

Beekeeping in Ghana

On the road in Africa doing developmental beekeeping demonstrations

Part 1 of Two Parts

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From mid-September to mid-October of 2002 I had the honor of serving as the first volunteer to Ghana in the Farmer-to-Farmer (FtF) component of FarmServe Africa, one of the U.S. Department of Agriculture's overseas aid programs. The Farmer-to-Farmer program offers technical assistance to countries in which the United States funds agricultural development. The assistance is provided in the form of technical professionals, who must be U.S. citizens, who serve for at least one month on a project requiring relatively advanced assessment and technical transmission skills. A couple of decades ago I had worked as a Peace Corps volunteer in rural beekeeping extension in Ecuador and thereafter was hired as a technical trainer for Peace Corps beekeeping projects in a number of countries in Latin America. Since then, I have become an entomologist and continue to keep several hobby hives including a Kenya Top-Bar

Hive (KTBH)—and persist in believing in the great potential that beekeeping can play in grass-roots development. It had been several years since I last traveled internationally (see "Himalayan *cerana*id: development assistance to preserve and promote *Apis cerana* beekeeping in Nepal," *American Bee Journal*, September 1999 at <http://nanaimo.ark.com/~cberube/nepalbee.htm>). So the e-mail request for assistance for a beekeeping project in Ghana that was passed along to me by a friend in the spring of 2002 seemed very attractive.

Several months after submitting my application and credentials I heard back from the offices of Opportunities Industrialization Centers (OIC) International in Philadelphia; OIC is a non-governmental organization that manages the FarmServe Africa Program, coordinating the activities of overseas subsidiaries in 17 African countries. With surprising efficiency, in comparison to my previous experiences in traveling to the developing world, my visa and airline tickets were in hand and I was winging my way to Ghana. Upon

my arrival in the capital city, Accra, I was met by Carla Denizard, the Haitian-American country representative for the OIC Ghana country-headquarters and Samuel ("Sammy") Arku Kelly, agricultural officer. A few days of project briefing brought me up to speed on the project and afforded me an opportunity to practice the niceties of eating fufu. (Fufu is one of a number of dough-like staples that are served hot with "soups"— actually more like stews; one tears off a small piece of the mass, dips it into the soup with one's fingers and then scoops the savory morsel into one's mouth. The operation was occasionally messy to my unskilled hand, but I found was invariably delicious.) Carla and Sammy explained that there are four branch offices in Ghana including the office to which I was assigned: OIC Tamale (OICT). OICT amongst other programs, administers an integrated program for Food Security. The program provides village-level assistance in production, processing, post-harvest loss reduction, micro-credit/micro-enterprise development and water and sanitation training. After a brief tour of some of the projects and sights in Accra, Sammy and I embarked on the 700 kilometer journey to Tamale—which afforded plenty of time for him to fill me in on the details of the project on which I was to work.

The beekeeping project involves aspects of production and processing improvement that is supported by a rotating credit program: groups that are interested in tending bees can receive loans of hives and protective equipment; from the



Conrad Bérubé (top right hand photo) and Mohammed Ali (the beekeeper, not the boxer), shown in the bottom left photo, visited 23 client community apiaries and conducted training sessions, both in the field and at a 5-day short-course held at the OICT training Centre.



Most rural Ghanaians live in villages in huts constructed from daub and wattle. The sense of community is very strong in the villages and people often share in tasks such as fetching water or pounding fufu.

proceeds of honey and wax production they pay back the value of those materials and the money goes back into the credit fund to be used in other communities or other projects. The project serves women's cooperatives in 23 communities surrounding the city of Tamale in the dry-tropic Northern Region of Ghana. Kenya Top Bar Hives have been distributed to and apiaries have been established in all communities. About half of the communities have participated for two years in the project, the other half having participated only during the past year.



OICT technical advisor, Dr. John Azu, has inspiring thoughts about development: "We have to work with each other, like the bee, in a social cohesion that brings together a lot of mastermind thought—for the mind is capable of achieving whatsoever it desires."

The ultimate intent of the project is concisely summarized in the name: "Higher incomes for beekeepers through the application of improved honey production techniques". The objectives of my particular visit were to assess the current beekeeping skills level of clients and Polycovaleant Community Facilitators (PCF's). (The PCF's are OICT extensionists trained to deliver core technical support across a variety of disciplines essential to improving standards-of-living.) They identify appropriate targets for technical advancement as prerequisite to the delivery of training to clients and PCF's. They facilitate the building, in the client group, of the capacity to complete the overall project objectives by providing to both clients and PCF's—supervision/guidance in selection, establishment, and management of appropriate apiary sites; train-

ing in harvesting, extraction and packaging techniques; resource and training materials.

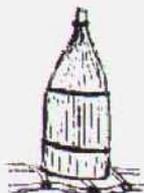
The road from Accra to Tamale is rough in places—particularly when it passes through towns. There the roads are usually not paved at all, presumably to force vehicles to slow down to afford some measure of safety to the pedestrians, foot carters, and bicyclists, not to mention the chickens, goats, dogs and cows, that also use the thoroughfares. Along the route vendors hawk beverages, prepared food and fresh produce: everything from pineapples and cassava to surprisingly large edible snails whose shells were about the size of soda bottles. We stopped a few times to replenish ourselves on roasted guinea fowl and fried plantain and sweet potato, covering the 700+ kilometer distance in a fairly respectable eleven hours of road-time. We passed from the large metropolitan sprawl of Accra through towns, farmland, and tropical hardwood forests until we entered the savannah area of the Northern Region, of which Tamale is the capital.

Most people (60-70 percent) in the Northern Region live in villages and pursue a subsistence agricultural lifestyle with few modern amenities (electricity and plumbing are rarities outside the city). The villagers of the surrounding countryside produce cattle, goats, cotton, shea-nuts, and groundnuts (peanuts), amongst other things, which are processed by Tamale's 210,000 or so inhabitants. Although I had been prepared to stay in the traditional daub-and-wattle round huts my attitude is probably considerably more flexible than my spine is these days and I was somewhat relieved when circumstances proved otherwise. As it turned out, all of the client villages are within an hour or two of Tamale, so it was possible to stay in the town and conduct day-trips to the surrounding communities. Dr. John Nene-Osom Azu, the program technical advisor for OICT, kindly offered me (air-conditioned!) accommodations in his residence near the program office in Tamale. (Several other staff members who rotated work on projects in different areas of the country were also taking rooms at the house, so I had plenty of opportunity to make friendships and discuss technical concerns.) John rather reminded me of an older, more intellectual and stately version of Wesley Snipes and it

was not at all surprising to find that he was born of one of the royal houses of the Krobo, an ethnic group from the southern portion of Ghana. John received his doctorate in plant physiology from the University of Guelph in the 1970's—at about the same time that a team from that university was working in East Africa to develop the Kenya Top Bar Hive, or KTBH. He and I both have far-ranging interests and we shared a number of interesting conversations beginning what I hope will be a long-lasting friendship.

Amongst the topics of our discussions were the important roles that bees have played in the culture of western Africa. Brass work from the region is created using the "lost-wax" method of metal casting. In such casting a sculpture is created out of wax and is then encased in plaster. The plaster is then heated to melt the wax, leaving a cavity into which molten metal is poured to recreate the original sculpture in metal. Batik is a traditional African method of dyeing cloth. Wax is painted or blotted onto fabric and then the fabric is dyed. After dyeing, the wax is removed by boiling the cloth. Prior to the availability of paraffin, both metal casting and batik was done using beeswax as a raw material. In addition, it is estimated that during certain months of the year about 80% of the caloric intake for some of the forest-dwelling pygmies of central and western portions of the continent may have been derived from the consumption of honey, pollen and brood from hunted honeybee nests, food sources that were certainly used by other peoples in west Africa as well, though, most likely, to a lesser extent. In many parts of western Africa honey is used to produce honey beer—but this was not the case in any of the villages that I was to soon visit. Instead the predominant use for honey in the Tamale area was as a sweetener for morning porridge and as a cough syrup or medicine.

Traditionally in Ghana and throughout sub-Saharan Africa, honey was, until relatively recently, considered a bush product and even to the present-day may be gathered from wild nests using little more than smoke, cover of darkness, a knife and a daredevil attitude to obtain the harvest. Minimal protective clothing is usually the norm because bees tend to sting more when they get caught under garments and pressed against skin, and bulky clothing



Bee-culture has played an important role in the culture and economy of Western Africa. Honey has traditionally been an important food item and has documented efficacy for both internal and external medical applications. Bee products have been harvested from wild nests and a variety of traditional hives in Africa for millennia. Wax has been used in traditional African crafts such as batik dyeing and lost-wax metal casting.



which might protect one from stings would also impede one's climbing into nest-trees and increase the risk of a fall. Slapping the skin to numb oneself to stings is a common technique for primitive honey-hunting. Harvesting is done at night, when bees do not fly as readily—although the bees will fly to a source of light, such as the grass torches used during harvesting, but will usually, like moths, navigate themselves right into the flame. The torch is sometimes passed several times under the comb, killing, dislodging or stupefying a great number of bees. (If one is using flashlights, as we were to do on several night raids, the flashlights should be propped up a small distance away from the nest in order to keep those few bees that will take flight off of the harvesting crew.) Usually the entire comb is harvested and squeezed out, to yield honey that is dark, watery and contains much pollen and other impurities. The introduction of the Kenya Top Bar Hive to the area allowed the production of much higher quality honey without requiring a great deal of additional technical skill nor investment of capital while at the same time allowing for significant returns on the labor that could be invested.

The day after my arrival in Tamale, John showed me around the OICT offices and introduced me to the field staff. This included making the acquaintance of

Mohammed Ali (in his words, "the bee-keeper not the boxer"), a local honey producer that OICT had contracted to assist me with translation and technical support during my stay. Given the short duration of Farmer-to-Farmer exchanges it is essential for the FtF volunteer to concentrate efforts on "training the trainers". Fortunately, for my own experience, Mr. Ali (or simply "Ali" as he prefers to be called) and the 14-member cadre of OICT's Polycivalent Community Facilitators are very competent and well trained in their respective areas. Because of their familiarity with a formal education system, much background material could be conveyed to them through technical literature.

As regards appropriate reference materials, an excellent resource already exists in the form of *Small Scale Beekeeping* by Curtis Gentry and published by the U.S. Peace Corps Office of Information Collection and Exchange (and also available at: <http://nanaimo.ark.com/~cherube/toc.htm>). I delivered a copy of this public domain "how-to" manual to OICT upon my arrival and a copy was reproduced for each of the PCF's along with a set of self-study questions and some sets of mini-flipcharts that can be used to convey the information contained in the manual. I expect that any of the PCF's who peruse the technical materials given to each of them will be able to address clients' tech-

nical questions regarding basic beekeeping. However, it is my experience that it is usually not worthwhile to attempt to make beekeepers out of people who are intensely averse to being stung, or who just don't seem to be subject to the allure of apiculture. Thus, it was expected that many of the PCF's would not actively participate in hands-on training with bees and subsequent beekeeping extension—and this proved to be the case; only two PCF's participated in actually handling bees during training sessions. However, Ali was very enthusiastic and extraordinarily helpful and we learned many things from each other which we were able to share with the members of the women's cooperatives—who were more willing to risk the pain associated with the gains that beekeeping offers.

Ali and I made field visits over the course of two-and-a-half weeks to all 23 communities involved in the beekeeping project in order to assess current skill levels and to gather baseline data on management practices, annual income from bee products, current uses and quality of honey, and cultural aspects associated with bees and beekeeping, such as folklore or taboos. Ghana has a very rich cultural heritage and, as a former British colony, English has been adopted as the official language of Ghana to allow some common means of communication in a land with



Examining Kenya Top Bar Hives



(Above) A very good apiary site with good shade and easy access was improved further by arranging Kenya Top Bar Hives into two circular configurations; in the smaller, inner circle the hive entrances face inwards, in the larger outer circle the hive entrances point outwards. This creates a zone between the circles where people will be less evident to the bees, thus reducing stinging incidents during apiary maintenance and hive manipulation.

nine major language groups contained in an area only slightly smaller than the state of Oregon. Thus, most folks in the larger towns and cities speak English. However, at the village level, local languages prevail—Dagbani being the tongue spoken in the area around Tamale—such that even a Ghanaian extensionist may need a translator when working beyond the range of his or her own local language. To shamelessly mix metaphors, as in most countries where English is the lingua franca, it has acquired its own unique flavor and I was frequently challenged to re-tune my ears to Ghanaian pronunciation. This led to several amusing misunderstandings.

One of the office assistants, Afe, was curious about the slogan on the bee-embazoned T-shirt I'd worn on several occasions. She asked me "What does it mean

(Below Left) Although it was not honey harvest season during my visit, training exercises to remove wild nests at the training center provided the opportunity to practice comb transfer and improved honey processing techniques.

(Below Right) Training materials developed and delivered to OICT included newsprint flipchart, mini-flipchart presentations and *Small Scale Beekeeping*, a complete "how-to" manual by Curtis Gentry published by the U.S. Peace Corps.



on your shirt 'Beekeepers do it for the booze'?" I had to explain to her that phonetic spelling to the contrary my shirt actually said 'Beekeepers do it for the buzz'—but in a region where honey is often used in brewing honey beer perhaps Afe's motto works just as well...

As the result of our field visits I learned of several taboos about "honey tapping" (nest robbing/honey hunting):

- The grass torch used to pacify bees during honey tapping should not be put on the ground during the operation in order to avoid attacks by bees. (That makes sense; you wouldn't want to be caught without your source of smoke ready at hand.)
- Bees should be driven from comb by smoke rather than killed by flaming to encourage a bountiful harvest in the future. (This is a necessary realization to make the transition from bee hunting/killing to beekeeping.)
- A libation of honey should be offered to the spirits of the forest to ensure a bountiful harvest in the future. (It seems rarely a bad idea to express ceremonial reverence.)
- One shouldn't defecate before harvesting honey—otherwise one will find much propolis in the hive and little honey.



(This probably reflects a folk belief that propolis contains, at least in part, honey bee fecal material; this is, in fact, not the case but is an understandable misconception given the fact that animal manure is an integral component of the adobe-like material traditionally used for building huts. Another prominent social insect, the termite, actually does use its own excreta as a building material and it is thought that the design of termite mounds may have influenced some types of traditional architecture.)

- One should not eat honey harvested in the bush until at home—it is believed that someone doing so will not survive if bitten by a snake. (This seems like a cautionary tale that would encourage sharing of the harvest as opposed to on-the-spot consumption.)
- It is believed that a sting to the nose will be fatal. (Oh-oh, I guess that means I'm going to die, since I've been stung on the proboscis a number of times—luckily, the effect seems to be one of protracted delay...)

I also learned several local fables:

- Rooster and Elephant quarreled over



In a typical village in the Northern Region of Ghana, villagers during the harvest of groundnuts (peanuts) spent many hours chatting and shelling the nuts for market. A typical problem in the apiaries was hives that were too close together, haphazardly arranged and left empty and untended for too long such that ants or other critters took up residence.



Termite mounds are a ubiquitous feature of the Ghanaian savanna. Their buttressed form probably influenced the traditional architecture exemplified in the ancient mosque of Larambanga, which in turn influenced the monumental mausoleum built in the capital city of Accra for Ghana's first Prime Minister Kwame Nkrumah. Although the mound-building termites subsist on fungus grown in "gardens" of the termites' excreta, subterranean termites can cause significant structural damage to beehives.

the hand of a young girl. They assembled armies to fight one another; Elephant choosing all four-legged animals as his allies and Rooster choosing all flying animals. Rooster won the hand of the girl as the bees fought aggressively on his side.

• He-goat was harvesting honey when Wolf came along and demanded that Goat forfeit a tribute of flesh because Wolf was hungry. He-goat gave the wolf some honeycomb saying they were his testicles. After Wolf had eaten the offering the predator announced that he was going to eat all of He-goat because surely the rest of the billy's flesh would be as delicious as the first tidbit. Just then, Rooster happened along with his fiery comb erect like a crown of flame, crowing like a banshee and scared Wolf away. He-goat and Rooster have been friends ever since.

• When the world was young and the nature of things still being set, Bee left his son in charge of his wife while he went away on an extended journey. Upon returning home he found his wife was pregnant and assumed that his son had lain with his mother. The son denied this and said that it was Man who had cuckolded him. The bee then stung the first man in his testicles and since that day men have been subject to testicular hernias.

The first story reflects the renowned ferocity of African bees when disturbed. Africa's varied ecosystems have led to the evolution of distinct races of *Apis mellifera*—most of which are highly defensive because of the wide variety of natural enemies with which they have been challenged from time immemorial. Ants, wasps, spiders, scorpions, lizards, rodents, birds, honeybadgers, and apes (including ourselves and our hominid ancestors) will attack individual bees or entire colonies and, through natural selection, have skewed the disposition of surviving subspecies towards ill temperedness. One of the nastier strains is *Apis mellifera scutellata* which inhabits the central and eastern portions of Africa; imported to the New World it was bees of this race which

escaped from breeding trials in Brazil in 1956 and subsequently spread throughout the tropical zones of South, Central and North America. *Apis mellifera scutellata* has, to many people, come to be thought of as "the African honey bee". However, the bees along the western coast of Africa, are classified as *Apis mellifera adansonii* and they are at least as irritable as their more publicized cousins. Smaller than the European bees with which most U.S. and Canadian beekeepers are familiar, *Apis mellifera adansonii* bees will sting with less provocation, with a greater proportion of the colonies' population, around a greater distance from the nest and for a longer duration than will European bees. In short, they're just nasty.

The second and third stories, both of which associate bees with male gonads are only slightly more obtuse. Anyone who has ever seen the backside of a buck goat will be hard-pressed to deny that the pendulous testicular pouches do, in fact, resemble, in outline, the hanging combs of a natural honeybee nest. From there it's just a short intuitive jump to create a mythic association of the stinging pain of testicular hernias with some alleged injury done to the First Bee of fable (although the story errs, of course, in ascribing to male bees the ability to sting). The KTBH takes advantage of the pendulous form of natural honeycomb.

A team from the University of Guelph developed the KTBH in the 1970's using basic concepts established for traditional horizontal hives used in many parts of Africa. Usually such hives are cylinders of bark, hollowed logs or woven reeds or grasses from which honeycombs can be removed without destroying brood combs—thus allowing for the continuance of the colony. However, these are fixed comb hives which do not allow for the manipulation of brood combs that is a requisite part of true beekeeping—thus traditional hives allow only "bee-having". The KTBH, in contrast, involves the use of individual strips of wood with central

guides to encourage the bees to build straight combs. The body of the hive is trapezoidal in cross-section—which allows the bees to build comb in its natural "V" shape without the need for them to attach the comb to the sidewalls for the additional support required when rectangular comb is constructed. Since top bars are kept flush together when a hive is being inspected and a comb is removed from the hive, there is only one slot on top from which bees can emerge—making it easier for the beekeeper to control the colony. (For more information and plans for the KTBH see "The Kenya Top Bar Hive as a Better Hive in Developing Countries," *American Bee Journal*, August 1989 at <http://nanaimo.ark.com/~cberube/ktbh.htm>) It was these types of hives, 30 to 50 per group, that had been distributed to the cooperatives.

The KTBH is more appropriate than the Langstroth hive for the storage habits of *Apis mellifera adansonii*. One of the principle differences between the Langstroth hive and the KTBH is that the Langstroth hive allows for rapid expansion of honey storage capacity through the addition of supers. But expanding the hive capacity of African bees is not a particularly effective management strategy because of how they react to surplus stores. Before discussing storage *per se*, a brief discussion of the foraging behavior of *Apis mellifera adansonii* is in order. It is sometimes stated that bees of one or the other of African or European honey bees are more efficient foragers. Caveats ought always to be added to such statements since each subspecies is adapted to foraging under different circumstances. In general, European bees are better foragers during profuse flows when numerous plant species can be depended on to deliver pollen and nectar in a manner that is distributed regularly in both time and space; African bees are better foragers on patchy start-and-stop flows. As one would expect, temperate flows are generally of the former type and tropical flows are typically characterized by the latter pat-



Kenya Top Bar Hives allow for the construction of naturally V-shaped combs. A central ridge along the lower portion of the bar serves to guide the construction of comb.

tern. European bees do best when conditions favor group foraging, to which they are well adapted, while African bees fare better under conditions best exploited by more individualistic gleaning behavior in food collection. In general, if European and African colonies of the same size are foraging in the same area in a tropical ecosystem, the African colonies will bring in more nectar to the colony and have the greater potential for tropical honey production. However, large honey stores represent a significant attractant to the numerous pests that plague honey bees in the tropics. Therefore, African strains of honey bees have evolved away from maintaining large stores of honey and, instead, tend to convert surplus stores into increased brood production. This results in the bees' greater propensity for swarming. By conducting smaller harvests more frequently, at about the same intervals at which one would install supers in a Langstroth system, swarming can be better controlled and honey production with the KTBH can be increased.

Probably because of environmental pressures very similar to those exerted on bees, subsistence farmers in Ghana do not have a strong habit of saving—and this, I believe, has impacted economic development. It isn't easy to store crops in the tropics. Rats, ants, beetles, moths, fungi and other factors can cause significant post-harvest losses. Therefore, the faster that a farmer sells the harvest, the less are the worries that stored crops will be rotted, fouled or consumed. Unfortunately, since any given commodity tends to be harvested at about the same time, markets can easily be glutted and prices driven downwards when everyone brings their produce to market at the same time. In addition, Ghanaians have experienced a long history of expropriation of wealth through intertribal raiding, the exportation of resources by colonial overlords and exploitation by despotic governments preceding the relatively recent era of post-colonial democracy. I would hazard to guess that these factors have had a demoralizing influence on entrepreneurial spirit and the acquisition of capital. Why bother saving up material goods if something or someone is just going to come along and take your hard-

won wealth away from you? I believe this dynamic has influenced the mindset enough to impact the general ethic regarding savings—but a mind can be changed, and a changed mind is the first step in changing the world.

In one of our interchanges John Azu expressed the relationship between savings and developmental philosophy very concisely: "Ghana has had a very big problem with capital to develop. But we don't need somebody else's money to develop—we can develop by creating our own wealth through savings. Number one: you've got to save in order to create money to do business. Number two: we have to take possession of our own minds. You see all the wealth of this world is in the mind. So we have to help people to know that they are *capable*, that they can be *self-reliant*—that they can create goals, they can have plans and they can get together, like the bee, in a social cohesion that can create that force which brings a lot of mastermind thought with which you can do things." The OICT projects, exemplified in the women's beekeeping cooperatives, encourage capacity building—including the installation of infrastructure and the building of skills to properly safeguard both agricultural and financial savings—and community networking. And that kind of social cooperation offers the same benefits in human society as it does in insect societies: synergism. Synergism describes situations in which forces working together have an effect greater than would be the case for those forces exerted individually. For instance, working hives in pairs offers advantages over working singly and attempting to juggle a smoker, a flashlight, harvested combs, receiving bucket etc. with nasty bees that can make you severely regret even one fumbled motion. Two women working individually might be able to harvest only two hives per hour. Working together those same women might be able to harvest six hives in the same period of time. By developing a division of labor, individuals can specialize on a particular task, something perhaps as simple as stoking a smoker and ensuring that a beehive receives an appropriate amount of smoke: enough to keep the bees docile but not so much as to taint the

honey. The complementary task would be to inspect each comb carefully to make sure that the comb contains no brood and that at least two thirds of cells containing honey are capped. In this way, there would be improvements in efficiency, i.e. synergism, in both the speed of harvesting and in the quality of honey harvested. But John goes on to indicate that the "bee principle" to develop a social consciousness to work together must be balanced by an individualism embodied by entrepreneurial spirit: "We need to mind our own minds, wherein lies all the riches of this world. It's not a 'zero sum' game—and the wealth is in the mind and the mind is capable of achieving whatsoever it desires."

Part two will be printed in the June issue.