FRAC Visits "The Cove"

by Bill Warren

The area near Woodbury, Ga., referred to as "The Cove" by locals is well known to many FRAC members. A boy scout campground, Camp Thunder, is located outside the NE rim of The Cove. Another familiar landmark, Dripping Rock, also lies beyond the NE rim, adjacent to Camp Thunder. A popular state-owned and –operated recreation area, Sproule Bluff, offers picnicking, hiking, rafting and fishing along the Flint River on the SE edge of the rim. All of those areas are accessible from Ga. Hwy. 74. Some FRAC members also knew that Georgia Tech operated two large satellite disks inside The Cove.

What we *didn't* know was that The Cove is probably an impact crater.

During FRAC's Oct., 2008 visit to the Wetumpka (Ala.) Meteor Impact Crater, our host, Auburn geology professor **David T. King,** startled us by mentioning casually in question form, "You know, of course, that there's a meteor impact crater site in Georgia?"

Well, *No,* Dr. King, we didn't know that. We asked him where it was.

"It's near Woodbury, Ga., in Meriwether County," he said. "It's almost as large as Wetumpka Crater. Area residents call it 'The Cove.'" But since it hasn't been proved conclusively to be a meteorite impact crater, geologists refer to it as the "Woodbury structure" or "Cove Dome."

Areas of Disagreement…

Astronomy is, of course, an area of scientific inquiry. As amateur astronomers, however, we in FRAC are not necessarily bound by the same rigorous standards of proof that define the work of professional scientists. We regard astronomy as both an art and a science, the "art" being our appreciation of the beauty and wonder of what we see regardless of whether we understand it fully.

So, having explored The Cove at length since our visit to Wetumpka with Dr. King – and having seen its overwhelming resemblance to what we think an ancient meteor crater in a fertile area would look like untold millions of years later – we're satisfied that The Cove is in fact a meteor impact crater site.

Scientists, on the other hand – in this case, *geologists* who study such things – carefully

avoid such sweeping conclusions. Instead, they describe The Cove as "a structural dome which post-dates the development of regional metamorphic foliation." (Loosely translated, that means that, whatever The Cove is, it was formed after the rest of the area took shape.)

Privately, Dr. King thinks it's an ancient impact crater. Publicly, though, the closest he will come to saying it in print may be seen in two articles he co-authored: "Cosmic Impact in the Piedmont of Georgia? The Woodbury Structure" (*Lunar and Planetary Science,* 2006) and "The Woodbury Structure: Evidence for an Ancient Impact Crater in West-Central Georgia, USA" (*L&PS,* 2008).

We are content to believe what we see. So are others, such as pilot **C. W. Massey,** who wrote, "I fly over a crater just south of Atlanta, Ga. It is located just SE of Woodbury, Ga … From the air, a very round ring of hills is very evident, especially at low sun angles."

Before pronouncing an area to be a meteorite impact crater, geologists look for four things: (1) circular or oval shape, concentric faults and overturned layers of bedrock on the rim; (2) geophysical features consistent with impact; (3) hypervelocity-shocked materials such as shocked quartz or shatter cones; and/or (4) physical traces such as meteorites.

…And Areas of Agreement

There are, however, a number of things that we and the scientists who study possible impact crater sites can agree on.

*The Cove is a concave depression in the earth located 3.6 mi. SSE of the little town of Woodbury, Ga. (population: 1,091, give or take a few dogs and cats);

*That depression, lying inside a rim that rises from 300 ft. to 450 ft. above it on all sides, is almost perfectly round. (It's larger than most of us thought it was before visiting the site, measuring about 4.2 mi. in diameter – about 1/3 of a mile smaller than the Wetumpka crater);

*The highest point on the rim is in the northern quadrant, and the lowest point a V-shaped gap along the SE rim. The Flint River, which was there before the crater was formed, cuts through the rim in the NE quadrant, follows the eastern rim south and exits through the aforementioned gap.

Dwight Harness's Role

FRAC member Dwight Harness served as coordinator and host for our club trip to The Cove – and what a splendid job he did! Dwight was ideally suited for the task since, in his work as a satellite dish technician, he had installed dishes for several residents living inside the crater. Some of them granted permission for FRAC to explore their property during our tour, and others told Dwight how to contact other landowners. He said that virtually none of them were aware that they might be living in an ancient meteor crater, and that all of them were interested, friendly and helpful.

Dwight contacted Dr. King twice to discuss where we might look for shatter cones, one of the tell-tale signs of large meteorite impacts. (While "smoking guns" such as the presence of iridium and shocked quartz in the bedrock are detected in microscopic samples, shatter cones can be as small as pebbles or as large as 30 ft. tall.) Shatter cones are rocks – in The Cove's case, granite (and in Wetumpka's case, limestone) – that are deformed when intense shock waves such as those created by large meteorite impacts pass through the earth. Those waves literally "shatter" the rocks into elongated conical shapes that point toward the precise point of impact.

Dwight's timeline for our visit gave us four hours to tour the crater and look for shatter cones.

Our Trip to The Cove

Fourteen FRAC members and two visitors attended the tour that Dwight led on Sunday, Feb. 15, 2009: **Dwight; Jerry & Bev Williams; Alan & Sally Bolton; Tom & Brit Danei; Charles Boils** & his nephew, **Tony Gubbels; Joe Auriemma; Carlos Flores; Charles Turner; Curt Cole; Larry Higgins;** and **me (Bill Warren)** & my guest, Columbus State Univ. geology major **Andrew Capel.** Most of us met at the same Dairy Queen on Ga. Hwy. 16 in Griffin where we met to go to Wetumpka last October. Leaving there at 1:15 p.m., we met Dwight and a couple of others in Hollonville and, after making another stop at a restaurant on Ga. Hwy. 74 to pick up our final three attendees, we headed for The Cove.

The Bald Hilltop Overlook. Our first stop, a treeless, red clay hilltop along the northern rim, verified Dr. King's description of The Cove: "an elevated quartzite rim and rather flat floor comprised of schist and gneiss." (As Larry Higgins might put it, "It may not be 'gneiss' to say,

but I wouldn't recognize schist if I stepped in a pile of it.") There was quartz everywhere – not gemstone-quality crystals, of course, but quartz nonetheless, much of it combined with other minerals such as mica in rocks strewn all over the hill.

A brief but vigorous hike brought us to the top of the hill. The view from there was as good or better than at any of the overlooks at Wetumpka, at least in terms of how much we could see of the crater from there. Looking south and east, we saw about 2/3 of the crater, the only areas we couldn't see being the extreme NE, western and SW portions of the rim. Virtually all of the east and southern rim were clearly visible, rising like a **C-**shaped, miniature mountain range above a flat plain – the crater floor – that serves as farmland for the residents.

The Flint River, meandering southward below and beside the eastern rim, lay hidden by trees beyond the farmland; on an earlier, exploratory visit to the area, Larry, Dwight, **Richard Schmude,** and I walked across the fields to the river and searched (unsuccessfully) for shatter cones along the shoreline for about an hour.

Our view of The Cove from the bald hilltop was, to our thinking, unmistakably that of an impact crater site. That impression was reinforced whenever we turned and looked the other way, NNW toward the town of Woodbury. As with Wetumpka, for as far as we could see looking away from the crater, the land was flat for miles around. And as with Wetumpka, we were struck by the *suddenness* of the change in topography, as if a small mountain range had suddenly sprung up in the landscape. A small, solitary mountain, Dixon Mtn., lay a short distance away to the north, but otherwise there was nothing resembling a hill to be seen outside the crater.

We searched briefly for shatter cones on the hilltop and hillsides. I probably wouldn't have recognized one if it had dislodged from the hill and rolled onto my foot, crushing my toes. The closest anyone else came to finding one was when Larry found a broken beer bottle and proclaimed it to be a "shattered cone."

Before we left the bald hilltop, everyone agreed that it would be a wonderful place to hold an observing – if, that is, a way could be found to transport our 'scopes and equipment up the 150 yds. to the top. ("There's never an escalator around when you need one," someone

grumbled on the way up.) But the rocky clay "road" to the hilltop was barred and locked, and the landowner specified that our visit was a one-time-only affair.

The Dishes. Our second stop was inside the crater at a site just north of the center. There, inside a fenced-off area, two gigantic 30-meter dishes resembled a pair of giant eyes peering upward into the sky like the wandering eyes of an iguana. (That description is grounded in fact, since they were radio telescopes that were originally owned by AT&T and later sold to Georgia Tech.) Larry wasn't sure what kind of research had been conducted at the facility, except that at one time Tech had either conducted its own SETI (Search for ExtraTerrestrial Intelligence) research or leased out dish time to an independent group for that purpose.

An area resident who was passing by on a 4-wheeler stopped by while we were parked on the roadside to take photos. He didn't know whether the facility was still in use – the grounds were always neatly mowed, he said, but only once had he ever seen anyone entering or leaving the facility. It appeared to be no longer in use.

Before leaving the site, Dwight conducted an independent research project on his own. After wondering aloud whether the fence enclosing the property was electrified, he reached out and grabbed it with both hands.

It wasn't.

The Crater Floor. Our third stop was also inside the crater. We parked on the roadside and walked onto verdant farmlands for an up-close-and-personal look at the entire E rim.

The view was spectacular from that open field. We couldn't see the Flint River from the crater floor – but we saw the treeline that marked its edges as it meandered south a couple hundred yards away. Beyond that treeline, the earth rose several hundred feet to a well defined eastern rim. From that vantage point, it was difficult to imagine that The Cove might be anything other than an impact crater.

The Rocky Outcropping. The final stop on our tour was at a rather steep hillside in the northern quadrant. There were no paths to follow , and the ascent was difficult due to dense underbrush, rocks and boulders everywhere, and leaves that hid whatever might lie beneath them. A few hardy souls accompanied Dwight to the top, and all of them agreed that the view

from there was worth the effort. No one found any shatter cones – did any of us really expect to? – but on the other hand, there were no sprained ankles, heart attacks or snakebites, so we considered the trek to have been a success.

Conclusions

That word – *success* – aptly describes our entire Cove experience. We didn't prove to anyone's satisfaction but our own that The Cove is in fact an impact crater. But having seen all that we saw, everyone in attendance shared the same sense of overwhelming awe at the power of natural forces to have rearranged the landscape in such a violent and sudden manner.

What might have caused The Cove's distinctive and conspicuous features if not a meteorite impact? Dr. King has suggested that "The (Cove) structure lies in a tectonically complex region," so it might have been formed by an ancient earthquake (i.e., a sudden shift of plates along fault lines in the Earth's crust). He doesn't really believe that, however: that's why he and others continue to study the area and search for definitive answers. They have found PDFs (plane-deformed fractures) in zircon, leading the researchers to conclude that "At least some of the rocks associated with the Woodbury structure experienced an impact event."

And when might the event that formed The Cove's present shape have occurred? Dr. King's best guess is "sometime around the Wetumpka impact, give or take a few million years."

As for the impact itself – well, the crater's circular shape suggests that the meteor probably came nearly straight down. Topographical maps and satellite photos reinforce that conclusion.

The Wetumpka impact occurred in 100-300 ft. of shallow ocean; the Woodbury area was not underwater at the time, so The Cove meteorite may have been somewhat smaller than Wetumpka's celestial visitor was. Regardless, the effect was the same, i.e., a massive displacement and deformation of land within the crater and its rim. To have seen it first-hand gave us a small insight into the awesome forces necessary to have altered the land in such a mind-boggling manner.

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