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(opposite side)

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Insomnia is a terrible thing if you owe Susan Drennan a column for *American Birds* — especially if you're in the middle of your fieldwork far from a large library. I couldn't get back to sleep. What could be written about birds that wouldn't require ornithological journals in which to check facts? How could I get a column done, written, during the busiest summer of my life? Suddenly the answer came: write about the field work. And, then, eureka! Persuade my graduate student (who is running the project and has most of the ideas anyway) to help me write it. After all, doing work so professors can claim credit is traditionally what graduate students are for. Unfortunately, from my perspective, this graduate student is senior enough to demand credit (as you can see from the authorship), but otherwise my solution was brilliant. Back to sleep like a baby.

So here we are in Colorado at the Rocky Mountain Biological Laboratory in a sub-alpine valley at an elevation of 9,600 feet, trying for the fourth summer in a row to outsmart a bunch of Red-naped Sapsuckers, but, as before, more often being outwitted by them. The sapsuckers seem to be keystone herbivores in the vicinity of the lab, possibly important to the survival of numerous other species. As soon as the willows leaf out in early summer, the sapsuckers begin developing wells in willow clumps. The sugary sap flowing from these wells is exploited by a wide variety of other animals, including flies, wasps, butterflies, moths, warblers, hummingbirds, chipmunks, squirrels, and occasionally sparrows, mice, and voles — often to the great distress of the sapsuckers which chase most of the sap-robbers.

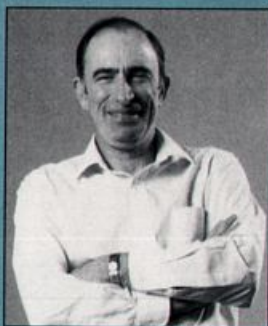
The rich sap resource, in which the sucrose concentration runs up to 60 percent, is made available at a critical time in this submontane meadow ecosystem. Many animals are attempting to reproduce and then store fat for migration or hibernation.

In addition, the sapsuckers excavate new nest cavities in Aspen each year; the old ones are later appropriated by House Wrens, Mountain Bluebirds, Tree Swallows, Violet-green Swallows, Mountain Chickadees, and Northern Flickers.

Most of that we found out in the summer of 1987 (see *American Birds*,

Paul R. Ehrlich
and
Gretchen C. Daily

BIRDING FOR FUN

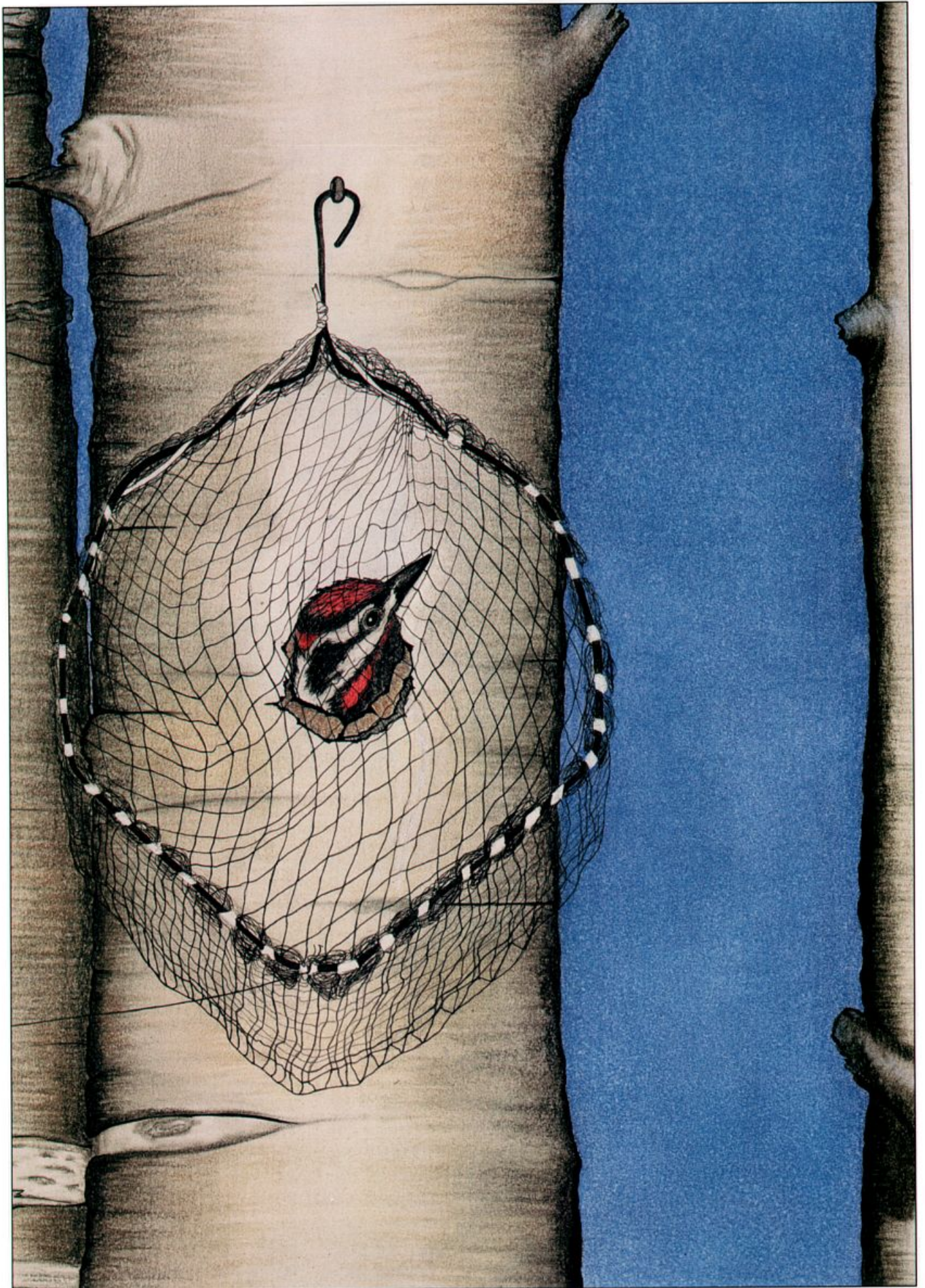


Seeking Sapsucker Secrets

Illustration by Daryl Whyte

Fall 1988). Why then are we, assisted by Stanford undergraduates Erica Fleishman and Anne Wara, trying so hard to keep up with the activities of a dozen or so pairs of sapsuckers again this year? Simple. There's a lot more we'd like to know about the sapsuckers and their role in this biological community. Indeed, every summer provides more questions along with answers. For instance, there is some sign that the pattern in which wells are drilled in willows differs between sapsucker families. Could the patterns be passed on genetically or culturally from parent to offspring? There is also evidence of use of the same set of wells by members of different sapsucker families. Is this cooperative sharing or sneaky stealing, and how common is it?

We have also found that the sapsucker system is a good one in which to study foraging strategies — that is, how animals allocate their time when seeking food. The sapsuckers are especially interesting in this respect. Like human farmers, but unlike most other animals, the sapsuckers must work to keep a flow of food resources coming; they must divide their feeding time between keeping the wells flowing and actually eating the sap. In addition, the foraging of the various sap-robbers that visit the wells can be observed with ease, permitting study of the influence of such factors as the quantity and quality of sap and the



tance. He stuck his head out and probed the net, but did not make a break for it. Ten minutes later, we decided to remove the net to permit the male to continue foraging, when he suddenly bolted and we caught him. To our dismay, we discovered that he was another of our scarce already-banded individuals; trying to keep a low profile around the nest, we had failed to spot the bands. Perhaps banded males like to excavate their nests conveniently low, assuming human beings wouldn't be so stupid as to try and catch them again. (Sapsuckers 3, Daily and Ehrlich 1.)

So we waited around for the female. And waited. And waited. And waited. The male kept returning, but no female. Finally it dawned on us: the male was a widower (or divorced), attempting to raise his brood alone. (Sapsuckers 4, Daily and Ehrlich 1.) He might have made it, too, but a few days later while Anne and Erica were watching a weasel, it made a running jump and scrambled into the nest hole. The male, sadly, kept returning with food even after the young were long gone.

We haven't been able to put in the time we'd like banding sapsuckers because there has been too much action on the main front: determining the foraging patterns of sapsuckers and robbers at the wells. We've been stymied in our attempts to observe marked avian visitors at the wells, but we've had some success with nervous but hungry chipmunks. The chipmunks typically dart from well to well within a willow clump, lapping desperately at the oozing sap, seemingly apprehensive, as if watching for the return of a sapsucker that inevitably would chase them out of the clump.

Last year we started trying to mark chipmunks to determine whether they influenced one another's foraging behavior. But we never observed more than one marked chipmunk in a clump at a

time. This year we discovered a big set of sapsucker wells drilled in a willow clump in the center of an area of high chipmunk density. Out came the "Have-a-heart" traps and peanut butter and honey to lure the rodents into them.

We put ten traps around the clump, and then settled down to videotape and record data on sapsuckers and visitors. We soon caught a chipmunk, gave it a white ear-tag, and dyed its back black (to permit identification if it lost its tag.) A day or so after White-ear was caught, we captured and tagged Blue-ear, and dyed the top of its head black.

That was it. For several days, as we sat in head nets and gloves in a haze of mosquitoes and deer flies, we were taunted by an unmarked chipmunk spending most of the "chipmunk time" in the clump. We heard the snap of a closing trap about five more times, but every time it was White-ear; he had become "trap happy." He couldn't resist the bait and had learned that the only penalty of going after it was being allowed to run out of the trap back into the clump, to the tune of human vocalizations that (fortunately) it couldn't interpret. Meanwhile, the unmarked chipmunk gnawed and scratched furiously at the closed back of the trap (the part nearest the bait inside) in plain view of us without going in!

The next day we carefully painted honey-water trails to lead chipmunks into the traps. After a couple of long hours filming and recording in the drizzle, an unmarked chipmunk approached the trap that was nearest us. On camera, it explored the outside of the trap, and then promptly disappeared inside. The trap snapped shut, to our delight, and unmarked became "Yellow-ear, black butt." But our joy was tempered by the sighting last night of yet another unmarked chipmunk in the clump along with a red squirrel, the one visitor that can dominate

the sapsuckers. Nonetheless, we hope we'll get to the point where we'll be able to observe mostly marked individuals working the wells.

That's the way research goes. Much of it is dull: waiting for hours with an aching back for *anyone* to appear at the wells, evaluating sap flow rates at the wells in the rain, bushwacking through willow clumps looking for new sets of wells, recording numbers of willow stems killed by sapsuckers, or timing feeding visits at nests. Some of it is outright unpleasant: trying to figure out why people don't obey the signs and keep their dogs leashed in the wilderness area where we sometimes work. There's nothing like a hound plunging into the clump to ruin an observation session! One can easily see the effects of human population growth in our research area. Even if only one percent of the tourists don't respect the rules, we must deal with more rule-breakers every year.

But there are the compensatory thrills: watching a beautiful mourning cloak butterfly coming in to feed; discovering White-ear's persistence in feeding even when a sapsucker is present; realizing that a male sapsucker is trying to raise his brood alone; and then trying to fit all that we learn into a "big picture" of the way nature works and how it is threatened by things like global warming.

So that's what it's like in the field; sometimes miserable, sometimes delightful, but always interesting (and tiring). We think we'll be able to answer many of the questions we're posing; and when we do we'll try to persuade Susan to let us describe our results again in *American Birds*. But for the moment, White-ear is waiting for his peanut butter ration, and we've got to go. ■

—Rocky Mountain Biological Laboratory and Department of Biological Sciences, Stanford University. Paul Ehrlich is co-author of The Birder's Handbook