Himalayan ceranaid: *Development Assistance to Preserve and Promote* Apis cerana *Beekeeping in Nepal*

Part I of II parts

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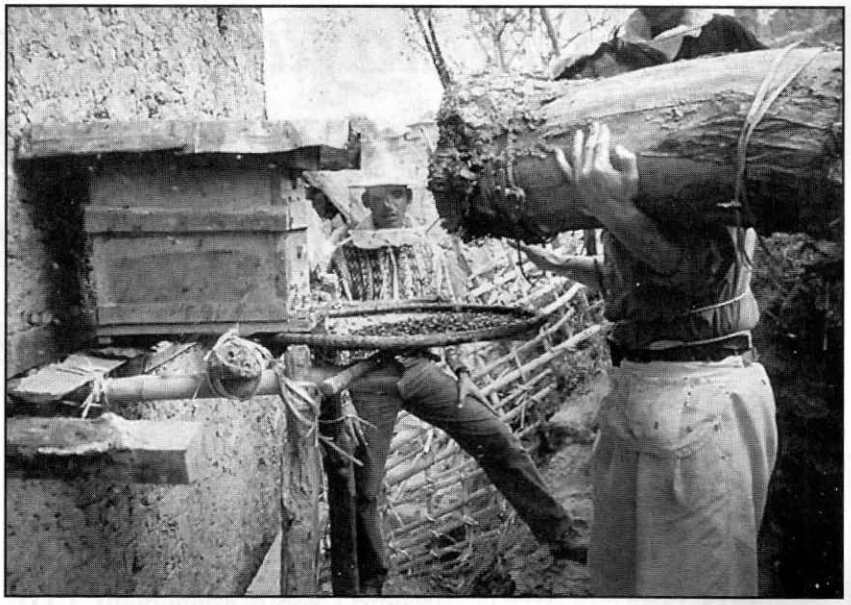
I was half a world away from my home in a land whose customs and language I didn't understand, thousands of irritated bees filled the air, several locals were yelling to me excitedly—I was on vacation in Nepal assisting in a colony transfer of* Apis cerana *bees with a couple of Nepali beekeepers, the buzzing of the bees was like music to my ears and we were all having a great time...

For the first half of the 1980s I worked first as a Peace Corps volunteer and then as a technical trainer in apicultural development in a number of developing countries. Although my career as an entomologist has since turned in the direction of agricultural and forestry integrated pest management, I have maintained a strong interest in beekeeping and apicultural development. Recently, as part of a month-long stay in Nepal, I undertook some casual research into the honey bee fauna of Nepal and the traditional and current methods of the country's honey production.

The beekeeping traditions of Nepal are quite interesting both because of the antiquity of cultures in the region and because of the diversity of ecosystems. Nepal can

Peace Corps volunteer Elizabeth Hobson and her husband Shreehari Thapaliya chat with beekeeper Dal Bahadur Limbu and his family. The prospective young beekeeper sports a locally made bee veil, while his father displays home-made frames constructed from slats of bamboo. Such bamboo frames may be used in place of wooden frames where milled wood or carpentry tools are difficult to procure.

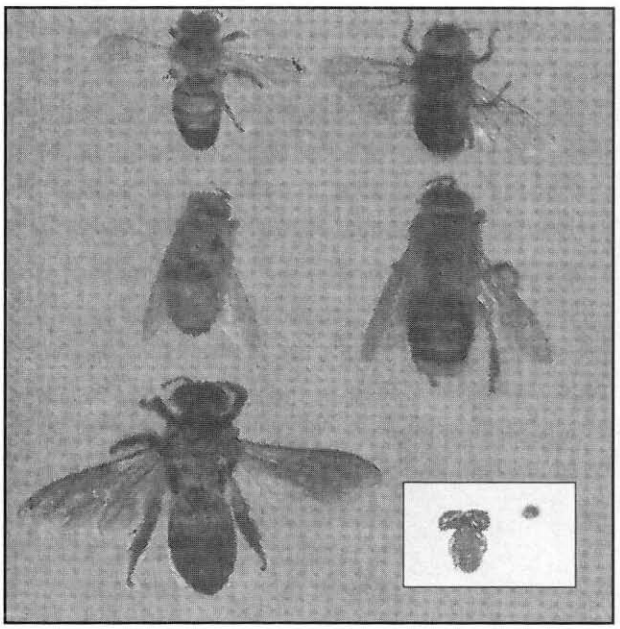
be divided into three distinct bands running the length of the country. The southernmost band, called the Terai, is comprised principally of tropical lowlands once covered by dense jungle; the Terai has now been extensively logged and converted to agriculture and scrubland. The Himalaya is the northernmost of the major physiographic regions and is world-renowned for its snow-capped mountain peaks—including eight of the ten highest peaks on the planet! Outpost communities in the region are home to herders of the high mountain passes and stopping points for trekkers and traders. Transition zones from each of these areas grade into the central Pahar or mid-hill region of high valleys where moderate temperatures and rainfall support the remains of temperate forests and approximately half of the country's population. And quite a population it is! The country is approximately the size of the state of Iowa or about 4.5 times the size of Vancouver Island in British Columbia where I currently reside. However, the country is inhabited by over 21 million people—about three quarters of the population of the state of California, which is about three times its size (and also about three quarters of the population of the entire country of Canada—which is just over 70 times the size of Nepal!).



After all comb has been transferred into a frame hive, the new hive is placed in the same location as that previously occupied by the fixed comb hive to assist bees in orienting to their new abode. Bees remaining in the log hive are dumped on a mat in front of the hive to transfer young bees not yet skilled in flying. The old hive will be removed so as not to mislead colony members and will later most likely be used as a trap hive in the upcoming swarming season.

In addition to the myriad diverse landscapes and cultures which are found in Nepal, the country's varied ecosystems are home to five of the seven or so species of the genus *Apis,* the honey bees. Of these, the well-known *Apis mellifera* is present as an introduced species—confined primarily to the lowland Terai and mid-hill regions—the rest of the species are native to Nepal. *Apis florea*, the little or dwarf honey bee, is a little over half the size of *Apis mellifera. Apis florea* nests are single-comb affairs usually sited in trees, dense brush, or cavities. They are exploited only to the extent that they can be easily robbed of their honey stores, when discovered, because the bees are not easily incited to sting. Colonies of the giant honey bees, *Apis dorsata* , and the closely related *Apis laboriosa* (which some taxonomists believe should be considered a race of *Apis dorsata*) also each produce a single, exposed comb. However, while *Apis florea* colonies produce a comb whose face is about the size of this magazine's cover, the latter two giant species each produce their comb roughly half the size of an average door. Lastly, is the species with which I had the most experience while in Nepal, *Apis cerana,* variously referred to as the eastern honey bee, the Asian hive bee, the Indian honey bee or the Himalayan honey bee. Aside from the smaller size—both in terms of the individual bee and the colony (i.e. total population and the resulting lesser number of combs in the nest)—the bees were very similar in behavior to the western honey bee. However, *Apis cerana* is quite distinct from *Apis mellifera* in being well-adapted to the Himalayan region. A number of development organizations working in Nepal are committed to preserving and promoting beekeeping using *Apis cerana* both as a means of income for villagers and as a valuable biological resource for beekeepers throughout the world. I was able to spend time with extensionists from two of these organizations: the International Centre for Integrated Mountain Development (ICIMOD) and the United States Peace Corps.

Shortly after arriving in the capital city of Kathmandu I had the opportunity to visit the offices of the beekeeping section of ICIMOD and to visit their demonstration apiary in the nearby village of



From top to bottom and left to right: *Apis cerana* worker and drone, *Apis mellifera* worker and drone, *Apis laboriosa* worker; inset shows a pseudoscorpion and a varroa mite—the tantalizing possibility exists that pseudoscorpions pick the smaller varroa mites from the bodies of the bees whose nest space they share, thus assisting in keeping down the population of the potentially harmful parasite. Images shown at 1.5 times actual size.

Godawari. While there I was able to speak with a number of the staff members:

•Dr. Uma Partap is a biologist who has worked extensively in pollination mediated by Apis cerana. Much of the country's agriculture depends upon grass crops: rice, millet, corn and fodder species for goats and dairy cattle (including buffalo and yak components). Moderate construction needs are often served by bamboo, another grass species. Since these commodities are all wind-pollinated, the need, and indeed the opportunities, for bee culture is somewhat limited. However, many development projects in Nepal strive to improve local nutrition by promoting vegetable crops—which may require insect pollination. Uma has assisted in developing an inventory and management handbooks and manuals for crops grown in the mountain regions which will benefit from *Apis cerana* pollination (a complete list and ordering information of these and other publications are available at ICIMOD's website).

•Aniruddha Nath Shukla is an apicultural extensionist who oversees the Centre's demonstration apiary. He gave me a tour of the apiary—which features *Apis cerana* hives and honey production equipment of various designs appropriate to conditions in different parts of the country. Aniruddha, in cooperation with the Netherlands Developmental Organization Beekeeping Training and Extension Support Project (BETRESP), also offered guidance in the founding of a workshop manufacturing beekeeping equipment. It is now a thriving private enterprise and is forming a consortium for collecting and marketing locally produced hive products. He is currently in the process of completing a beekeeping manual in Nepali for use by extension workers.

• Dr. Naomi Saville is a zoologist who has worked in apicultural development in the Caribbean, Africa and Asia as a researcher and extensionist. She has tested and improved a number of appropriate-technology hives in Nepal, focusing on both their technical merits and their suitability from a cultural perspective. Most notable is her use of 'participatory approaches' and 'participant observation method' with local beekeepers in the very remote district of Jumla. Here, they developed an improved log hive incorporating top-bars, which is more fitting for the area in which she works because of the availability of building materials, insulating properties, and cultural acceptance of the design. Naomi is also very active in promoting beekeeping as a means by which women can improve their economic standing with a minimum of labor or other investments.

ICIMOD extension programs aim to identify and train individuals in the community who will serve as resources themselves once they have participated in the development-process. The staff discussed with me the philosophical and technical difficulties that can beset such a program. Of foremost importance is that community members be considered as partner participants in development rather than "recipients" onto whom western techniques and technologies are be- stowed. All too often in "top-down" development programs indigenous knowledge and the time-tested traditional methods of doing things are considered inefficient and inferior to western practices. When programs are implemented with such an approach, the results can be disaster instead of development.

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Naomi outlined a history to me, the results of which I myself have witnessed in numerous other countries. With all good intentions another western development organization introduced *Apis mellifera* to the Jumla region in the western part of Nepal in 1993 along with frame-hive technology and all the accoutrements. However, *Apis mellifera* is maladapted to the conditions found in this high, remote mountain region and the numbers of colonies introduced were not enough to establish a self-sustaining breeding population. By 1996 the *Apis mellifera* colonies imported into the region had died out—in large part due to their being ill-suited to the cold, harsh environment.

The other major contributing factor in their demise was the effect of brood disease that had been imported to the area along with the colonies. Tracheal mites, varroa mites and the African hive beetles are maladies of which most North American beekeepers are aware. All have become problems to them because of inappropriate importation of honey bees and the pests they carry. Likewise, in the Jumla area, a bacteria, *Streptococcus pluton*, which causes the disease European foulbrood, was the undesirable tag-along brought in with *Apis mellifera.*

The extinction of the imported *A. mellifera* was just one in a cavalcade of catastrophes:

• European foulbrood spread to the indigenous *Apis cerana* causing a serious decline of colonies in the region.

• There is some overlap in the range of sizes for *Apis mellifera* and *Apis cerana* with smaller races of the former (such as the source of the "africanized" strains migrating through California, *Apis mellifera scutellata)* being of a comparable size to the larger subspecies of *Apis cerana cerana* found in the Jumla region. However, frames and other hive equipment brought

The author, beekeeper Dal Bahadur Limbu, and Shreehari Thapaliya, showing transferred comb. The frame held by the author shows hammock-style cradle which results in greater support of the comb against the top-bar which will facilitate repair by the bees. (photo by author)

in for use with *Apis mellifera* were too large to properly maintain *Apis cerana;* top-bars (accommodating the width of an average comb plus a bee-space) for the latter should be 2.9-3.2 cm wide as opposed to 3.7 cm for European strains of *Apis mellifera.* Rebuilding this equipment to the appropriate size or making new, scaled-down frame hives would have required tools and milled wood not practically available locally.

- Frame hives require the use of an extractor to justify the expense of using frames rather than top-bar hives—and the cost of such an extractor can easily exceed the yearly income of several rural farmer/beekeepers.
- The diseases and problems with frame equipment caused a significant credibility problem for development work following in the wake of the fiasco.

Eventually, with much hard work to correct the injudicious actions of others, ICIMOD was able to regain most lost ground in their apicultural development program. A cornerstone in the development strategy of ICIMOD is a benevolent "pyramid scheme" in which key members of a community participate in a beekeeping training course. The participants may be government personnel, development workers of non-government organizations, farmer-extensionists or beekeepers who are expected to transmit the information they receive at the training course to other members of their communities. Since 1996 ICIMOD has conducted 17 "training the trainers" courses with a total of 226 participants. This program resulted in or was supplemented by "grass roots" training of 1,623 individuals during 99 training courses. Training included modules on medication and management to assist in the recovery of the decimated *Apis cerana* population. I was able to see first-hand the results of similar training organized by a volunteer of another development agency, the United States Peace Corps.

Before leaving for Nepal, given the difficulties of international communication, it had proved impossible to arrange an itinerary. In fact, even after arriving in Kathmandu it was somewhat dicey using the in-country phone system to attempt communication with the contacts who had been suggested to me by John Ladley, associate director for Natural Resource Programs of the U.S. Peace Corps in Nepal. After several episodes of downed communication and crossed lines, I was finally able to contact a Peace Corps volunteer Elizabeth Hobson, working with bees in the area of Terhathum in the eastern part of Nepal. Although she was very busy tying up loose ends as she finished her two years of service and prepared to return home in two weeks, Liz very graciously agreed to host a short visit from me and my wife, Maura.

We arrived in Terhathum in what we were told was near-record time. We had made the transfers from the large "night bus" that left Kathmandu to a smaller "local" and thence to a land rover in such quick succession that we shaved several hours off the usual travel time. We completed the journey of approximately 450 kilometers (275 miles) in "only" twenty-two hours of travel. An average of 20 km per hour (12.5 mph) is the norm, given the delays encountered along the only two-laned paved highway that spans the country. Frequent stops are necessary to wait for traffic accidents to be cleared or for repairs to be made where landslides have blocked the modest secondary roads of packed earth as they snake their way into the mountains, sometimes skirting formidable precipices. Perhaps oddly, we did not feel as elated to have broken the record as we were to get out of the last vehicle. Difficulties in transportation can have a profound impact on beekeeping. In North America, beekeeping equipment, and even bees themselves, are routinely shipped by mail or couriers. This is presently impossible in Nepal; bees must be obtained and equipment constructed on a local basis. In mountainous terrain where beekeepers may be separated by a hike of several hours, or even several days, this can further impact the type of hive technology employed. Where it would be necessary to carry a jointly-owned honey extractor on a porter's back from beekeeper to beekeeper, it is easy to understand the logistical and economic advantages favoring top-bar hives.

In spite of our road-weariness, we very quickly settled into our new surroundings, thanks to our hosts' good graces, and began getting acquainted with the folks we had come to visit. Liz is a native of Virginia who was assigned to a soil conservation project by virtue of her Master's degree in Resource Management. Peace Corps volunteers share their technical expertise for a tour of duty of two years in which they attempt to transfer at least some of their skills to host national extentionists or community leaders who will serve as resources in the community after the volunteer has returned home. During the course of her service Liz began two notable secondary projects, beekeeping and marriage. Liz met the man who was to become her husband, Shreehari Thapaliya, through a mutual friend who worked at the Peace Corps training center. Shree's gentle nature and good humor, exemplary even amongst the friendly and hospitable Nepali peoples, belie his family's roots in the Chettri caste from whence the rulers of the assorted kingdoms in the area traditionally drew their warriors. Shree's experience in his family's construction business had given him skills that naturally complemented his wife's in assisting local beekeepers improve their hives. The couples' knowledge and personableness garnered close relationships with the community to which they welcomed us—which allowed a much closer perspective on beekeeping, and Nepali culture in general, than we would otherwise have been party.

****Part II of Conrad Bérubé's Himalayan* Ceranaid *will be printed in the October issue of the* American Bee Journal.

LOG HIVE, NEWTON HIVE, STRAW HIVE AND WALL HIVE
This wall hive entrance has been festooned with thorns for protection against raids by the pine marten. The hives have been placed on this balcony-platform to afford some protection from theft, and the pine marten. A wall hive can be discerned on the right by a festoon of thorns provided as further protection against raids by the pine marten. (photo by author)