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Part I: Take me back to Caroga Lake

▼ ometime during 2016 I was contacted by a guy by the name of Scott Pavelle, from the Pittsburgh area, who said he got my name from John Plischke. Scott had joined the Western PA Mushroom Club a few years previously, and now he was beginning to experience the transcendent joy of transitioning from pure pothunter to bona fide mushroom enthusiast. He wanted to put together an informal group he dubbed the Northeast Bolete Consortium (NBC). Its goal would be to gather and submit for study examples of the many interesting varieties of fleshy pored fungi (boletes) found in our eastern American forests.

It wasn't long before there were nine of us in the NBC, including Dr. Roy Halling, who kindly offered assistance as an unofficial advisor. (We have since added additional members.) We decided to make the red-pored boletes our first project, in particular Boletus subvelutipes. Each of us had observed similar morphological variations, hinting that maybe this "species" was due for splitting. Also, a few members found these boletes exclusively in oak forests, whereas my own experience up to that point in time had been to expect to see B. subvelutipes in coniferous forests, sometimes with birch mixed in. A

Dave Wasilewski

review of Charles Peck's 1889 original description indicated the presence of a type specimen stored at the NYS Herbarium in Albany, NY. But, not surprisingly, the material appeared to be in condition unsatisfactory for either DNA sequencing or for microscopy (although Smith and Thiers had provided a type study in their notable 1971 book *The Boletes of Michigan*). There appeared to be an obvious need for a new specimen to replace Peck's. This new specimen would be called an "epitype" in the botanical parlance.

The morals of this story: Hunting mushrooms for research is exciting and great fun. If you're not particularly fond of studying maps, then marry someone who is. And some things can be more important than starting the day with a cup of coffee.

Peck's type specimen was reported to have been collected near Caroga Lake in the southern Adirondack region of New York state. As luck would have it for a few of us NBC members, Caroga Lake was virtually on the way to the 2017 NEMF foray in central Vermont. So, we talked about the possibilities of meeting to hunt for *B. subvelutipes* in the same area where Peck had made his collection. Finding a mushroom at least near the location of the original type specimen and fitting the original description seemed like a worthwhile pursuit. Anything we found could be brought directly to the NEMF foray within 24 hours of being collected. Roy suggested that a well-cared-for bolete would hold up well enough for subsequent dehydration and consideration as an

> epitype. I reserved a one-night rental of two adjacent campsites at Peck's Lake Campground—named for Charles Peck's family—which is only a few miles from Caroga Lake.

My wife Karen and I met up with Scott the day before NEMF began. We got our tents set up, had a beer, whipped up some quick campsite food, checked the forested areas near the campsites, and still had enough time to explore a few areas later that afternoon and evening. We talked to the guy in

charge of the campsites, a Peck family member who said he knew about his ancestor being a mushroom scientist. He told us an Italian family had occasionally hunted mushrooms in a forest just across the road, and that we were allowed to foray in this area. The forest was a mix of hemlock, birch, beech, and maple. No oak in this area. We found some mushrooms, but no red-pored boletes. After over an hour, we moved on to Caroga Lake Campground, a state park. Although the park was closed for renovations, we were able to walk through.

At home, Karen had searched maps for additional public lands near Caroga Lake. One of these was Glasgow Trail, south of Caroga Lake. This looked really promising; a ridge of mature oak, pine, and other trees, including some hemlock. We spent the rest of the day searching high and low in these woods, and found plenty of boletes, including an Austroboletus gracilis with a deeply wrinkled cap that seemed interesting. There was a small yellow, brown-pored bolete, probably Boletus vermiculosoides; a perfect example of *Porphyrellus* porphyrosporus; some large densefleshed Sutorius eximius; and sky-bluestaining *Gyroporus cyanescens*. But the sun was getting low in the sky and not a single example of B. subvelutipes had been found. Time for dinner at a local

restaurant, and a plan for the morning.

I woke up early, and found Scott was already outside eating small chocolate doughnuts, the breakfast of champions made famous by John Belushi (see YouTube). Scott had a bunch of these doughnuts, enough to share with Karen and me. Plus, there was no time to waste during this critical morning. We had only a few more hours to try to achieve our goal. It was decided that there was not enough time to make coffee (gasp!). We broke camp, packed our stuff, and set out in our two separate cars. Our goal was to find Morey Road, a small road turning off the left side of Route 10 north. Karen had found it on a map. It terminated in a state forest not far from West Caroga Lake. According to the map, Morey Road was only about a quarter mile north of Vrooman Road, which was easy to find since there was a restaurant right there (closed at 7 AM, spoiling my hope for a quick cup of coffee). Vrooman Road provided no access to the forest. We drove slowly northward on the deserted Route 10.

After covering over a mile, we had not managed to spot Morey Road. Scott's GPS informed us that we had gone too far, so we turned back to the south and pulled our cars over at an intersection, which according to the map, consisted of State Road 112 to the east and Morey Road to the west. But on the west side of Route 10 there seemed to be no road at all, only what appeared to be an unpaved driveway a short distance to the north; one mailbox, no road sign. This was Morey Road.

A few hundred yards from the highway, the dirt road suddenly degenerated into a steep washed-out rut not possible to navigate with either of our vehicles. There was no place to park other than along the edge of someone's yard. It looked like nobody was home, or at least if someone was home they were probably still sleeping. We parked, grabbed our foraying gear, and made a rather hasty ascent up the hill. The woods were mixed, lots of oak, some pine, small hemlocks, ash, and other hardwoods typically seen in the region.

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Scott climbed atop the ridge to the right where most of the trees were oaks, while Karen and I mainly stayed below on the dirt road. Here and there I checked spots in the adjacent woods, where I saw Amanitas, Russulas, *Cortinarius, Gymnopus*, and *Humidicutis*; but not a single bolete of any type.

After close to two hours of searching spots in and out of the woods, whatever nutritional benefit I may have gained from the little chocolate doughnuts was beginning to wear off. Karen's feet were dragging. And I really wanted to find some coffee. We were close to deciding to call Scott out of the woods and lobby to give up the search, when I spotted a side road cutting to the left down the ridge just ahead of where we were; one last place to perhaps have a look. Maybe 100 yards down the hill, the side road rounded a turn into a coniferous area, a transition into a different type of habitat. Karen stayed up top while I went down to look around. Hemlock dominated the area, with a few yellow birch mixed in. It looked a lot like the spots where I find *B. subvelutipes* back home in Pennsylvania.

Feeling somewhat renewed, I decided to check things out in the hemlock forest. I searched for maybe 20 minutes before I saw it standing there on the forest floor, all alone, looking haggard, stained, and rodent-bitten. It was *Boletus subvelutipes*! Not the prettiest specimen. But I was absolutely thrilled to see it there. I harvested the mushroom, took a few photos, and looked around for another one for a few minutes. I didn't see any others. So, I headed back up the hill, calling out to Karen, "I found it! I found it!" This brought Scott out of the oak woods. I showed him the bolete and suggested that, having accomplished our goal, it was time to leave.

Scott was fairly unsatisfied with my single battered specimen. "Where did you find it? Let's get a better one." I offered some minor resistance to this suggestion, telling him that the plot of hemlock looked to be little more than maybe five or six acres, and that I had thoroughly checked the entire area. But Scott insisted on walking down the side road to search the area, which—deep down inside—I also wanted to do. It was a nice morning; a little cloudy, not too hot, not many insects pestering us. Karen decided to just rest on the roadside while Scott and I went back down the hill. After maybe 10 minutes of searching, we arrived at the far perimeter of the hemlock area where the terrain abruptly dropped off above the shore of West Caroga Lake. Then Scott pointed down at the ground. "That looks like one," he said. I glanced over and noticed that not only was there what appeared to be a *subvelutipes* fruit body on the ground a few feet in front of Scott, yet another one was within a couple inches of his right shoe. Then I spotted a third one about 15 feet away. This last one looked to me like a perfect specimen, young, firm, no insect or rodent damage. Its base was coated in white, which I took to be mycelium. We looked around a little longer but found no others.

Time to head back to the cars—which were still there and without any tickets or nasty notes on the windshieldsto take a few additional photos, and apply some chemicals to one of the mushrooms. The one I had initially found looked to be old, so I figured it was an inferior choice for chemical testing. I wanted to avoid cutting up what I thought was the nicest one of the four we had found. So, I sectioned one of the pair of mushrooms Scott had found. The area by the cars was open and the sky was overcast, so I was able to get a few decent photos. I applied KOH and ammonia to pieces of cap surface, cap context, stipe context, and pores. Then it started to rain. I finished photographing the chemically treated



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We managed to find a small general store on Route 10 that had opened for the day. It wasn't exactly Starbucks, but the coffee could not have been more satisfying. It was a celebration, seated beneath the front porch roof, sipping, watching the rain fall, and describing our great adventure and discovery to a couple semi-interested local folks. We said our good-byes to Scott, who had driven more than seven hours from Pittsburgh for the sole purpose of searching for Peck's *subvelutipes*. A work-related issue had arisen that prevented him from continuing to the NEMF foray.

Immediately after arriving at NEMF, I tracked down my NBC compadres to show them our treasures. At first I couldn't find Roy Halling, so he never saw the fresh material before it went into Bill Yule's dehydrator. Bill later packaged and labeled the dried material according to the order in which the mushrooms were found, collections A, B, and C. (One half of one of the pair constituting collection B had been used for applying chemicals.) It turned out this level of care—as well as saving material from collection B-was essential to a positive outcome. When I located Roy and showed him the photos, the one I had judged as the best specimen—with what I thought was white mycelium coating the stipe base—Roy thought may have been infected by a Hypomyces. (The white fuzzy coating on the stipe base was later determined to be mycelium.) What looked to be the nicest of the four specimens would have been a questionable choice for an epitype. An essential ingredient in Peck's description is the reddish fuzz-the sub-velvety patchtypically found on the stipe base of this bolete species. Since the white coating had apparently obliterated this feature on specimen C, the mushroom failed to exhibit a key feature cited by the author of the species. Thus, the pair labeled B, including the one I had spotted on the ground about 2 inches from Scott's shoe, turned out to be the most suitable representatives. Indeed, a small velvety red patch on the stipe base may be seen in one photo.

The dried and labeled material was handed over to Igor Safonov, who later submitted samples to Linas Kudzma for sequencing. So, we now have DNA data to support the proposal that our Caroga Lake Boletus subvelutipes serve as representative of the species. Turns out that the Caroga Lake material produced the same molecular signature as my hemlock/birch collections made in Pennsylvania. (Igor has also submitted—along with financial support—some of my PA collections to Linas for sequencing.) Moreover, Igor has submitted oak-associating subvelutipes, and this type of redpored bolete almost certainly represents a taxon distinct from the conifer subvelutipes. Placement within a phylogenetic tree supports moving these taxa from genus Boletus. My understanding is that the details for generic placement are still being worked out, but Igor believes subvelutipes, and the similar type that appears to favor oak, both belong in genus Neoboletus.

I wrote a brief description of our proposed epitype (collection B), which may be read online at Mushroom Observer, observation #285181. Specimens A and C are seen at MO #285175 and MO #285189 respectively.

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