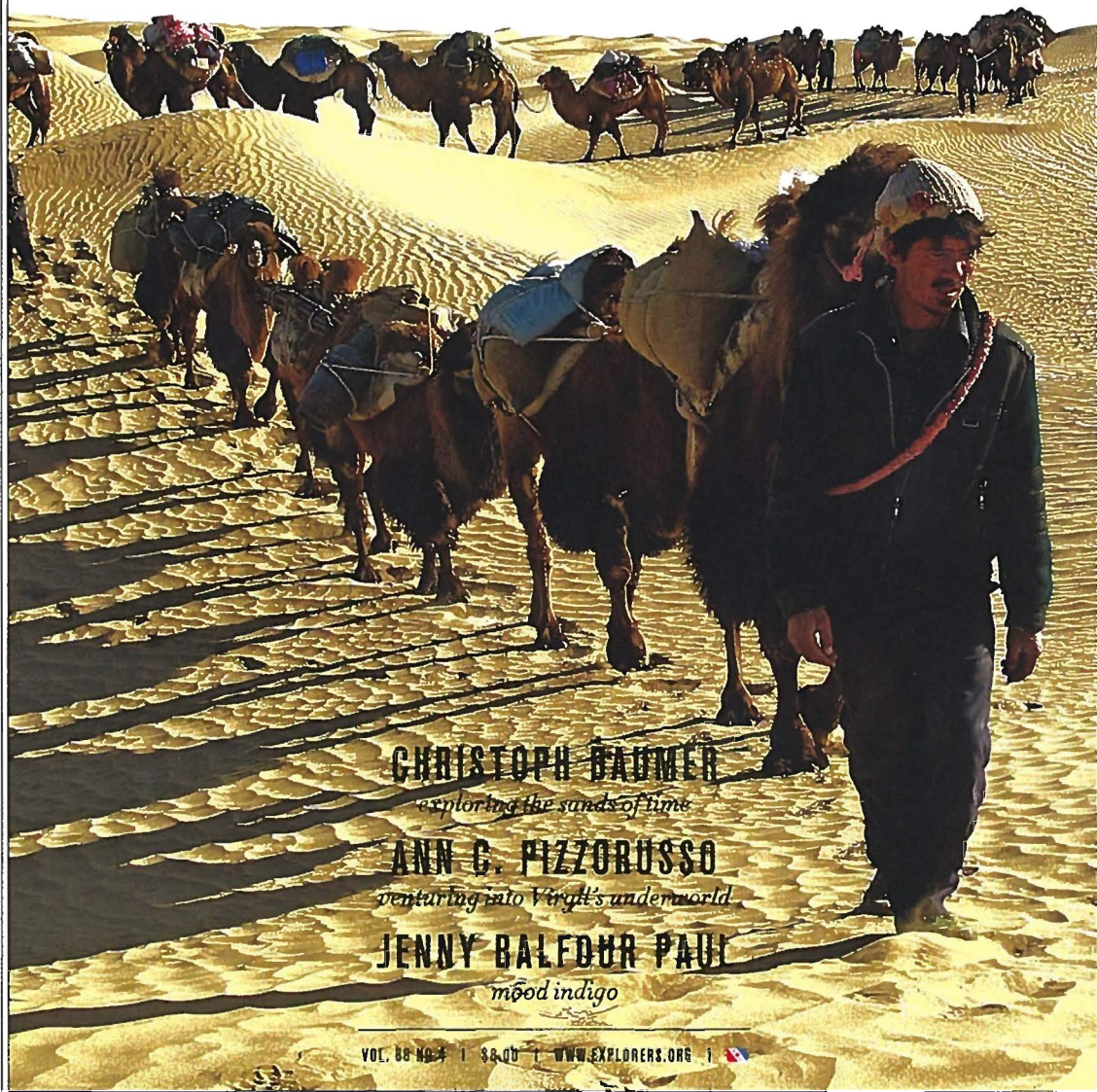


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relics

WINTER 2010/2011



CHRISTOPH BAUMER

exploring the sands of time

ANN C. PIZZORUSSO

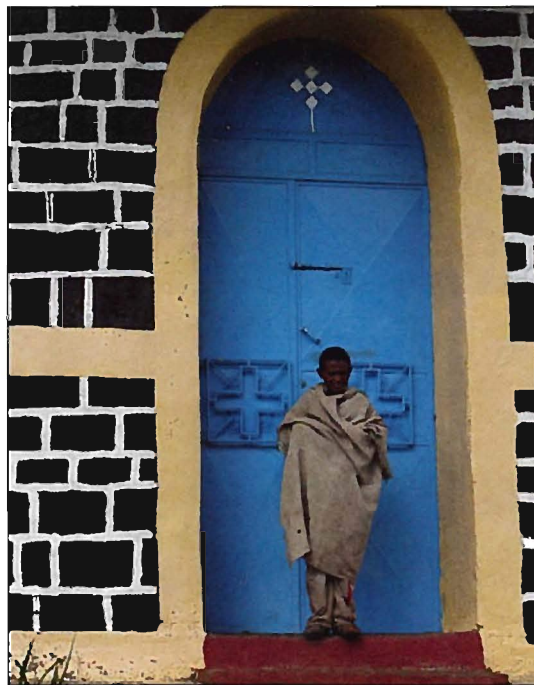
venturing into Virgil's underworld

JENNY BALEDUR PAUL

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FINDING SANCTUARY

*Saving the biodiversity of Ethiopia,
one church forest at a time*



by MARGARET D. LOWMAN

Home to the headwaters of the Nile; a wellspring of humanity; and a place thought by many to have been the fabled land of Punt—frequented by Egyptian traders who sought its ivory, gold, slaves, and myrrh—Ethiopia is endowed with a rich cultural heritage that reaches deep into human time. It is also



a bastion of one of the oldest forms of Christianity practiced today, having embraced the faith as a national religion in the fifth century A.D. Since then, Ethiopia has amassed a vast portfolio of ecclesiastical architecture, most notably in the twelfth-century rock-hewn churches at Lalibela,



A PRIEST AT DEBERESHA SHOWING THE AUTHOR A TREE THAT WAS WITHIN THE BOUNDARY OF THE CHURCH FOREST ONLY A FEW YEARS AGO.

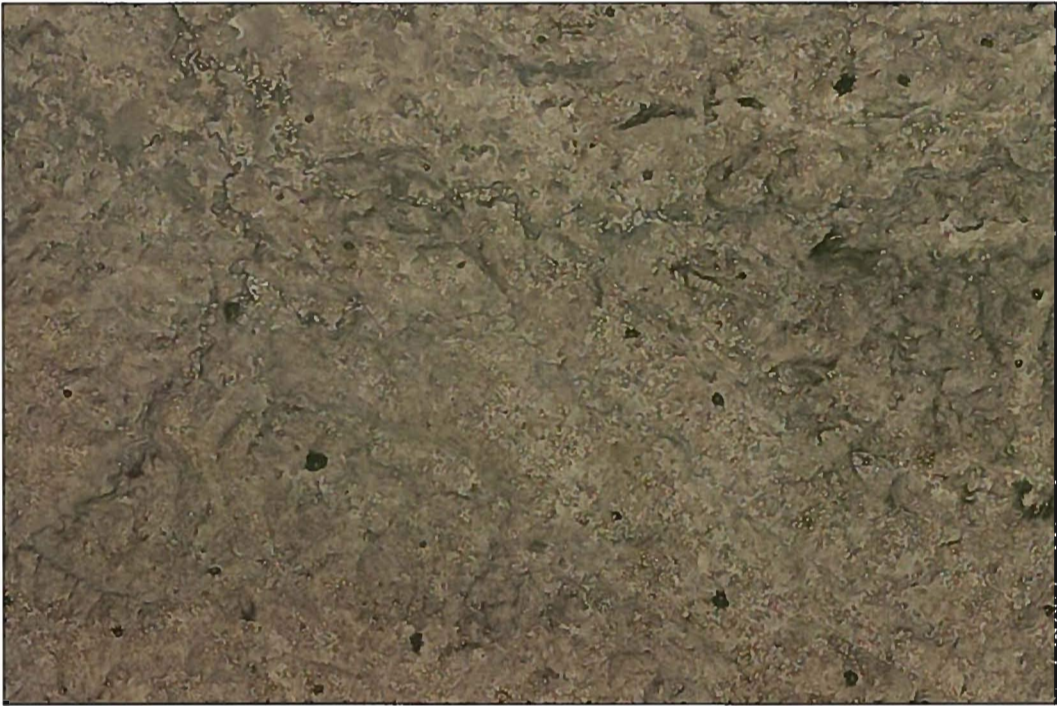
their earlier counterparts at Tigray, and the thousands of circular sanctuaries that dot the landscape, particularly in the region of Lake Tana and the northern highlands. These houses of worship have served not only as beacons of hope for the faithful, but also as the last preserves of virgin forest in a nation that has lost an estimated 95 percent of its old-growth forest to human activity—livestock grazing, agriculture, and civil strife—most of it in recent decades.

What has survived is in a fragile state and, from an ecological point of view, has remained vastly understudied until now. Knowing that these remnant green zones may very well vanish as climate extremes begin to take a toll, we have embarked on a project to reverse the current trend, sponsored in part by the National Geographic Society and the Florida-based TREE Foundation (Tree Research, Exploration, and Education, www.treefoundation.org). This past August, our team of 14, which included five members of The Explorers Club—coleopterist Janet Ciegler, FN'04, (who was awarded Explorers Club Flag #101 for the project); Robert Kluttz, SM'09; Hal Heatwole, FN'80; Phil Harpootlian, FN'10; David Jarzen, FN'03, and myself—explored the afromontane regions of Ethiopia around Bahir Dar on the south shore of Lake Tana and at Debre Tabor, a rural village 100 kilometers to the northeast.

Our goal was to survey the insect and important tree biodiversity in the last remaining forests associated with the 35,000 Christian Orthodox Tewahedo churches in the area. These church forests are local and global hot spots and are critical to the conservation of a large portion of Ethiopia's remaining biodiversity.

Groundwork for the current expedition had been laid in 2009 when, at the invitation of my local colleague Alemayehu Wassie Ashete, I first journeyed to Debre Tabor, headquarters of the Coptic bishop, to conduct a workshop on forest conservation with the local priests. Renting a generator and erecting a bed sheet in the church hall, I gave a PowerPoint presentation that showed images of the shrinking church forests via Google Earth. More than 100 men had traveled some two days each—mainly on foot—to attend the session.

The priests gasped—not only had they never seen a laptop or such an internet application, but they recognized these “heavenly images” of their individual forests and saw their church boundaries shrinking, which was clearly visible in the colored rings of soil surrounding their sanctuaries. They immediately understood that their mission of biodiversity stewardship was under severe threat. In addition, they grasped the importance of ecosystem services—how fresh water, pollinators, biodiversity, soil conservation, and their cultural/



IMAGES COUNTER-CLOCKWISE FROM TOP: FROM THE AIR, CHURCH FORESTS ARE SMALL DOTS OF GREEN, AMIDST AN OTHERWISE AND LANDSCAPE. A GOOGLE EARTH VIEW OF ONE OF APPROXIMATELY 35,000 CHURCH FORESTS THAT SPREAD IN SIZE FROM 1 TO 720 HECTARES. TYPICAL FOREST CANOPY IN ETHIOPIAN CHURCH FORESTS, FEATURING ONE OF THE GENUS FIGUS, AKA. FIG. MACRO-ARTHROPODS SAMPLING FROM THE FORESTS.

spiritual heritage depended on the health of their forests. Our partnership with the church was cemented, establishing the trust needed to make working together on forest conservation possible.


On my return, I recruited our 2010 biodiversity survey team, which had two objectives: 1) to survey the biodiversity of insects in Ethiopian church forests, creating relatively inexpensive, replicable protocols that can be utilized by local children; and 2) to find solutions for simple perimeter delineation (aka fences) to prevent further shrinkage of church forests from human activities. Further, by engaging young people as future stewards of these church forests, we hoped to utilize the church infrastructure to inspire local stakeholders to create sustainable conservation solutions.

Our decision to survey the insects was a good choice: they are always a fair indicator of the health of an area and with degradation the first creatures to disappear are large animals and birds—clearly evident in Ethiopia. The trees are the most critical component of the forest and some of the trees are especially important as sources of medicinal products. For these reasons, our efforts were concentrated on exploring the canopy and forest floor of two church forests, Zahara (near Bahir Dar) and Debresena (on the outskirts of Debre Tabor). Some of the team members climbed into the canopy, several of us sent insect traps into the canopy via rigging, others examined the lower portions of the forest and the floor where the dung beetles were carrying on their important task of cleaning the area of feces.

Working in the mountains of Ethiopia during the rainy season is challenging. Electricity and hot water were not reliable, and road conditions are treacherous. Working in the rainy season also took its toll, as walking and climbing through the rugged terrain became more and more difficult. For most of us the slipping, sliding, and cussing became part of the day's adventure, as we struggled to keep the data sheets dry and sort the insects accurately. We collected data for 5,500 insects, recorded digital images for the entire project, and along the way managed to identify nearly 200 bird species, most of which were of new to our life-lists. The trees were not enormous, but were of great interest. One in particular, *Prunus africana*, is a species in the rose family, related to plums, cherries, and peaches. An extract of the bark of this tree has been used successfully to treat benign



DOCUMENTING THE BEETLES OF ETHIOPIA

During our three-week expedition, we collected more than 5,500 insect specimens. Beetles numbered more than 1,000, with specimens representing at least 26 families. Some 465 specimens of dung beetles (*Scarabaeidae*) were found—*Heliocopris*, *Proagoderus*, and *Aphodius* being the showiest. More than a hundred 0.5-1.5-mm featherwing beetles (*Ptiliidae*), which live in dung and forest litter, flew into aerial traps, bringing the specimen yield from Zahara to three times as many as we collected from Debresena. Tallies of species found, however, show Zahara with only 20% more than Debresena. We observed differences in the two UV light collections at Debresena, carried out on the same night. The light at the church wall yielded 185 beetles, while the one in the forest yielded only six despite it appearing speciose in plants and not particularly degraded. The abundance of mobilized ants in the forest may have contributed to low beetle population. Final tallies, classification, and publication of the insects we found in these forests, however, will take years to complete; by that time they are sure to be extinct without immediate conservation intervention. 

BIOGRAPHY

Janet Ciegler, FN'04, author of *Weevils of South Carolina* (*Coleoptera: Nemonychidae, Attelabidae, Brentidae, Ithyceridae, and Curculionidae*), was awarded Explorers Club Flag #101 for the Conservation of the Church Forests of Ethiopia Expedition.

prostatic hyperplasia (enlarged prostate glands not affected by cancerous tissues). However, the collection of the mature bark for the extract has in recent years placed the tree in danger of extinction. The economic value to Ethiopia (and other African countries), however, has increased production of cultivated trees grown strictly for the removal of the bark. This practice may save the tree in the wild.

On our last day at one of the church forests, we met with the head priest, who wanted to learn about our work in more detail. We sat on stones outside his thatch hut, and, through an interpreter, told him of our project to study the biodiversity of the insects and trees. We explained how this would allow better understanding of the future of the forests, including his fresh-water springs and other precious ecosystem services that trees provide. After our presentation, the priest thanked us for the science we were doing. He appreciated our concern for the welfare of the forests that he knew and loved. But he also wanted us to know that although his "educated" followers advised him about the importance of biodiversity studies, what they really needed most from



the outside world—toilets! The inhabitants of the forests, including many young student disciples, live in twig huts and use the forests for many of their daily needs due to the absence of any toilet facilities. We felt humbled. The increasing levels of human feces had been correlated to a shift in biodiversity, most notably the fact that our ground fauna collections were almost 80 percent dung beetles specific to human waste.

One of the highlights of our 2010 expedition was the discovery that some of the churches had begun to build fences around their forests. Processing the information about ecosystem services in my workshop last year, they now understood that the church forests provide fresh-water springs, shade, biodiversity libraries, pollinators, homes for wildlife, seed sources for native vegetation, and most important, their spiritual and cultural sanctuaries. Seeking a creative solution, villagers

had hauled stones from their fields to construct walls around the church forests. In the world of conservation biology, this is a true sustainable solution, creating win-win-win. It is a win for the farmers because the fields are easier to plant; it is a win for the church forest that gets protected; and it is a win for the villagers who find work constructing the walls. It brought tears to my eyes to see their level of perception and to see how they created a sustainable solution to their dilemma. By our educating the people of the forest, especially the children, a sense of stewardship will grow and protect these forests for generations to come.

These green islands represent an irreplaceable treasure to Ethiopia and to the world. Some of us are already planning a return visit to the region during the dry season in January 2012. A closer, more detailed study of the flora and fauna is needed over several years, covering wet and

dry seasonal changes of these forests, to fully understand the nature of the forests and strategies for their conservation.

We left Ethiopia with a feeling of heightened sensitivity and in awe of the country's extraordinary cultural legacy. Yet as an emerging nation, Ethiopia may need to modify its culture to meet the needs of a growing population with declining resources. Everywhere we traveled, people dotted the landscapes, tending to their underfed cattle and hand-harvesting their crops. Despite the relative lack of Western trappings, the people of rural Ethiopia were happy and healthy-looking. We look forward to returning with latrine shovels as well as butterfly nets, and with unbridled enthusiasm to work together. ▲ ▽

B I O G R A P H Y

A Fellow of the Explorers Club since 1997, "CanopyMeg" Lowman has authored more than 100 peer-reviewed publications and six books on canopy biology. She is director of the Nature Research Center at North Carolina State University and was recently selected as a Fulbright Senior Specialist scholar to develop forest conservation action plans for India.

PHOTOS COUNTERCLOCKWISE FROM TOP: ZAHARA CHURCH; THE AUTHOR TEACHING CHILDREN TO IDENTIFY INSECTS; NEVILLE WINCHESTER SAMPLING CANOPY ARTHROPODS; TYPICAL CHURCH FOREST INCLUDING MEDICINAL TREE PRUNUS AFRICANA. PHOTOGRAPHS BY PHIL HARRINGTON.

