Wilderness Horticulture: Himalayan Highlands on the Hudson

John Gwynne

Plants are playing an increasingly important role in the "immersion" exhibits of leading zoos.

Imagine searching for a glimpse of the elusive snow leopard in the high Himalayan wilds. Your imagined trek would depart from main roads to wander narrow uphill footpaths, past thickets of wild magnolias and overarching bamboo, through groves of fir and birch, and up steep grassy meadows dotted with purple-blue *Geranium himalayense*. Perhaps you'd come across a flimsy rustic bridge of rope-tied logs fitted between great boulders spanning a steep-sided mountain brook where ferns, *Ligularia*, and candelabra primula grow in the moist soil.

Terrific! A mother snow leopard with two cubs is spotted among the talus boulders of the grassy slope. Crouching behind boulders,

Millions of Americans can now witness a snow leopard in the snow — a sight previously seen by only a few field scientists. © *New York Zoological Society Photo.*

The Himalayan Highlands exhibit has room for people to read graphic messages about conservation.

the cats are almost perfectly camouflaged, tails slowly twitching, as a scarlet-chested tragopan pheasant works its way down the hillside, pecking at wind-scattered grass seeds.

Just such an experience formed the basis for the design of a new type of ecological exhibition recently created, not in the mountain wilds of Nepal or China, but in an oak wood in New York City. Here a determined team of zoologists, field scientists, exhibition designers, landscape architects, horticulturists, sculptors, welders, and graphics specialists—all employed by the New York Zoological Society—joined efforts to build a place that captures the feeling of montane Asia. Together, they moved mountains of soil and scree, planted thickets of bamboo and twenty-five-foot firs, and even sculpted rocky outcrops and a great fallen tree of steel, concrete, and epoxy to match the site's geology and woodlands. Named "Himalayan Highlands," the exhibition at the Bronx Zoo offered the opportunity to build a sanctuary for snow leopards, red pandas, white-naped cranes, and Temminck's tragopans. The design team also purposely created a dynamic place where visitors are encouraged to learn about wilderness, about the importance of plant-animal interactions, and of the urgent need for special conservation efforts.

Potential for Public Education

While conceiving of Himalayan Highlands as a naturalistic place for animals, the design team also recognized the potential to enhance the visitor's appreciation of wild places and wild species. The challenge was to transcend typical zoo formulas, which concentrate on exhibiting animals within containments that are clearly manmade (buildings, architectural moats, fences, faux rock cliffs) and that deal with the animals' natural ecology only second-hand by means of signs or explanations by docents.

Himalayan Highlands was to be different, a place that would try to create the primary experience of a trek across an Asian hillside. While transporting an actual mountain slope intact would have been optimal, the more practical challenge was to recreate enough similar elements, combined in appropriate ways, so that visitors would feel immersed in the same environment as the animals. Without having to read, they would see a snow leopard teaching her cubs or a crane probing for tubers along a pond edge, and they would be able to learn how this bit of nature works. Unlike traditional zoo design where the manmade dominates, here the intent was to recreate a wild environment worth exploring, worth learning about, and worth preserving.

The primary educational goal for Himalayan Highlands was to impart an overall affective message—to get people to care. Educational graphics were carefully designed to provide a subtle yet important sublayer of interpretation; for example, a replica of a weathered ibex skull encourages people to read a small sign discussing leopard diets. Messages deal with plants, habitats, animal

Visitors wander through a simulated wilderness landscape in the Himalayan Highlands exhibit.

ecology, and conservation; and a concentrated effort was involved in their writing, fabrication, and siting so that they seem to fit into the landscape.

Sculpting with Bulldozers

Because zoo biology mandates a barrier between animals and visitors, it was decided to separate the two by giving most of the woodlands to the animals and by restricting people to a winding path that leads around rocks and plantings to several viewing structures. So in one place a wood ramp was designed to bring people up to a viewing deck that cantilevers toward the woodland treetops favored by red pandas for their daytime roosting. In another spot, a blind of rough poles was built in a wild-looking, ten-foot-tall thicket of giant *Miscanthus* grass providing an open view into a marshy pond for the cranes.

In another location, the rustic underside of a Nepalese bridge provided the model for a shaded public structure at the edge of a grove of black cherry trees frequented by snow leopards. Here a gauzy screen of fine piano wire, stretched tautly vertical and dark-stained, is attached to the underside of the rustic bridge, as if emerging from the scree below. Easy to see through, especially in the shadow of the bridge, this flimsy-looking film of wire is sufficiently strong to separate animals and people. Two of the nearby cherry trunks are actually thirty-foot aluminum poles, covered with a skin of epoxy, sculpted and painted to match the living trees. These poles support a tentlike aviary of fine wire mesh that keeps the cats in the foreground where visitors can see them but is itself nearly invisible in the flickering light of a natural woodland backdrop. Near the visitors, what looks like a large flat boulder is actually fabricated of fiberglass-reinforced concrete cast from a mold taken of a real boulder. Its secret is internal heat coils, which create a warm dry perch for the cats to enjoy on wintery days.

By the careful siting of viewing places, designers could screen undesirable views and focus attention on handsome vistas deep in the woods. Painstaking attention to detail insured that such manmade elements as structural poles were hidden by rocks or plants, or disguised within the rustic vernacular architecture of Nepal. Authentic cultural details were used to reinforce the sense of place: prayer flags marked exhibit entrances, a pile of prayer stones were placed along the public path, and architectural details were painted by a Nepalese artist. When setting boulders to support rustic bridges, skilled New York masons were asked to transcend their usual professional neatness by building walls in a haphazard and unsound-looking fashion with no mortar showing, a detail that helps achieve the look of nature reclaiming human efforts.

Special efforts were made to bring in many tons of topsoil and talus and to regrade the site—where possible around existing trees—to create a rough undulating topography and multiple microclimates for new plant communities. To make Himalayan Highlands believable as a wild place necessitated developing a new attitude towards naturalistic gardening, which might be termed "wilderness horticulture." The horticultural intent was to create an Asian planting with a feeling of wildness—a landscape that did not look newly planted, or even planned at all.

The woodland site in the Bronx Zoo was chosen in large part for its existing bedrock outcrops and cool northeastern exposure. It was dominated by natural stands of oak, tulip tree, and ash, their trunks measuring up to three feet in diameter. The understory included black cherry, swamp maple, a few invading *Ailanthus*, and some previously planted flowering dogwood. Although American rather than Himalayan species, most were kept to enhance the final exhibition by providing not only important shade for the animals but also a sense of scale and timelessness. Fortuitously, these genera have close relatives that form part of the Asian forest.

Hardy Himalayan Plants for New York

Finding authentic, hardy Himalayan plants was no easy task. The results of an exhaustive search of stock available from American

The graceful habit of Cedrus deodara, *an important feature in the Himalayan Highlands exhibit. Photo by Rácz and Debreczy.*

nursery catalogues were cross-referenced with research into the flora of sites in Nepal, Tibet, or South China that might serve as a model for Himalayan Highland's planting list. Nepal was initially favored, especially oak woodland sites near Annapurna, as ideal for this project because of the remnant presence of both snow leopards and red pandas, plus the distinctive beauty of local cultural artifacts. However, since New York's winter climate is harsher than that of much of the Himalayas and since hardy Nepalese plants (especially in large sizes) are relatively scarce in nurseries, a decision was made to expand to a generalized plant list of Sino-Himalayan flora, with a sprinkling of North American analogs. This compromise was necessary to achieve the proper sense of scale and the desired effect. For example, it was frustrating to envision the dappled shade of a spectacular grove of white-barked *Betula jacquemontii* from Asia when plants here were only available in one-gallon pots. To achieve the immediate effect of mature birch groves required the substitution of non-Himalayan species.

In spite of frustrations, a remarkable number of hardy Asian plants could be located, sometimes in sizes large enough to plant on a site accessible to the public. More than a dozen deodar cedars over fifteen feet tall were located in a mid-Atlantic nursery. Other appropriate woody plants included *Callicarpa bodinieri*, *Acer griseum*, *Hippophae rhamnoides*, *Pieris japonica*, *Potentilla fruticosa*, *Mahonia bealei*, *Cotoneaster salicifolius*, *Viburnum* ssp., *Sarcococca hookerana* var. *humilis*, and *Hydrangea*. Large clumps of bamboo (*Phyllostachys aureosulcata*) were transplanted from Long Island. Herbaceous goatsbeard (*Aruncus dioicus*), bugbane (*Cimicifuga simplex*), and geranium (*G. himalayense*) were deemed tough enough to survive and eventually may be joined by temperate aroids and other specialties.

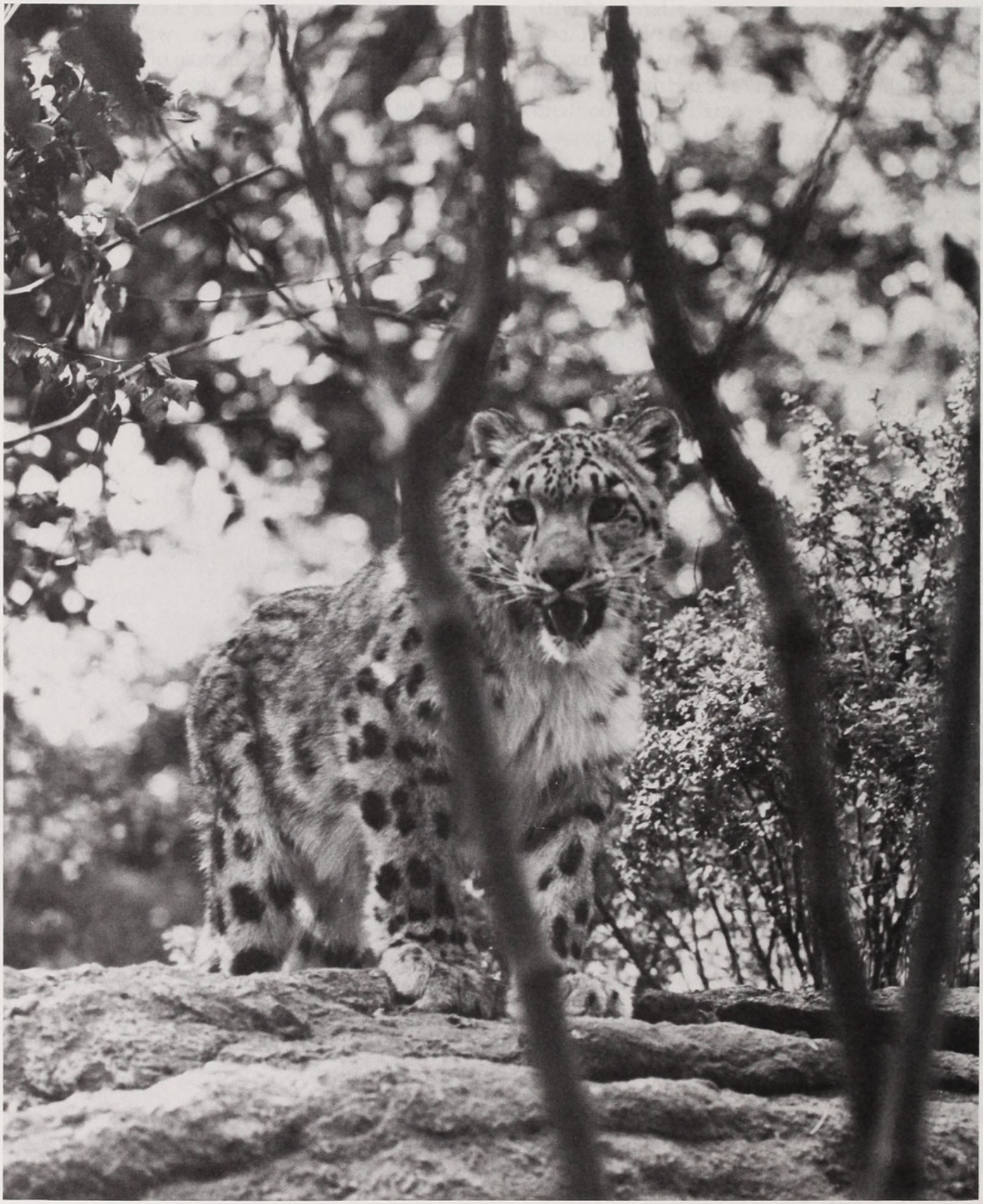
A number of especially desirable plants posed special problems. The fabled blue poppy (*Meconopsis betonicifolia*) was considered too intolerant of New York summers to warrant initial planting, but seeds of it have been obtained for experiment in a cool niche. Few of the true Himalayan wild "species" rhododendrons, so distinctive of Asian forests, are hardy enough. Some were tried (including *Rhododendron campanulatum*, *R. campylocarpum*, *R. forrestii* var. *repens*, *R. nivale* ssp. *boreale*, and even *R. cinnabarinum* and *R. barbatum*) and managed tentative footholds in protected locations, but could not be relied upon for mass effect. Consequently, several locally hardy rhododendron hybrids had to be used. Forms were chosen that are not immediately recognizable to most people (to avoid connotations of suburbia) or that have relatively small flower trusses similar to the wild species. Several good-sized plants of the white-flowered hybrid 'Dora Amateis,' with one Himalayan parent (*R. ciliatum*), were donated. A few plants of the North Asian *R. mucronulatum* 'Cornell Pink' were included for their unexpected sparkle early in spring and their willowy forms reminiscent of Himalayan lepidote thickets.

The marvelous tree-sized blood-red *R. arboreum* that so impressed explorers in the early twentieth century would have been an appropriate and spectacular plant for the Himalayan Highlands exhibit, especially as their groves are now being decimated by firewood gatherers in Nepal and elsewhere in Asia. *R. arboreum* is, however, impossibly tender for New York winters, so large plants of the dark currant-red Consolini/Dexter hybrid 'Francesca' were substituted, chosen for their distinctive color and upright stature. Planted on berms, someday these red-flowered trees may arch over visitors' heads as the true *R. arboreum* does in Asia.

Crucial Wilderness Planting Details

Since the intent was not to create a garden but to recreate a wild place, care was taken during installation to site plants in appropriate places and with correct associations and to space them irregularly. Where possible, larger-sized plants were located in the center of a cluster to replicate natural growth patterns.

Bamboo and magnolia fit naturally together on lower portions of the site, with fir and low-



Seeing snow leopards in a green environment enhances the quality of the interaction between visitors and animals.

growing rhododendrons on the rocky promontories. To suggest "krumholtz" wind pruning, distinctive of treeline firs, the team even discussed sandblasting lightly the northwest side of some plants. This idea was rejected, only because of the inappropriateness of this windblown look under overtowering oaks.

Much of the site was heavily bermed to exaggerate the roughness of the topography and to screen visitors' views of one another. The zoo's own aged manure was used liberally in the topsoil mix to retain moisture, especially on slopes. While grounds keepers of most gardens and public parks carefully remove dead vegetation, old gnarled stumps and deadfall were purposefully incorporated into the plantings to make this site seem wilder. All visible saw-cut ends were buried or disguised by "aging." Deadfall limbs were carefully sited among new plantings both for natural effect and to form low barriers to discourage people from wandering from paths. Not only were spacings between plants purposefully irregular but understory trees were planted at tilted angles to suggest their reaching for light. Plants with uneven shapes were obtained from nurseries in preference to symmetrical plants (undoubtedly to the delight of the local nursery). Where "saucers" of bark mulch were built around recently installed plants to facilitate watering, these regular forms were disguised with dead leaves. Much of the site, including mulched areas, was seeded irregularly with a fine-textured, "uncut" red fescue. On an irregular terrain, this clumping grass cover was effective in helping to disguise a newly planted look, to unify the massings of plants visually, and to enhance the impression of naturalness.

While not needing the maintenance typical of many public displays, Himalayan Highlands does require eyes trained in naturalistic horticulture. Weed species need to be recognized and removed. Pruning needs to be

People in an elevated viewing area can observe a red panda in the trees only a few feet away; the native forest lies beyond.

discreet and done with knowledge. The comparatively unorthodox beauty of a tuft of brown grass in winter needs to be recognized, appreciated, and left untouched, while a viburnum branch needs inconspicuous pruning when crowding a neighboring fir. Unlike a static museum exhibit, a planted site is a living place—its continual change creates new horticultural opportunities but also necessitates constant, subtle observation.

Certain species, such as the bamboos, are now maturing sufficiently to allow thinning for fresh browse for bamboo-eating red pandas. Other species require replacement, such as the initial short-lived plantings of American birches. The project will never be "done." Indeed, the goal is that, over time, the analogous North American plants will be replaced by more authentic Himalayan species. While the exhibit needed to look established when it opened, it is also a living place that can develop and change.

Exhibits to Encourage Saving the Wilderness

The Himalayan Highlands exhibit is both a subtly complex and popular place for visitors but, as an experiment in environmental "immersion" and "wilderness horticulture," it is not unique. In the Bronx Zoo alone, Himalayan Highlands is joined by huge new wild habitats where visitors can wander through an extensive and dramatic Asian rain forest, visit a rhino wallow, or a sparse African alpine habitat. Serious commitments to expansive landscape replication and specialized horticulture are now found in several American zoos aided by the recently formed American Association of Zoological Horticulture. We are witnessing a world with its wild lands and biological diversity fast disappearing and with its scarce refuges becoming increasingly insularized, inadequate, and degraded. The rate of tropical deforestation has recently accelerated to one hundred acres each minute. To try to combat the losses, zoos now are changing rapidly in order to become more effective sanctuaries.

While public interest in zoos has burgeoned and awareness of environmental destruction has increased, the idea of building educational wilderness immersion exhibits to reveal the beauty and ecology of wild places does not need to be the sole province of zoos. Imagine a botanic garden encouraging visitors to wander through a moody, beautiful, Carboniferous swamp forest of giant horsetails, cycads and tree ferns, along with an occasional primitive reptile. A huge greenhouse nearby could shelter a spectacular arid southwestern Madagascar spiny forest, complete with eroded stream beds for people to explore, as well as baobabs, rare tortoises, and marvelously specialized endemic flora.

To lobby effectively for wild places, we must make their values evident. If we cannot actually bring thousands of people to primitive tree fern forests, montane Ethiopia, or a vanishing Himalayan forest, we do have the ability to convey some of the fascination and beauty of those places here. The words of the Senegalese philosopher Baba Dioum succinctly express this intent:

> In the end, we will conserve only what we love.
> We will love only what we understand.
> We will understand only what we are taught.

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