurica erythropygia* (Sykes)
Indian Grey Shrike	*Lanius excubitor lahtora* (Sykes)
Indian Bay Packed Shrike	*Lanius vittatus vittatus* (Valenciennes)
Rufous Backed Shrike	*Lanius schach erythronotus* (Vigors)
King Crow	*Dicrurus adsimilis albirictus* (Hodgson)
Brahminy Myna	*Sturnus pagodarum* (Gmelin)
Indian Pied Myna	*Sturnus contra contra* (Linnaeus)
Indian Myna	*Acridotheres tristis tristic* (Linnaeus)
Bank Myna	*Acridotheres gininiamus* (Latham)
Northern Jungle Myna	*Acridotheres fuscus fuscus* (Wegler)
Blue Jay	*Coracia benghalensis benghalensis* (Kinnaeus)
Northern Green Barbet	*Megalaima zeylonica caniceps* (Franklin)
Coppersmith	*Megalaima haemacephala Indica* (Latham)
Northern Goldenbacked Woodpeckers	*Dinopium benghalense benghalense* (Linnaeous)
Indian Golden Oriola	*Oriolus oriolus kundoo* (Sykes)
Large Indian Parakeet	*Paittacula Krameri* (Scopoli)
Pied Crested Cuckoo	*Clamator Jacobinus serratus* (Sparrman)

Koel	*Eudynamys scolopacea scolopacea* (*Linnaeus*)
Common Crow Pheasant	*Centropus sinensis sinensis* (Stephens)
Small Blue Kingfisher	*Alcedo atthis bengalensis* (Gmelin)
Whitebreasted Kingfisher	*Halcyon smyrnensis smyrnensis* (Linnaeus)
Indian Pied Kingfisher	*Ceryle rudis leucomelanura* (Reichenbach)
Redvented Bulbul	*Pycnonotus cafer* (Linnaeus)
Verditer Flycatcher	*Muscicana thalassina thalassina* (Swainson)
Indian Magpie robin	*Copsychus saularis saularis* (Linnaeus)
Indian Purple sunbird	*Nectarinia asiatica asiatica* (Latham)
Lal munia	*Estrilda amandava amandava* (Linnaeus)
Indian spotted munia	*Lonchura punctulata punctulata* (Linnaeus)
Crested bunting	*Melophus Lathami* (Grey)
Common Peafowl	*Pavo cristatus* (Linnaeus)
Hoopoe	*Upupa epops* (Linnaeus)
Indian Small Green Bee-eater	*Nerops philippinus philippinus* (Linnaeus)
Indian White-eye	*Zosterpos palpebrosa palpebrosa* (Temminck)
Reptiles	
Common Indian Krait	Family .. Elapide
	Bungarus caeruleus .. (Schneider)
	Family .. Viperidae (Shaw)
Russel's viper	*Vipera russelli*
Phoorsa	*Echis carinatus* .. (Schneider)
	Family .. Typhlopidae
Blind snake	*Typhlops porrectus* .. *Stoliczka*
	Family — Typhlopidae

Indian python	*Python molurus molurus* (Linn.)
John's sand boa	*Eryx johni johni* (Russell)
	Family .. Colurbridae
Wolf snake	*Lycodon striatus* (*Shaw*)
Rat snake	*Ptyas mucosum* (Linn.)
Sand snake	*Psammophis leithi* Gunther
	(i) *Hemidactylus brooki* (Grey)
	(ii) *Hemidactylus flaviviridis* (Ruppell)
Kirla or *Girgit*	*Calotes versicolour* (Daudin)
Sanda	Uromastix hardwicki (Grey)
Other types of lizards found in the district	(i) *Mabuya macularia* (Dum. and Bibr.)
	(ii) *Ophiomorus tridactylus* (Blyth)
	(iii) *Acanthodactylus cantoris cantoris* (*Gunther*)
	(iv) *Varanus monitor* (Linn.)
Tortoises found in the district	(i) *Geoclemys hamitloni* (Grey)
	(ii) *Kachuga dhongoka* (Grey)
	Family .. Ranidae
Amphibiana	
Indian bull frog	*Rana tigerina* Daudin
Indian cricket frog	*Rana limnocharis* Wiegman N
Indian burrowing frog	*Rana breviceps* Schneider
	Family .. Bufonidae
Common toad	*Bufo melanostictus* Schneider
Fishes	
Parri	*Notopterus notopterus* (Pallas)
Katla	*Catla catla* (Hamilton)
Mrigal	*Cirrhinus mrigala* (Hamilton)
Chunni ..	*Cirrhinus reba* (Hamilton)

Bata	*Labeo bata* (Hamilton)
Siriha	*Labeo gonius* (Hamilton)
Rohu	*Labeo rohita* (Hamilton)
Magur	*Clarias batrachus* (Linnaeus)
Singhara	*Aorichthys seenghala* (Sykes)
Ghally	*Ompok bimaculatus* (Block)
Mallee	*Wallago attu* (Schneider)
Dolla	*Channa punctatus* (Bloch)
Curd	*Channa striatus* (Bloch)