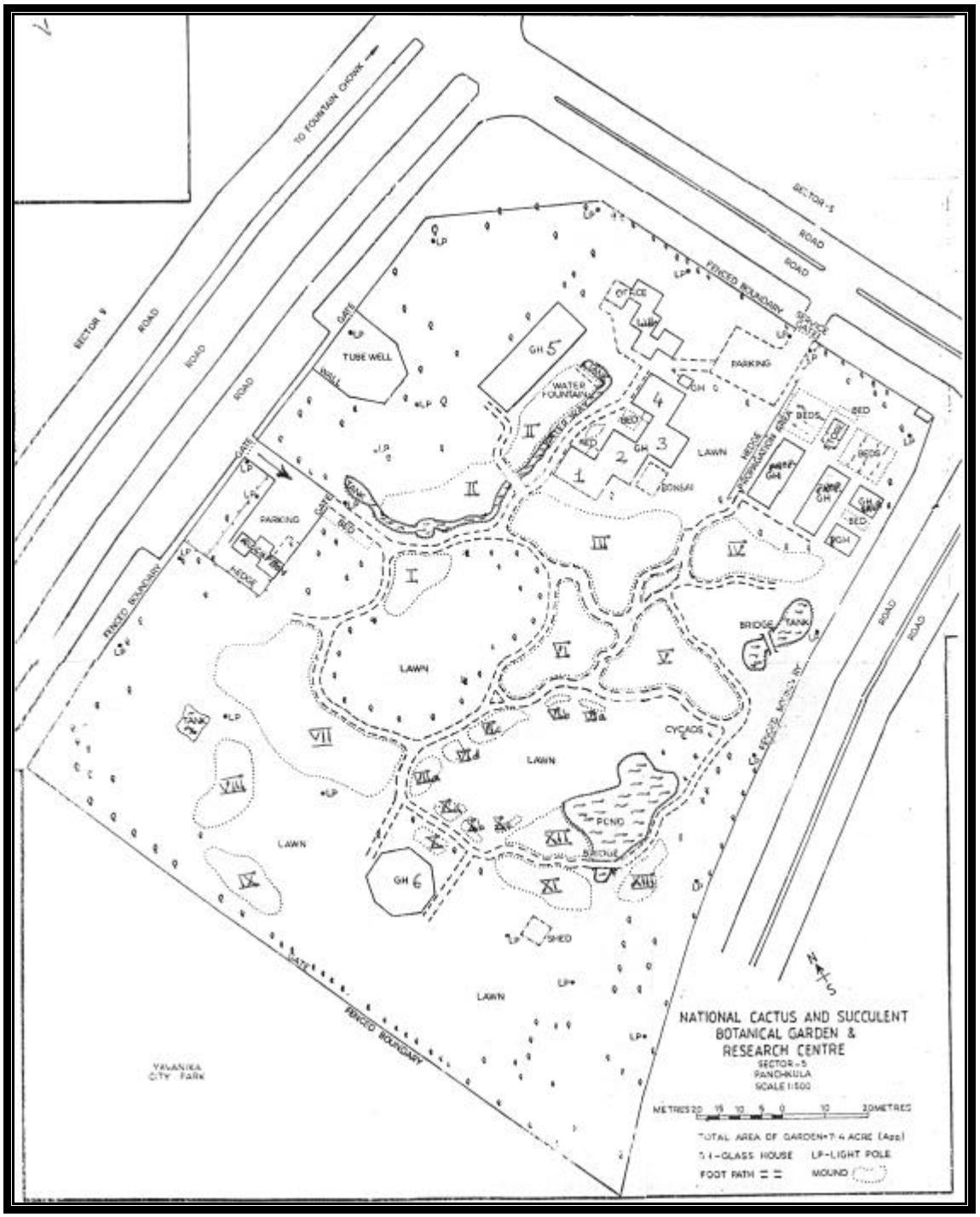
Part B
DISPLAY ROCKERIES

4. THE TOUR BEGINS!

The National Cactus & Succulent Botanical Garden and Research Centre is located in SECTOR 5, PANCHKULA. This sector is being developed as the main City Centre of this modern township. The garden is at the northern end of the City Park, covering an extensive area of 7.4 acres. It is approachable by road, being about twenty minutes' drive from the Chandigarh Bus Stand, and practically the same distance from the Chandigarh Airport. The entrance to the garden is situated on a service road, that runs parallel to the main road going from the Fountain Chowk near the HUDA building to the main Panchkula Bus Stand. Coming on the main road from the Fountain Chowk near HUDA building, this side road takes off from the first traffic light.

To gain the maximum benefit from a visit to the garden, one should spend a few minutes to study the attached LAYOUT MAP of the area. While planning the garden, the topography of the land, which is undulating and gradually sloping towards the South, was taken into account. The map will show that it is a well-planned garden.



The Haryana Urban Development Authority architects have done a creditable job. There is an optimal utilization of the area. The concrete

pathways, well laid-out plant rockeries, spacious lawns, water features and waterways, and above all, the spacious Botanical Collection Glass Houses speak volumes of this effort. The RECEPTION CENTER (near the main gate) and OFFICE (towards the north and nearer to the service gate) provide the necessary back-up; the latter houses a small LIBRARY of succulent plant literature, and a small LABORATORY is also being developed there. The propagation area has already been described in detail.

In the previous chapter it was explained that the Cacti and Succulents need a highly porous and nutritious soil with very good drainage. In 1979 I had built a small Cactus and Succulent Garden for Jammu University. In that garden I had built raised mounds with a low peripheral retaining wall. The soil of that area was similar to the one to be developed now. In both these project areas the soil has very high clay content. As such, at Jammu the MOUNDS or ROCKERIES were made with very coarse river bed sand, with addition of 5% burnt coal cinders, and only 15% of local soil. To this mixture, extremely rotten cow dung manure was added. The Jammu climate and rainfall range---about 70 to 80cms annually---is similar to that of Panchkula. The growth rate of cacti and succulents planted in Jammu garden was extremely encouraging. The experience gained in the development of that garden came in very handy now.

All the outdoor features or rockeries of this garden have a low stone masonry periphery wall, and the bed itself is filled up with the type of sandy mixture used in Jammu. A top dressing of coarse cinders is given to prevent soil erosion during rains. Stone boulders of varying sizes are also scattered on the top. As the succulents have widely spreading superficial roots, more stones were scattered in areas where *Cerei* or other tall plants are grown. The stone boulders give additional holding support to these taller plants.

When we started this garden, about 15 workers under a Junior Engineer were deputed for its development and upkeep. I had noticed that the official working of the buildings department was steeped in formidable red tape, taking a long time even before any work could be started. So, as soon as the layout plans were in my hand, it was decided that all the works connected with the outdoor beds and landscaping will be done by the small band of garden workers. Amongst the workers, MR. JEET SINGH had worked before as a helper with some masons. The Junior Engineer, MR. AMRIK SINGH, was there to give technical expertise. Stone boulders were in abundance in the adjoining undeveloped areas or local streams. Sand was carted from Ghaggar river-bed which runs close to and through Panchkula.

With an unhindered supply of cement from the Public Works Department, we built all these features at a very rapid pace.

The top surface of all rockeries has a gentle slope of 20 to 30 degrees towards the retaining stone boundary. That helps in free drainage as well as better display of plants at the back.

Planting of Cacti and Succulents being propagated followed. The small plants in the beds did not make much visual effect. These were supplemented by a large number of bigger plants being grown by me at my farm since 1976, when a garden was planned for Chandigarh. We needed a large number of *Echinocactus grusonii* (THE GOLDEN BARREL CACTUS) to create an impact. While most of the cacti from my farm were given free, I charged a nominal price for the transfer of over 250 large *Echinocactus grusonii* and a few other exotic cacti. This nominal price tag was necessary to save these beauties from "White Collar Predators", i.e., unscrupulous administrators, who generally consider it their birthright to take away any plant they like from government nurseries or gardens.

Under the watchful eyes of the Junior Engineer and of MR. SUSHIL KUMAR, Supervisor, and due to the devoted effort of all workers, this

garden has taken great strides: a comparison of the photographs from 1990 and of present-day mature plants bear testimony to this claim.

A big hoarding outside the main gate confirms the existence of this exotic garden. The garden is not visible from the main road as two avenues

of thick foliage trees hide it from the view. As you enter the garden, there is a small car parking lot, with an enquiry and ticketing office next to it. There are three display boards. One of these gives you a brief know-how about Cacti and Succulents. The other board lists the names of prominent plant donors. Such a large venture was impossible without the help of beneficiaries from all over the world. This board, along with the garden layout plan, will guide you through the garden.

Agaves

Another gate leads you into the garden, on its right side you can see that “Inauguration Stone” perched on two large sandstone boulders.

AGAVES. Along the path on the right side, there is 5 x 15 meter long bed of *Agave attenuata* plant. *Agave attenuata* is one of the most attractive members of the *Agavaceae* Family. *Agaves* are popularly known as CENTURY PLANTS, due to the misguided notion that they flower after a hundred years. Most of the *Agaves* in cultivation flower at eight to twenty five years of age. *Agave attenuta* flowers at the age of eight to ten years. *Agave attenuta* leaves form a beautiful rosette sixty to seventy five centimeters across. The waxy leaves are bluish green in colour and have no spines on the margins or vicious sharp spine at the tip. This unarmed character of the leaves makes these the most sought-after house plants. The inflorescent raceme, about one to three meters long, is curved like the raised trunk of an elephant, and is thickly covered with small greenish-yellow flowers. The inflorescence lasts three to four months. These plants offset freely from the base.

BURSERAS. Behind this bed of *Agaves*, there are trees of the *Burceraceae* Family. The first one is *Bursera hindsiana*. This tree is a native of Mexico. The tree has a thick bark, while the branches and the trunk interior are spongy and exude a milky sap when cut. The bark is a very shiny greenish-brown in colour. The trunk and branches become very thick with age. The curving convoluted trunks are very attractive and can be trained into Topiary Forms. Three trees elsewhere in the garden are trained in this fashion. The next tree is *Bursera microphylla,* that inhabits the Colorado Desert in U.S.A. The dark brown shiny bark of the trunks is very attractive. Leaves are small fern-like. In its natural habitat the trunk grows very thick and the tree is commonly known as ELEPHANT TRUNK TREE. Its sap is used for medicinal purposes. The main tree was torn near the soil during a storm last summer. Its trunk near the roots had developed extensive rot. Now fresh cuttings have been planted. A small sapling of an Indian species of *Bursera* is the next plant. In India the bark and the sap are used for making incense. The last one is *Bursera fagroides*. This native of Mexico forms a very attractive tree. The bark is very shiny whitish green and the tree has a thick canopy of small leaves. In nature, its trunk becomes two to three meters thick with age. Cuttings and seedlings of this tree form very good material for Bonsai culture. The three large Bursera species are

from seeds sown in 1976. The garden's Bonsai collection has a two foot high Bonsai of *Bursera fagroides* from a seedling of this batch.

BAOBOBS. About 10 meters from the "Inauguration Stone" there is a large tree of *Adansonia digitata*. This tree is from the steppes of South West Africa. It is commonly called BAOBAB or MONKEY BREAD TREE. These are very long-lived trees and the trunk swells to huge dimensions like the body of an elephant. This is also a vintage 1976 seed-grown tree and already the trunk is nearly a meter in diameter at the base. Unfortunately this tree shows some rotting near its base, which is being attended to. There are two more trees of *Adansonia digitata* trees in the garden. As the tree grows to huge dimensions, more trees of this species cannot be added. It may interest the readers to know that a large number of these trees have naturalised in Gujarat forests near the Maharashtra border.

5. ROCKERY I

Front view of Rockery I
(with plants numbered ,in conformity with text, as follows on a transparent covering)

1

7 8

44 9

20

19 18

28

35 36 21

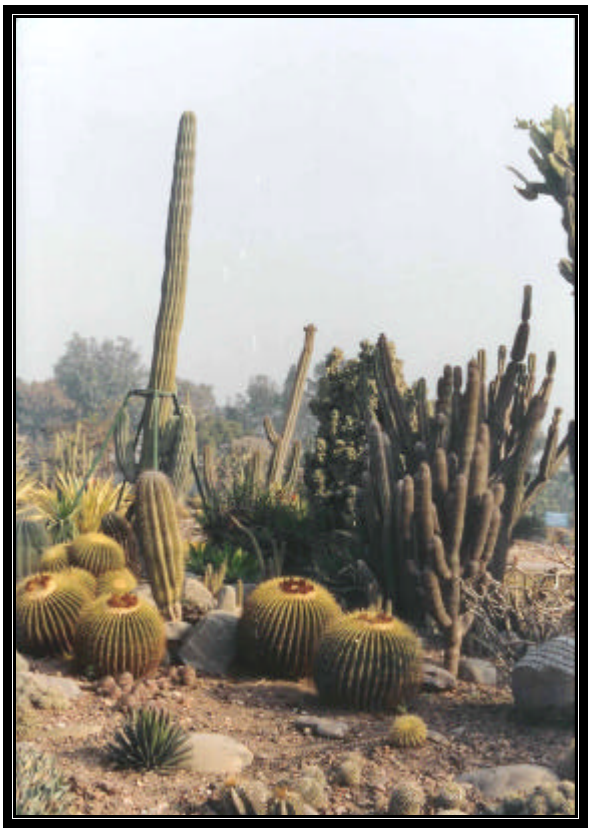
27

34 28

58

53

At the end of the path adjoining the bed of *Agave attenuata*, there is the small, more or less triangular shaped, Rockery Number I. As you approach this rockery, a very tall majestic *cereus* growing near the left side end of the rockery attracts one's attention. This is *Pachycereus prinjlei* (1). There is a group of five more *P. prinjlei* near the right hand side end of the rockery. The tallest plant is about eight meter high, and is branching in a candelabra fashion in its lower part. One might be familiar with tall candelabra type branching cacti seen in photographs or in the Wild West movies of S. W. Texas. Those cacti are the majestic *Carnegia gigantea* Syn. *Cereus giganteus* or SAGUARO as commonly known there. *C. giganteus* is a very slow grower---only three to five cm in a year. One can very well imagine the age of those giants, as some of those grow up to ten to fifteen meter height. On the other hand *Pachycereus prinjlei* has a much faster growth. This tall *Pachycereus prinjlei* was grown from seed in 1976, and my daughter RAMANJIT DHILLON had planted it in a rockery in her home garden in Chandigarh. It got uprooted in a storm in 1978 and was later brought here. The main roots had been severed or badly damaged. As such supports were given so that the root system may regenerate. This exercise has proved effective and this plant has withstood several seasonal storms with wind gusts of more than one hundred kilometers per hour.



1

2 15

33

50

37

Those Texas photographs frequently show an eagle sitting on top of a majestic *Carnegia gigantea.* Regular visitors to this garden, interested in bird-watching, may be rewarded with the sight of some interesting bird

sitting on the top of this *Pachycereus prinjlei,* and surveying the garden landscape. Sometimes, one can see a fly-catcher swooping down to catch some insect, and then return to its high perch. The *Pachycereus prinjlei* on the right are a group of five plants, the tallest is almost six meter high. For enhanced landscaping effect two smaller plants of this species have been added to this group. In the text above, mention has been made about *Carnegia gigantea* (2) Syn. *Cereus giganteus*. There are two plants of this species on this rockery, both grown from seed in 1976. One is right in the middle. This is 35 cm thick and one meter tall, and the other, which is smaller, is near the right end of the rockery.

This rockery, though small, only 20 x 10 meters, introduces over fifty species of cacti and other succulents to the visitor. The landscape has tall growing cacti and other succulents in the background, with smaller *ceroid* type cacti just in front of these. The main visual effect is brought about by the large growing barrel shaped cacti such as *Echinocactus grusonii* and *Ferocactus* plants. In the foreground are low growing cacti and succulents. For the students of these exotic beauties, all plants on this rockery have been identified and clearly labelled.

Rear view of Rockery I

4

45

43

24

26 28

34

11
10

54
2

55 56

18
37
29

58 50

43

4

1

34 26 25 50

24

27

The numbers accompanying the above photographs serve to precisely locate on the rockery most of the species growing on it. The genus *Opuntia* is represented on this rockery by *Nopalea cochenillifera* Syn. *Opuntia cochenillifera* (3), *Opuntia rubescens* (4), and *Opuntia imbricata* (5). Of

these, *Opuntia rubescens* is a tall, three meter high majestic plant in the middle of the row of *cerei* at the back. *Opuntia cochenillifera* is just behind it, and slightly to the right of *Opuntia rubescens*. In the eighteenth and early nineteenth century, the pads of this plant were used for breeding cochineal insects---a small woolly bug. COCHINEAL DYE was made by crushing millions of these bugs. Due to this industry this plant has spread all over the world. The tall growing cacti, the *cerei* in the background (from left to right) are *Ritterocereus pruinosis* (6), *Cereus jamacaru* montrose (7), *Cereus peruvianus* (8), *Cephalocereus palmeri* (9), *Cereus thurberi* (two plants) (10), *Pachycereus marginatus* (11), *Cereus hutingtonianus* (12), *Cereus dayami*(13). *Cereus jamacaru* montrose is a noteworthy specimen. Also note the woolly tops of *Cephalocereus palmeri* branches. Just in front of the row of *cerei* are several groups of their thinner cousins, the *Cleistocactus strausii* (14), *Cleistocactus jujeyensis* (15) *and Cleistocactus baumanii* (16). *Cleistocactii* grow up to 1.5 meter height and during summer the upper part of the plant bears two to three crops of small bright flowers. A tree-like, much branched plant of *Espostoa lanata* (17) is in front of this row.

The large barrel-shaped cacti form the base of any good cactus landscape. The genus *Echinocactus* is represented by a large number of

Echinocactus grusonii (18) - the 'Golden Barrel Cacti' scattered across the landscape in front of the tall background. These plants can grow up to one meter in diameter and height and may weigh one ton. There are certain grouping plants on this feature. A large plant having the name of *Echinocactus ingens* was grown by MR. V. K. CHADHA of Hoshiarpur and gifted to this garden. This plant has now been identified as *Echinocactus visnaga* (19). Close to this is *Echinocactus palmeri* (20), with reddish spines off-setting from the base. *Ferocacti* are represented by a large *Ferocactus herrerae* (21), one juvenile plant of *Ferocactus emoryi* (22) and several plants of *Ferocactus glauscensis* (23). This last ultimately forms very large spectacular groups.

In the foreground are low-growing cacti. The genus *Mammilaria* has the largest number of plants. The following species can be seen on this rockery: *Mammillaria magnimamma* (24), *Mammillaria compressa* (25), *Mammillaria nivosa* (26), *Mammillaria albilanata* (27), *Mammillaria geminispina* (28), *Mammillaria beneckei* (29), *Mammillaria haageana* (30), *Mammillaria polyedra* (31), *Mammillaria carnea* (32), and *Mammillaria mazatlanensis* (33). Of these, *Mammillaria geminispina* groups are very impressive. In nature, I have seen this *Mammillaria* forming huge groups of over one meter in diameter practically covering large stretches of the

volcanic slopes in HIDALGO VALLEY, MEXICO. Groups of *Mammillaria magnimama*, *Mammillaria compressa*, and *Mammillaria carnea* are also very impressive. Some of these groups have been created by the low grafting technique described earlier. Other species on this feature are: *Echinocereus pentalophus,* (34), *Notocactus leninghausii* (35), *Notocactus magnificus* (36), *Astrophytum ornatum* (37), *Melocactus bahiensis* (38) *Melocactus intortis* (39), and *Coryphantha elephantidens* (40). Two plants of *Haageocereus aureispinus* (41), and one plant of *Boliviocereus sampatiensis* (42), have been grafted on high stock of *Ritterocereus prunosis.* These form large groups of hanging plants and during summer are profuse bloomers. They flower several times each year and the plants are covered with thousands of showy orange flowers.

Succulents other than cacti also have an equally large presence here. In line with the *cerei* is a *Yucca* species (43), which forms large caudexes, two groups of *Aloe arborescens* (44), a very tall *Yucca argentii* (45), and near the right-hand end a large group of *Kalanchoe behariensis* (46). *Agavaceae* is represented by *Agave deserti* (47*), Agave guengola* (48), *Agave attenuata* (49), *Agave ocahui* (50), *Agave stricta* (51), *Agave toumeyana* (52), and *Agave patonii* (53). Of this *Agave ocahui* flowering plant with a two to three meter long towering spike covered with hundreds

of small greenish orange flowers is a sight not easily forgotten. The plants flower at the age of 8-12 years. A large number of these plants are now all over the garden. There are two large *Adenium obesum* var. *multiflorum* (54) plants on the right side of this rockery. Except during the winter months, these two plants are generally covered with hundreds of pink flowers. During the early summer *Echinocereus pentalophus* group is also covered with hundreds of bright red flowers. There is a large plant of *Gasteria carinata* (55), behind the *Adenium* plants. Another attractive sprawling dwarf *Yucca* species (56) is also there. A *Euphorbia trigonafa* variegata (57) plant about 1.5 meter high is amongst the *Cerei* in the background. In the foreground, along the border, are several groups of *Ornithogalum caudatum* (58), a member of the *Liliaceae* family. It has large green bulbs above the soil level. An interesting feature of this plant is the growth of numerous bulbils on the bulbs. On the back of the rockery is a large group of *Sedum pachyphyllum* (59) and a smaller group of *Kalanchoe* species (60).