THE AMAZING LIFE IN THE INDIAN DESERT

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THE AMAZING LIFE IN THE INDIAN DESERT

The Indian Desert is not an endless stretch of sand-dunes bereft of life or vegetation. During certain seasons it blooms with a colourful range of trees and grasses and abounds in an amazing variety of bird and animal life. This rich natural region must be saved from the over-powering encroachment of man.

To most of us, the word "desert" conjures up the vision of a vast, tree-less, undulating, buff expanse of sand, crisscrossed by caravans of heavily-robed nomads on camel-back. Perhaps the vision includes a lonely cactus plant here and the skull of some animal there and, perhaps a few mini-groves of date-palm, nourished by an artesian well, beckoning the tired traveller to rest awhile before riding off again to the horizon beyond. This vision is a projection of the reality of the Saharan or the Arabian deserts. The Great Indian Desert, or the Thar Desert, does not conform to this popularly held general pattern in many details. For example, no oasis waves its palm fronds in welcome of the weary travellers here, nor any native cactus breaks the monotony of the sandy span. The desert is, however, very much with us and we may indeed be grateful that it is there.

The arid wastes of today will perforce be reclaimed in the near future to feed our growing human family—for good or for evil, only time will tell. Our desert is our future land-bank which will allow us to draw on its resources of food and fibre for atleast some time to come. However, this will be achieved at a price—the total breakdown of the desert's natural ecology. Our pressing socio-political exigencies will perhaps care little for such a destruction of one of Nature's wondrous handicrafts. And that will be a great tragedy.

Biogeographically, the majority of the plants and animals found in the Indian desert exhibit 'western' affinities. Climatologically also, the Great Basin, extending from Sahara to the Thar, is considered to be a continuous unit. Geographically, the Indian desert holds a rather debatable position as it exhibits an admixture of peninsular, extra-peninsular and Indogangetic features. Geologically, the desert has resisted orogenic forces and has been subjected to marine transgressions, parti-

cularly in Jodhpur, Bikaner, Kutch and Jabalpur regions. The area became dry during the Miocene and the Pliocene when the sea gradually receded. Dr. D. N. Wadia had concluded that the Indian desert began to dry up after the last glaciation period. Archaeologically, it was the seat of the Mohanjodaro-Harappa-Ghaggar civilizations. Historically, the region was dominated by Princely States and had borne the brunt of a successive series of invasions by Moslem chieftains and emperors.

A SORCERER'S MAGIC WAND

The hot, arid and semi-arid region in northern India extends from Punjab and Haryana to Gujarat, through Rajasthan, and to the western parts of Madhya Pradesh. This desert is not a continuous stretch of sand but is interspersed with hills and the dominating Aravalli ranges are a distinct land-mark of this tract. A few large lakes and small 'nadis' and a number of ephemeral and perennial streams, occurring in the desert, constitute about the whole of the invaluable surface water resources of the region. While animal life in the desert depends to a large extent on these sources of surface water, plant life too derives sustenance from these sources in no small measure.

The Thorny scrub land is spread over the sandy plains from southern Haryana, Punjab and western Rajasthan to northern Gujarat. At several places the native vegetation has been replaced by agricultural crops, particularly in regions where irrigation facilities are available. The unpredictable bounty of the thrifty rain-gods has led to a take-over of the land mostly by annual species of plants but certain perennial grasses, shrubs and trees have persistently resisted total domination by the annuals. With the first shower of the season, the forbidden sea of sand assumes a gay cloak of the most magnificent greenery. The sweet patter of the long-awaited rain drops breaks the slumber of the dormant seeds lying buried in the sand and the desert is transformed almost overnight into a garden as if by the touch of a sorcerer's magic wand.

This annual transformation of the desert scene from one of drab lifelessness to one of lush greenery is fortunately, a characteristic feature of the Indian desert. In most other deserts of the world, the monsoon fails to bring in its wake such a vivid transformation of the landscape. The monsoon vegetation in our desert comprise the annuals such as a few sedges and the perennial grasses.

The extent of their colonization and the dominance they attain over a particular tract is mainly determined by their relative adaptabilities for the environment. Their seeds germinate with the first shower and develop a shallow root system so that moisture can be quickly uti-

lised from the top soil. They have a rather short life cycle and flowers appear within 25 to 35 days of germination. The cocktail of the mild fragrance of these flowers fill the desert air in August when honey bees and butterflies flutter around in search of nectar. By the end of monsoon, during September-October, the annuals shed their seeds which are flung far and wide by various natural agencies. The seeds of desert plants are capable of withstanding extreme soil temperatures, about 60°C, by lying burried under the top soil during the summer and retaining their viability till the showers come to make them sprout.

THE GREENERY IS TRANSIENT

The lush monsoon vegetation of the desert may seem an inexhaustible source of foraging material for the very large number of domestic livestock that are reared within the desert's bounds. Unfortunately, most of the green annuals are not only inedible or unpalatable to livestock, they colonise so thoroughly and compete so severely with the perennial species and highly nutritive grasses that the latter are deprived of all chances of survival and regeneration. This deterioration of the perennials is furthered by factors such as overgrazing by cattle and destruction by rodents. If a balance sheet is prepared of the annual productivity of desert livestock (milk, wool and lambs) a rather gloomy picture emerges. The conception rate of cows is poor, their milk productivity is extremely low and the quality and quantity of wool produced by the sheep is too poor by Australian and New Zealand standards.

The desert scene starts changing soon after the monsoon. The air temperature rises and the vegetation experiences a second summer during the month of October. Soon the greenery fades and the desert starts looking brown. As winter approaches, bare sandy patches appear. The sand on the crests of dunes, sometimes, starts blowing. With the advent of spring emerges a fresh crop of sprouts but these are quickly grazed over by the wandering herds of hungry cattle and the all-destructive hordes of rodents and the desert soon conforms to its popular image of an area of bare, rolling sand dunes, undulating sandy plains, dry shrubs, a few thorny trees and the seductive mirage. The wind grows strong during May and June, with the afternoons often darkened by the howling **andhi** and the world seems lost under a blanket of dust. The full fury of the elements is now let loose on man and beast alike.

In the extreme west, in Jaisalmer district, which is the driest (2 inches annual rainfall) zone in the country, there is hardly any tree to meet the tired eyes of a traveller. Even the 'king' among desert trees, the **Khejri** (**Prosopis cineraria**) grows here only near wells. The Mandla basin situated in the south-west of Ramgarh, only a few kilometres away

from the Pakistan border, however, presents an extraordinary situation. This region is dominated by tall, longitudinal sand dunes. In the interdunal gaps in this basin, there exists a beautiful, un-utilized climax—'forest' of **Khejri** and **Jal (Salvadora oleoides)**.

The trees are not only very healthy but are larger in girth than those growing in higher rainfall zones. In this basin, the depth of the underground water table ranges from 100 to 330 feet and, therefore, the roots of the trees exploit 'perched' water which is in abundance in the gulleys between the lofty dunes. This forest, thriving under the harshest of conditions, is a fine example of Nature's ingenuity in meeting the challenge of life.

BURST OF COLOUR

The dune slopes throughout the desert are dominated by the shrub commonly known as **Phog (Calligonum polygonoides)**. It is a favourite fodder for camel and a useful fuel for the desert dwellers. It is highly adapted to arid conditions, the leaves are long, needle-like and the plant possesses a very efficient root system. While a mesh of long, thick rootlets run only a few cms below the surface of the soil, a stout tap root penetrates deep into the earth. The rootlets trap moisture from the soil during the monsoon only. The rainfall is so scanty here that it can hardly ever wet soil layers below the surface.

Another important shrub of the desert, particularly in regions where the soil is saline, is the Lana (**Haloxylon salicornicum**). It measures about a metre in height and is much branched but leafless. In a way it looks like a small Christmas tree. It flowers from October to March. During the winter the **Lana** is loaded profusely with tiny yellow flowers, a beautiful sight. On the sandy plains occur such familiar shrubs as **Ker (Capparis decidua), Ber (Zizyphus nummularia), Aankra (Calotropis procera), Kheenp (Laptadenia pyrotechnica), Jhunjhni (Mimosa hamata)** and **Aanwal (Cassia auriculata)**.

These shrubs are distributed almost all over the desert with regional variations in their relative densities. With deep orange red, whitish violet and bright yellowish flowers these shrubs lend glamour to the desert scene from autumn to winter. The delicious fruits of **Capparis** and **Zizyphus** are much sought after by birds and men alike and are an important element of the rural economy of the region.

By far the most ubiquitous tree in the desert is the **Khejri**. The secret of the **Khejri's** success lies in its unbelievably long, sometimes more than 30 metres, system of roots. With this enormous sucking force at its

disposal, the **Khejri** makes the most of whatever underground moisture that may be present. The **Khejri** has many uses for the desert man. All the **Khejri** trees are regularly lopped every year during the winter to provide fuel. Its leaves are an excellent supplementary feed for livestock and its thorny branches provide the desert dwellings with an economic and effective protection against prowling animals. Its pods are eaten by people, particularly in drought.

However, its value as the prime source of fuel in the desert region is also its curse. People use the axe only too indiscriminately and the process of desertisation continues unabated. Regeneration of fresh saplings is virtually impossible due to the depradations of the free-roaming cattle.

Next to the **Khejri,** the **Acacias** are important trees of the arid and semi-arid terrains. The familiar **Babul,** grows on slightly heavy soils, is not usually lopped and is thus left to complete its life processes without much human interference. When it flowers during the winter, it looks lovely. The yellow flowers emit a delicate fragrance. Its long thorns repel browsers except the camel. The acacias form a major group of trees in the desert and along with the **Khejri** form an integral component of the desert bionomics.

During the summer, the acacias are bereft of leaves and look rather gloomy but they are full of green foliage during the monsoon. They flower in autumn and winter. During the spring, the trees are laden with seed-bearing dangling pods which are soon harvested for livestock feeding. The **Jal** and **Rohida (Tecomella undulata)** are the other prominent trees of the xeric environment. **Rohida** provides good timber, fit for making agricultural tools and household furniture.

There are localised saline depressions all over the desert region. Some of these depressions are of considerably large size, e.g. Sambhar, Pachbhadra and Didwana while the others extend for a few kilometres or even less. The vegetation occurring in these depressions is highly adapted to survive under saline conditions.

GRASSES GALORE

The Rann of Kutch is a vast stretch of low lying saline sand. During the rainy season the entire Rann turns into a large swampy marsh. Due to high salinity conditions the entire rann is almost devoid of any vegetation. However, some grasses and chaenopods grow on the 'bets' which are slightly elevated sandy strands from which salt is leached out due to the washing effect of the rain water. The 'bets' are covered by monsoon vegetation.

The topography of Rajasthan State is dominated by the bisecting Aravalli ranges. Rocky outcrops also occur in a discontinuous manner throughout desert. The rocky masses are composed of metamorphic as well as sedimentary elements and are composed of gneiss, schists, quartzite, limestone and sandstone. The vegetation covering this habitat is primarily monsoonal with a relatively higher frequency of trees of semi-deciduous and evergreen species.

During the rainy season, the hills and hillocks look beautifully green but no sooner the autumn passes, the annuals and even the perennial grasses start drying and the rocks return to their barren look. This transformation is hastened by human interference and over-grazing by the livestock.

Among shrubs, **Euphorbia caducifolia** is the most conspicuous. It grows over very shallow soils, tapping water from cracks and crevices in the rocks. Its huge thorny clumps bear leaves only during the monsoon and the deep red flowers add beauty to the mountains during August and September. The large clumps constitute a sort of 'niche' or a micro-habitat in the environment, supporting a large number of trees and creepers.

A wide variety of grasses grow around these shrubs and a large number of animals take shelter in them. Geckos at certain places, pythons, peafowls, jungle fowls, mice and hares are some of the animals which prefer to inhabit this micro-habitat, well-protected under the thorny shelter provided by the shrub.

On the hilly outcrops, away from the Aravalli ranges, in western Rajasthan and northern Gujarat, only one tree species, the **Kumtha** (**Acacia senegal**), occurs predominantly. It is found on the foot hills, slopes and over rocky stretches which are covered by blown sand. It is a 10-16 feet tall tree having a flat sort of canopy. During the summer the tree sheds all its leaves and the naked, slender branches give it a ghostly-skeleton like look. But with the first shower, small leaves appear and soon it bears long, white catkin-flowers. During the monsoon when this inflorescence attain a white fur-like look in the background of fresh and young leaves this acacia simply looks splendid. The ripe fruits are also plucked and seeds extracted for preparing a famous 'Marwari' pickle—'pach-kuta'. This tree, however, also grows on the Aravalli ranges, in eastern Rajasthan and western Madhya Pradesh.

Another tree which frequently occurs along with **Kumtha** is the **'dho' (Anogeissus pendula)**, but its density is higher on the Aravallis and in the eastern parts of the desert. It is a larger tree than the **kumtha**. It flowers in autumn and its fruits are formed by December. The tree is much in demand as it provides the best quality charcoal. **Anogeissus**

latifolia and **A. acuminata** occur on the Aravallis between altitudes of 2000 and 3000 feet. Another tree found on hills throughout the desert is **Googal (Commiphora wightii)**. It is about 3 to 9 feet tall and is a much branched tree, remaining leafless throughout the year except during the monsoon when small brownish leaves appear. It is much exploited because of a gum secreted by its stems. **Googal** gum is used for several medicinal purposes and for 'havan'.

Palas or **Dhak,** occurs on the lower slopes of the Aravallis and on open grasslands in the eastern region of Rajasthan and in Madhya Pradesh. It is a medium sized, deciduous tree, 9 to 15 feet in height and 3 to 6 feet in girth. It bears large flowers in great profusion at the beginning of the hot season and before the appearance of new leaves. The flowers are bright orange-red in colour and their majestic vividness has invested the tree with the name : The 'Flame of the Forest'.

The dried flowers **(Tesu)** yield a brilliant yellow colouring material which is used for making colours on the occasion of Holi. The tree exudes a ruby-red gum from natural cracks and artificial incisions. Its leaves are much used throughout the country for making **'pattal'** and **'dauna'**.

Salai (Boswellia serrata) is a timber tree which grows on the mid-zone of the Aravallis in eastern Rajasthan and in Madhya Pradesh. It is a large branching tree, 13 to 16 feet tall and 3 to 6 feet in girth. It provides moderately strong and soft timber and the wood can be used as inferior plywood. It also provides an oil like turpentine oil which can be used for varnishing.

The famous **mahua (Madhuca indica)**, is found in mixed deciduous forests growing on rocky and sandy soils. It is common throughout Central India including Madhya Pradesh and parts of Gujarat. **Mahua** is a fairly large tree with cracked dark coloured bark. Its fleshy flowers are cream coloured and produce ovoid berries, upto 2 inches long. They turn into reddish yellow or orange colour when ripe during May and June. **Mahua** timber is used for construction. The seeds yield **Mahua** oil which is used for cooking purposes in the rural areas. Its berries are eaten raw and are also fermented to yield a strong, flavoured, intoxicating drink.

The bamboo **(Dendrocalamus strictus)**, occurs in clumps on hill slopes and forms an understorey in deciduous forests mainly on the Aravalli ranges. Clumps, 22 to 66 feet high are quite common. This species is fairly drought and frost resistant. Flowers appear from November to February. Felling of bamboo is done in cycles of two to four years. The bamboo is extensively used as a raw material for paper manufacture in India.

DESTRUCTION OF PRICELESS TEAK

Dry teak (**Tectonia grandis**) forests extend over black cotton soil in Banswara district and also in Udaipur, Chittorgarh and Kota divisions and in western Madhya Pradesh, representing the northern-western limit of the natural teak zone of India. The enormously valuable teak forests have been very seriously degraded and depleted by indiscriminate hackling and pollarding. These forests now provide small timber for furniture and house construction. Another interesting tree species occurring in some parts of the desert is **Acacia catechu**. It occurs in extensive patches on the alluvial beds of streams and is used for production of **Katha**.

Around Mt. Abu the natural vegetation is much dominated by introduced tree species, e.g. date palms, pines, fig and mango trees.

Even in the desert region, proper management will result in vastly improved forest produce. The productivity of natural grasslands, if enhanced, can provide fodder to a large number of livestock but unless 'family planning' among the latter is taken up seriously, very little improvement can be expected.

EXCITING "NIGHT LIFE"

Contrary to popular imagination, the desert is an animal lover's paradise. One only has to look around to wonder at the rich and variegated animal life that this apparently inhospitable tract harbours within its orbit. At day's end, when the sun exhausts its fury and the howling winds calm down to a soothing breeze, the desert really comes to life although day-active forms are not hard to come by. The denizens of the desert have learnt quite a few tricks, in the course of their evolutionary history, to eke out a successful living in the terrain of their choice. These include adaptations of body forms, behaviour and the functioning of internal organs.

Of the night-roaming desert lizards, perhaps the most interesting is the limbless skink, **Ophiomorous tridactylus**. Although rarely spotted above ground, its subterranean movements leave distinct wriggling tracks on the surface of the sand. This lizard with atrophied limbs is unlike other desert lizards in that it does not make a burrow in the sand but sort of swims under the sand and hence its persian name— **'Rig mahi'** (sand fish).

On any casual trek through the desert during the day, one is apt to encounter scores of the desert lizards, or skinks. Some of these are typical fast moving insect-grabbers which retire into the bush at the

slightest suspicion. On sun-baked hard soil occurs the spiny-tailed lizard, **Uromastix hardwickii.** It is a vegetarian by preference and spends a good part of its life in a simple L-shaped burrow with a single opening.

Utterly individualistic by temperament either a single male or a single female occupies a burrow. During the breeding season, extending from June to September, the female lays 8-15 eggs near her burrow opening. After the eggs are hatched, the young ones enter and stay in their mother's burrow. **Uromastix,** locally known as **sanda,** is dug out by people of the nomadic tribes to supplement their food. Popular belief has endowed the body fat of this lizard with extra-ordinary aphrodisiac properties.

The desert monitor lizard, **Varanus griseus,** is a common creature of the bushy regions. It is of a fairly large size and feeds on insects, other lizards, birds and their eggs and rodents. **V. griseus** is pale sandy coloured and flushes inconspicuously with its surroundings. A tunnel dweller, the monitor lizard lays from 15-30 eggs during May to August.

Another diurnal, admirably specialised lizard is the "toad agama". I may humbly take credit for its first record from India. It usually abounds in the very dry, 2 to 4 inches rainfall region situated in Jaisalmer district. It is a cute little thing exhibiting vivid colouration—with blue, green, yellow, crimson, red and black spots upon its brownish grey body. This delightful creature likes to bask in the sun on the very fine 'quick' sand of its duny habitat.

When approached or apprehended it runs very fast and quickly buries itself in the loose sand by peculiar lateral wriggling movements of its body. Curiously, its limbs do not participate in this activity. This characteristic defensive behaviour has obviously been evolved as a means to elude any chasing predator. Ants constitute the main item of food of this vivacious **toad agama.**

INJECTORS OF DEATH

Although snakes are there aplenty in the desert, luckily only three varieties are poisonous—the cobra, the viper and the Sind krait. The cobra, the plain hooded one, is found near towns, on the hillocks and is not very common in the regions to the west of the Aravallis, as it prefers relatively more humid climate.

The **phoorsa** or saw-scaled viper is found throughout the desert region. It is so common in western Rajasthan that out of 100 snakes collected there, more than 50 would belong to this species. If I were to

walk at night in the Assam jungles, I would not bother as much about tigers and elephants, as I do for this viper when I am on my usual rounds on the sand dunes for collecting nocturnal rodents. With a butterfly net in my hand and a spot light on my forehead, I not only search for the itinerant gerbils but my eyes also keep a vigil for the deadly strikers and my ears are always tuned to perceive the typical 'melodius' warning hiss of the **phoorsa.**

This dreaded snake is about 20 inches long and lies crouched up in a small pit, usually the cattle hoof depressions. Its pale brown to chocolate colour patches make it almost invisible on the greyish yellow desert sand. When it hears encroaching footsteps, it first let out a series of warnings to the intruder by exhaling loudly. Usually this warning sufficies to dampen the spirits of all mortals around but if one is careless and ignores the warning note, the viper wriggles at the same place forming a figure of eight and, as a sterner warning, produces a typical sound by rubbing its saw-scales against each other.

Woe betides the man or the animal that pays no respect to this expression of the viper's annoyance and the next thing it does is jump and bite. Unlike any other snake, the viper moves in a side-winding manner. Locusts and other insects, centipedes, toads and small rodents form parts of its menu. While all other desert snakes produce eggs, the female viper gives birth to 3 to 11 young in the course of its breeding season which extends from April to September.

The third deadly member of the snake family which occurs in this desert along the Sind border is the Sind krait. You may believe it or not, but the villagers firmly believe that at night this snake sits over the chest of a sleeping person, puts its mouth near the nose of the person, sucks his breath (hence its local name **'pivna'**) and exhales its own poisonous breath into the nose of the man. After a few exchanges of breath, the human dies. In reality, however, the krait is not an exhaler of death; it bites its victim in the same old serpentine way and injects death as other snakes do. Fortunately for all, the krait is scarcely encountered and that too in the extremely arid, westernmost fringe of this desert.

The symphony of the desert owes much of its splendour to the notes contributed by its rich bird life. The bracing coolness of the desert morning is an experience in delight and much more so for the twitterings of the bulbul and the flycatcher, the high-pitched conversation and the leisurely picnicking of the grey partridge family. As the day ages, the countryside takes sides in the jungle babblers' animated debates. The stillness of the burning noon is broken by the rhythmic dirge of the dove and the shrill note of the lonely **shikra** gliding up in the air. Around human dwellings the peafowl reigns supreme and its evening cacophony marks the end of the day.

The avian fauna of the desert region, like the other vertebrate groups is dominated by Ethiopian and Palaearctic elements. It is impossible to describe all our desert birds in detail in the limited space. I shall confine myself to some of the more prominent, colourful and economically important species.

In the natural desert pastures, which extend from southern Punjab and Haryana to northern Gujarat and upto the Aravalli ranges in the east, partridges and quails are fairly common. These little game birds are fighting a hopeless battle against man's insatiable greed and, as a result, there has been a severe depletion in their numbers in eastern Rajasthan, most of Gujarat state and Madhya Pradesh. The grey partridge, **Francolinus pondicerianus,** a beautiful ground bird can remain without water for a long time and depends for its water supply from the seeds and insect larvae that it eats. It lives in coveys of three to eight birds. The male, slightly larger in size, leads the party, scratching cattle dung for a morsel of insect. Occasionally it gives a call—**patella patella**—a forewarning to other coveys in the region that it means to defend its territory. The calls are more frequent in the morning, the bird quietens during the day and emits intermittent calls again in the evening before roosting on the branches of shrubs and trees.

DESERT SYMPHONY

This francolin never passes the night on the ground. Perceiving danger from a hawk or a **shikra,** it rises with a loud whirr of its wings and emits a shrill alarm call : **kirrr-kirrr.** But it takes to wings only for a short distance and lands quickly and ultimately depends on its legs for escape. During the breeding season extending from February to June, the males fight vigorously among themselves. The female lays from 5 to 8 cream coloured eggs in a grass-lined scrape, usually under a shrub.

The painted partridge is found along the Aravalli ranges in eastern Rajasthan and in parts of Madhya Pradesh and Gujarat. It is more arboreal than the grey partridge. The male calls all through the day : **chik-cheek-cheek-keray.** It breeds during the monsoon from June to September. Its clutch of 4-8 pale olive-brown eggs is deposited under thick grass cover or under shrubs.

A variety of quails are found in the region; the grey quail, the rain quail, the jungle bush quail and the rock bush quail are well distributed in the arid and semi arid regions, but are relatively more abundant in higher rainfall areas, near water sources and in the vicinity of irrigated crop fields.

During one of my faunistic surveys of the Indian desert, I was stranded due to vehicle failure one night at Devikoth in June, 1954. The only source of available surface water nearby was a **nadi** with dirty water fouled by cattle and sheep. Dreading the **parad** (**phoorsa** viper) all the 22 passengers in our bus had taken shelter for the night on the roof of the vehicle.

As morning came with its assurances, I had one of the most spectacular sights of my life. From about 8 a.m. flocks after flocks of the common sandgrouse (**batbar**), **Pterocles exustus**, started arriving at the **nadi** to drink. This noisy stream of arrivals and departures at the water point continued for nearly an hour and my conservative estimate would put the number of birds in those flocks that morning between five to six thousand. This yellowish, sandy brown, pin-tailed bird of the size of a pigeon is found throughout the drier parts of India. It inhabits fallow ground, open fields and barren gravel plains and feeds on seeds of grasses and weeds. Small pebbles are also taken but insects do not form a part of its menu. It must, however, drink twice a day—in the morning and in the evening.

When water collects in pools all around during the monsoon, the sandgrouse groups scatter in all directions but during the summer the sizes of individual groups increase and the birds visit the nearest water points in vast numbers. Unfortunately, their numbers have drastically reduced during the last 10 years and flocks of even 100 birds are a rare sight now. The **batbar** is able to fly over long distances but it migrates only locally. While flying they continuously emit the call: **kut-ro, kut-ro.** The bird lays 2-3 greyish, spotted eggs in an unlined scrape on the open ground from January to May. I have seen 2 eggs per bird during June in the Rajasthan desert. The spotted sandgrouse, and the painted sandgrouse also occur in the region.

THE HALLOWED NATIONAL BIRD

Western Rajasthan is the home of our National Bird, the peafowl. The bird has always enjoyed a unique status in our long history and mythology, having been intimately associated with the Krishna legend—it is also the vehicle of Subrahmanya or Karttikeya. Primarily because of this association it has remained unmolested throughout. Protection was guaranteed to it by the rulers of the now-defunct princely States. So one can easily see from 200 to 300 peafowls in any village today.

THE SPECTACULAR BUSTARD

To me, however, the most magnificient bird of the desert is the Great Indian bustard. Though it is in the Red Book, fast vanishing from

all over its range of distribution in India, yet in the Rajasthan desert, it still has not reached the point of no return. I have seen 17 birds during a drive of 16 miles. The major reason of its extinction from other regions of the country is the transformation of its natural habitat into cultivated fields.

In the desert, however, the paucity of water favours its existence as its preferred habitat-vast grasslands with thorny scrub cannot be turned into crop lands. The Great Indian bustard—**not bastard !** —lives in small groups, of 2-5 and feeds on fruits of ber, and ker, grasses, beetles, lizards, snakes and even the **phoorsa** viper. It lays a single egg, rarely two, in a triangular scrape on open ground.

The bird takes no care whatsoever in protecting its eggs from being trampled over by running herds of chinkara and the omni-present cattle, sheep and goats and from the curious gaze of the shepherds. It is very important that a proper sanctuary is created for the bustard as early as possible and any complacency on our part now may mean the utter doom of this doyen of the bird community in the Rajasthan desert.

The grey junglefowl prefers bamboo forests and is plentiful in the southern Aravalli ranges and in Dangs in Gujarat. It prefers Lantana scrubs and feeds upon grains, tubers, berries, termites and other insects. It roosts over bamboo clumps or on the trees. The smaller Red-spur fowl is distributed towards the south of Mt. Abu. At places both the species live together and their habits are alike. Both parents incubate 5-6 eggs laid in nests among bamboo clumps. Eggs are laid principally during the summer months.

This description of the more important resident birds of the desert will remain incomplete if I do not mention the **Skikra.** This predatory bird flies only a few metres above ground, scanning the land below for insects, lizards, smaller birds and rodents. It catches its prey by surprise and eats its dinner sitting on branches of trees. Its nest is a clumsy and untidy one. It lays from 3 to 4 bluish white, speckled eggs from March to June.

FLAMINGO CITY

The desert region is also a haven for certain migratory birds. The flamingo, **Phoenicopterus roseus**, arrives irregularly almost throughout the year but the majority of these birds arrive by the end of October and spend the winter in India. This long-necked and lond-legged pinkish-white bird with a comparatively small body is good at flight. Their flocks fly low in a grotesque V-formations. The birds turn into a beauti-

ful rosy-pink colour with scarlet wing cover at breeding time during the months of September, October, February, March and April.

Their nesting season depends greatly on the requisite shallowness of water in the nesting grounds located in the Great Rann of Kutch, between Pacham and Khadir islands. Here the birds nest in their thousands. From 1 to 2 eggs are laid on a slight depression over a truncated conical mound of hard mud, 6 to 12 inches in height.

Innumerable such mounds are prepared in close proximity to one another, with the entire colony looking like a veritable 'flamingo city'. The sheer magnificence of these colonies in the Rann of Kutch is to be seen to be believed. Afterwards the birds return to their old homes leaving behind the nestlings which are still unable to fly. Other important European migratory water birds which visit this region during the winter are the white-fronted goose, the Wigeon, the Garganey, the Red-crested Pochard, the Tufted Duck, and several other species.

The common crane locally known as **kurj** or **kunj**, is a palaearctic species which migrates in winter to the Indian subcontinent. Flocks of from 20 to 50 birds may be observed from October to March near lakes beside hillocks. The Demoiselle Crane arrives from central Asia to this region somewhat earlier, usually in the third week of August. The cranes prefer to inhabit open fields, feeding on tender shoots of gram, wheat and other winter crops. These largish birds are hunted in fair numbers and their flesh is considered a delicacy.

With the onset of winter, Macqueen's Bustard, Houbara or 'tilor' migrates from the middle-east and central Asia to the Rajasthan desert and to northern Gujarat. It is larger than the domestic hen, it very well camouflages in the desert landscape and spotting it is a difficult task. The birds arrive in small parties and scatter on the desert grasslands feeding on a variety of fruits, shoots and grain. It is a delectable table bird and is much persecuted by sportsmen.

In most of the Indian plains, except in Assam, the Lesser Florican is a resident bird but in parts of Gujarat and southern Rajasthan it arrives only during the monsoon. It visits tall grasslands or 'vids' and its presence is quickly disclosed by the male bird's nuptial display consisting of constantly hopping above the grass or crop cover. The fascinating courtship display advertises the 'male-presence' to the rival cocks and probably attracts the females present in the vicinity.

Another winter-visitor of the desert region is the Imperial sandgrouse which is larger than any of the permanent-resident sandgrouse species and has a prominent black belly. Its breeding range is from

Africa to Afghanistan. It migrates to northern India during the cold weather in large numbers. Bikaner and Jaisalmer districts and parts of Gujarat are the major haunts of this migratory bird. It is very much sought for by the sportsman and is severely persecuted along with the **Houbara.**

TRIGGER-HAPPY MAN

The past history of wildlife inhabiting the arid and semi-arid region is as interesting as that of the Rajput Maharajas and of the Moghul invasions. There are evidences that the rhinoceros occurred in the region as late as in 1519 A.D. The Asiatic lion, which is struggling for its existence today in the Gir forest, was found in the plains of Rajasthan, Punjab and Sind (Pakistan) in fair numbers in the recent past. It is on record that the last lions occurring in the south-eastern part of the desert were killed during 1876. The cheetah now-extinct in India was, at one time, "most common" near Jaipur. Both these vivacious carnivores disappeared from the desert scene about the turn of this century.

In the 1920s, Blackbucks were so abundant in the Jodhpur region that if a gun was fired, one could joyfully watch their fleeing black backs for an hour across the road. Upto the thirtees of this century, the wild boar was so prolific around Jodhpur that people used to shun walking in the outskirts of the town.

Trigger-happy man has played havoc with his wildlife heritage and the gory drama has, in a way, been helped by certain ecological changes in the land use pattern in the desert region. What remains now of the mammalian wildlife of the desert is a dim reminder of the past glory. I strongly feel that at least for a few species, there is still a chance of their continued survival in the desert region but time is running out fast and action must be taken without any further delay.

The semi-arid, hill-dominated regions of Rajasthan and Madhya Pradesh have long been a preferred home of the Tiger. George Schaller has presented an excellent account of their former abundance in these regions by giving the number of animals shot by certain individuals over the years. One person shot or injured 158 tigers in Rajasthan between the years 1850 and 1854 while the erstwhile Maharaja of Udaipur shot at least 1000 tigers. The records are replete with tales of such mass massacres of the noble tiger. At present the population of tigers is fast decreasing. According to a recent survey, only 20 tigers still survive in Rajasthan, 139 in Madhya Pradesh and some in Gujarat. It is to be hoped that the Project Tiger of the Government of India will save the tiger from total extinction. If we fail now, posterity will never forgive us for allowing this magnificent beast to vanish from the Indian scene.

SAD FATE OF THE LORD OF THE JUNGLE

During the last century the Asiatic Lion, **Panthera leo,** was widely distributed from Sind (Pakistan) to Madhya Pradesh and from Punjab to Gujarat. It is now restricted to the Gir Forest in Kathiawar where also their number is fast dwindling and only about 168 animals were reported from there in 1968. A lion and two lioness were introduced in the Chandraprabha sanctuary, in U.P. during 1957 and by 1964 they multiplied to 11. Inspite of this reported success in rehabilitation, the fate of the lion in India is indeed of the greatest concern to all animal lovers.

The Leopard or the Panther occurs throughout India and although their number is decreasing at an alarming rate yet, unlike the tiger and the lion, they are not threatened with extinction. The Caracal, once fairly common in the desert, has become an extremely rare animal. The Asiatic wolf is also facing extinction in the desert region. The Dhole, or Indian Wild Dog is much hated for its pitiless method of pack-hunting the deer and the antelope. The wild dogs are found in the jungles of Madhya Pradesh. The dhole breeds during the winter and its litter size ranges from 4 to 6. The Sloth bear is the black bear of the **madari** and of the circus. It inhabits hilly terrains of the Aravallis and the forested tracks of Madhya Pradesh. Among carnivores, a variety of cats, foxes, mongoose and otters are found in the desert region.

The saline flats of the Little Rann of Kutch often resound to the hoof-beats of our most enigmatic wildlife species—the wild ass, **Equus hemionus.** These reddish grey to pale chestnut-coloured, light-footed beasts live in troops of 10 to 30, but, alas, their total exit from the Indian scene is almost sure to happen in the very near future. They can be seen now to congregate near 'bets' in the Rann, tempted by the grass cover there. It runs pretty fast at a speed of 45 to 50 km per hr. In 1946, their total number was guessed by Dr. Salim Ali to range between 3000 and 5000. Sixteen years later, in 1962, E.P. Gee recorded the dismal figure of 870 asses only. The decline is, in terms of the quality of animal life in this country, a very discouraging matter. There seems no way now to redeem the future of the Wild Ass of the Little Rann.

The **Chinkara** or the Indian Gazelle is an animal of scrubland and thinly wooded ravines. They are also fairly common in the sandy and hilly terrains in the desert. It is a small gazelle of sleek and graceful build. It lives in parties of 2 to 20 members. Larger herds are rarely encountered now. The population of this easy-to-hunt gazelle has remarkably dwindled in the desert region in the course of the last 10 years. Its low requirement of drinking water enables it to survive in the very arid tracts of Rajasthan where it solely depends upon grasses

and wild fruits for its survival. It breeds all the year round; one and rarely two fawns are born at a time.

DESERT ANTELOPES

The Black Buck the Fourhorned Antelope or **Chowsingha** and the Blue Bull or **Nilgai** are the antelopes found in the desert region. The Black buck has now largely become an animal of the sanctuaries. In the Rajasthan desert, however, large herds, sometimes comprising as many as 500 heads, are still found around villages inhabited by people of the **Vishnoi** community. The **Vishnois** hold the Black-buck in great reverence and violently resist their killing. This most admirable way of wildlife conservation needs to be emulated by people everywhere so that other threatened species of wildlife may be delivered from the brink of total annihilation.

The Black Buck, unlike the **Chinkara,** prefers to stay near cultivated fields and water tanks. Their main rutting season is between February and March and one or two young are produced at a time. The **Chowsingha** is an animal of peninsular India but it is also found in the southern Aravallis, in Siriska and in parts of Madhya Pradesh. It lives in hill country and takes refuge in tall grass. Its dependence on drinking water makes it vulnerable to poachers and hunters. They are not gregarious like the Black buck and are seen in pairs. They litter during the rainy season and the young are generally born during the winter.

The **Nilgai** lives in small herds of 5-15 animals and avoids dense forests. It is usually found near crop fields although I have seen the blue bull in very arid parts of Rajasthan also. It is considered as a breed of cattle and is not usually killed. In certain parts, Nilgai herds severely damage the standing crops.

The **Sambar,** the **Chital** or the Spotted Deer and the Barking deer are forest-dwelling animals. The last-named species is restricted to parts of Madhya Pradesh but the former two occur in the Aravalli dominated region of Rajasthan.

The Indian Wild Boar was once widely distributed in the Indian desert but has now more or less vanished from western Rajasthan and from parts of Gujarat. It lives in herds in the bush jungles in eastern Rajasthan and Madhya Pradesh. It is omnivorous, feeding on crops, roots, tubers, insects, snakes and carrion. Four to six young are born at a time either shortly before or after the monsoon.

The Hare and the Indian Crested Porcupine are fairly common in the desert region; the latter animal is, however, restricted to the hilly terrains.

The most prolific "wild animals" in the desert are the field rodents. About 25 species inhabit the region and their total number is anybody's guess. As many as 800 rodents occur per hectare in western Rajasthan and they inflict collosal losses to crops.

It is inevitable that with our present population growth rate, the face of the desert, as we know it today, will change sooner or later. Many of the specialised forms of plants and animals associated with the desert will eventually vanish. This will be a great loss to natural science and to our cultural heritage as well. Preservation of the whole system may indeed be impossible but we may at least keep a part of this heritage with us for ever by creating a Desert National Park wherein the typical desert plants and animals of today may be preserved and propagated for our future generations to admire and enjoy.

Give me the desert, limitless and lone,
Eternity outfigured to the eye;
Where Grandeur rears her undivided throne,
And Silence listens to the eagle's cry;
Where the vast hills seem pillars of the sky,
Shrine of sublimity ! no bounds control,
Meet for the worship of the Deity,
When their loud hymn the solemn thunders roll,
And lightnings speak His power, and lift the awestruck soul.

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