



Lynne Engelbert of the Institute for Canine Forensics watches her dog Piper as he searches for cremains in the ruins of a modular home in Paradise that was destroyed by the Camp Fire.



Recovering Ashes from Ashes

Several raging wildfires have recently struck California, destroying the homes and possessions of hundreds of people. As terrible as these losses are, for some people the greatest tragedy is losing the previously-cremated remains of loved ones, which mingle with the ashes from the fire and are seemingly impossible to recover. But a group of archaeologists, assisted by specially-trained dogs, are recovering them.

By Gayle Keck

JASPER, a border collie with a mottled black, white, and brown face, picks his way through ashes, melted blobs of glass, jutting rebar, and hundreds of smashed terra cotta roof tiles—sniffing, always sniffing. This devastation was once Tim and Becky Muser’s house in Paradise, California, one of nearly 14,000 homes destroyed by the Camp Fire in November, 2018.

The chances are slim that Jasper will find what he’s looking for: the cremains (cremated remains) of Tim’s father, Harry, a military veteran who died in 2001. The air temperature is 105 degrees; the ground temperature, nearly 125. Six rainy, snowy months have passed since the fire, and the family has disturbed the site while searching for keepsakes. All these factors impact the dog’s ability to catch a scent.

Tim and three volunteer archaeologists stand by, watching Jasper’s every move as his handler, Adela Morris, directs her dog toward the area that was once the Musers’ den. This, Tim had showed the team, is where his dad’s cremains were kept, in a wooden box on a shelf. The only thing standing here now is a stub of concrete foundation.

“He has a scent,” archaeologist Alex DeGeorgey says, as Jasper pokes his nose into a buckled piece of stucco a few feet away. “Sometimes when a stucco wall fell and is still intact, they alert on that because that’s where the scent is collecting.” Camp is the fourth wildfire aftermath for which DeGeorgey has helped organize archaeologists, who partner with dog handlers from the Institute for Canine Forensics (ICF)—all volunteering their time—to hunt for cremains.



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The ICF's dogs are trained to alert when they have located the cremains. Dog handler Kris Black watches as Annie alerts amid the remains of a Santa Rosa home destroyed by the Tubbs Fire in 2017.

Jasper, who has assisted in finding numerous cremains, indicates where the scent is pooled. Morris brings in Jett, another border collie, who circles, sniffing, and then alerts. (The dogs either sit or lie down when alerting.) Piper, another border collie, handled by Lynne Engelbert, alerts in the same area. The dogs can't work more than two minutes because of the intense heat, which dries out their noses and represses the scent molecules that normally flow, eddy, and pool, almost like water. The handlers place pin flags where their dogs alert.

Archaeologists such as DeGeorgey, his wife Risa, and Kevin Dalton, assisted by ICF dogs, have searched 183 homes destroyed by the Camp Fire, and they've recovered 214 of the 251 sets of cremains that have been lost. Most of that recovery work, through rain and snow, was done shortly after the fire, though.

"People lose everything," Alex, says, explaining why the effort is so important. "The things they miss most are heirlooms, photo albums, cremains. Then the government comes in, scrapes up all the debris and sends it to a toxic waste dump. That just adds to the heartbreak." That scenario haunted Tim Muser. "My biggest fear," he says, "is that my dad would end up in some dump."

THE DeGeorgeys first got involved in cremains recovery because someone in their office building lost his home, and the cremains of his mother and father, in the 2017 Tubbs Fire. "This is something that had never been done before," Alex explains, "so we're figuring it out as we go. You walk

up to a 2,500 square-foot stucco building reduced to five inches of ash, and you think, 'I'm supposed to go find this guy's parents? This seems like an impossible feat.'" And, to his amazement, he and his colleagues are frequently able to achieve it.

Archaeologists are uniquely qualified for searching out cremains. "When you get trained to identify things," DeGeorgey says, "you learn how to recognize artifacts that other people don't recognize just walking around: color, texture, luster—so your brain can focus on those things. We trained our eyes to identify human ash amongst the ashes and debris of a burned-out house. We're consistently successful because we've trained our eyes to find the person."

The teams have worked four disaster areas: the Tubbs, Carr, and Camp fires in Northern California, and the Woolsey fire near Los Angeles. The stories, and the searches, are heartbreaking, joyous, stressful, uplifting. "When these houses collapse, stuff shifts around quite a bit," says archaeologist Mike Newland, who helped with many recoveries. "In one we were looking for a metal urn. Analyzing how the house collapsed, it seemed to me that it might have fallen in the builder's trench. That was filled with debris. We got shovels out and dug, and we pulled out the urn. It had collapsed into itself almost like two hands in prayer. The minute I pulled it out, the woman [the daughter-in-law of the deceased] who was there started to sob. People just break down."

"We refer to the ashes by the person's name," Newland

adds. “We approach it as if the person is still there. We talk to their loved ones about the person, what they were like, what the relationship was. We treat it as if the ashes were the victim.” Protocols evolved from fire to fire. Engelbert of the ICF talked by phone with someone from every family prior to the 183 Camp Fire searches; some calls lasted an hour.

It was no different at the search sites. One team leader, archaeologist Natalie Brodie, says, “People wanted to talk to us about the people, the things they had lost—like, ‘I just want to relate to someone how crazy that was.’ And we could say to them, ‘We’re here to help.’ What was a small commitment of my time, talent, and effort made a very big difference to each of these people, which made it extremely worthwhile.”

The teams learned to ask a series of questions: What was the container? (One woman said her mother’s ashes were in a Chinese takeout box.) Were they in a closet? On a shelf? On the floor? Next to other things? What year were they cremated—the archaeologists noticed some color differences based on how long ago the person was cremated—and where? Is it a full set of cremains?

“While the dog is searching, we’re doing a visual assessment,” Brodie says, “looking for hazards, things we can’t move, the wind, and whether things will fall on us. “After the dog alerts, we do a visual assessment of the alert area, including a rather large buffer. We’ll start five or six feet away from where the dog alerts. We move debris and clear any of the melted stucco or wood or whatever and take it down to the native soil.”

They treat the site like a regular archaeological feature, Brodie explains. “We start peeling away all this old stucco and drywall until we see something that’s different. Then we stop, poke around it in a circle or square. We’re basically creating a pedestal of this different-looking material. Once we find that and are confident that it’s the cremains, we’ll dig around to find the extent. Once we’ve exposed it, sometimes we’ll have the dog come over again, and sometimes the dog will alert again.”

How do archaeologists distinguish human cremains from all the ashes and rubble? “A lot of us have worked on [historical] cremations,” Newland says, “so we’re familiar with cremains.” After a cremation, though, the remains are ground into a fine powder, but tiny bits of bone may be visible. “The

“In a matter of seconds Piper closed a wound that no one else could.”

—Pam Rasmussen



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Alex DeGeorgy (kneeling) and Michael Newland identify cremains at a Santa Rosa home that was burned by the Tubbs Fire.

colors can range from dark gray to salmony pink,” Newland says. “Human remains create about ten pounds of ash, about the size of a loaf of bread.” However, the amount loved ones keep can range from a full set to only a small, token amount. To complicate matters, cremains can look similar to burned drywall residue. “We rub it between our fingers,” Alex says. “If the substance is smooth, it’s drywall.”

“Often we find a metal tag that has a binomial on it that’s a signifier from the crematorium,” Newland continues. The

top number denotes the crematorium and the bottom number is unique to the cremated individual. “When we show the owner the tag, it’s a slam dunk,” he says. “The amount of reassurance that provides is huge.”

When the Camp Fire burned Molly Rich’s mother’s home, a recovery team searched for the cremains of her father, a veteran who had passed away that summer. “It was an experience that I will never forget,” Rich says. “I get goose bumps when I talk about it, still—it’s an amazing process. I



Katrina Cunningham gets a kiss from Piper. When Cunningham’s home was burned by the Camp Fire, Piper helped to recover her brother’s and grandmother’s cremains.

Archaeologist’s Best Friend?

How can dogs possibly sniff out cremains buried amid ash and debris? It’s part nature, part nurture. Dogs’ natural ability to detect odors is up to 100,000 times better than humans’. The highly trained dogs certified by the non-profit Institute for Canine Forensics (ICF) are familiarized with the odors of human bones and teeth at a very early age, some even a few weeks after birth. Dogs train three days a week, with food and play as a reward.

Known as “historical human remains detection dogs,” they specifically learn to locate remains that can be thousands of years old. They can even detect former burial spots when the body has been removed. Nose to the ground, they trace a scent to its strongest source—which could be a squirrel burrow that funnels scent to the surface, a grassy spot where scent has “pooled,” or the exact location of a bone fragment. Then, they lie down or sit, to alert their handler.

Archaeologists have worked with the ICF dogs for more than twenty years, often to locate graves without disturbing them. Archaeologist Russ Skowronek of the University of Texas Rio Grande Valley used the ICF to find unmarked graves in a west-central California potters’ field, and was able to confirm the dogs’ accuracy. “We ground-truthed there, saw human remains, and put them back,” he says. Canines can sometimes be more useful than fancy technology. “We all want bells and whistles: GPR [ground-penetrating radar], drones,” Skowronek comments. “But sometimes GPR doesn’t work with soil conditions, or we come

back with an anomaly, but it doesn’t indicate what the anomaly is.”

The ICF has aided a number of Native American tribes seeking to identify burials on tribal and ancestral lands, typically when the burials are threatened by a construction project. Ethnographer Melodi McAdams works with the United Auburn Indian Community in Auburn, California. “For so long, archaeology hasn’t had good tools for nondestructive identification of burials,” she explains. “And what isn’t on most archaeologists’ radar is burial soil that contains decomposed soft tissue-remains or tiny pieces of bone—but it can be very important for Native American communities that burial soil be protected, just like burials and cemeteries are protected. To my knowledge, these dogs are the only way to detect burial soil.” McAdams has never had a situation in which the dogs cleared an area that turned out to have burials.

The ICF dogs are also involved in trying to solve cold cases, including the most famous of all, locating Amelia Earhart’s remains. Four dogs and their handlers went to remote Nikumaroro Island in Kiribati with archaeologist Tom King and the National Geographic Society. “We took them to the site where we have evidence human bones were found [and then went missing] in 1940,” King says. “We took the dogs one at a time to the area, and all of them alerted in various locations in the vicinity of where we think the bones were found.” Although the team didn’t recover new remains, they took soil samples for DNA testing.

Dog handlers’ skill and dedication plays an important role, too, of course. They must train their dogs for agility and endurance, in addition to scent-detection, keeping detailed records to maintain certification. But ICF’s Lynne Engelbert gives all the credit to the pups: “We just get to come along because we have two thumbs and can drive.” —Gayle Keck

LYNNE ENGELBERT



Jasper alerts atop the wreckage of a house destroyed by the Camp Fire. It took an hour for the archaeologists to clear away the debris that covered the remains of the mother of the homeowner, Alan Kuntz (background, tan jacket). Adela Morris, Jasper's handler, stands behind him, and behind her are two archaeologists clad in Tyvek.

can see why they're so successful." The family had planned the funeral for fall, at a veteran's cemetery in Redding. Then the Carr Fire struck there, preventing the funeral. Adding to the irony and heartbreak, the funeral was rescheduled for what turned out to be a week after the Camp Fire started.

"The archaeologists got their saws out and started cutting away the stucco very, very carefully," Rich says. "Once they'd removed the stucco, they let the dogs sniff around right where we thought the ashes were. I think it was Piper, she circled and circled and then sat down exactly where we thought the ashes would be. I wasn't totally convinced—and then the archaeologists went to work, which was an amazing process to see. As they were carefully digging, they found the cremation tag that was in the urn, but the urn was disintegrated. Then the archaeologists were able to show us the distinction in color between house rubble and human remains."

Rich continues, "I just remember whispering to my dad, 'Hey, we got you, we didn't leave you behind, and we're taking you home.' I couldn't stop smiling." She and her family were later able to bury her father, with special guests Morris, Engelbert, and their dogs in attendance. "Having the dogs there was just heartwarming, just to know that those dogs

did their job and they were the reason we were having that funeral," Rich says.

Nick Rasmussen and his wife had spent four days sifting through eighteen inches of ash and debris at his mother's home after the Tubbs Fire, searching for the remains of his father and brother. "We just kind of gave up hope," he says. "Then Lynne came over with Piper and the team, and within about forty-five seconds, Piper found them. The archaeologists started digging and came up with my brother's urn, which was still intact, just scorched. That was a pretty emotional thing right there," he explains. "The dog also found my father's ashes amongst all the ash and debris, even though the box had disintegrated. I have my dad and my brother back, is how I see it. They found both of them within a half hour of being there."

ONE thing that makes remains recovery radically different from typical archaeological work is the emotional element. "These property owners are devastated, because when we interact with them, the fire is very fresh," Newland says. "For many, this is the first time they've been back to the house." Archaeologist Kimberly Wooten agrees. "There are no ground rules for the emotional side of it. Handing over remains or



Debbie Rasmussen (holding their dad's ashes), Pam and Nick Rasmussen (holding their brother's urn), and archaeologists Kimberly Wooten, Robert Watson and Alex DeGeorgey. The Rasmussens had given up hope of finding the cremains, but the archaeologists were able to recover them with Piper's help.

LYNNE ENGELBERT

artifacts of people's lives...there wasn't a protocol for that," she says. "You start seeing all the material culture that's been left behind by the fire and it's hard not to recover it all."

For Wooten, the most impactful moment was watching as another team recovered the cremains of a forty-year-old woman who had died of breast cancer, and then handed them to the woman's mother. "Having faced breast cancer myself, I knew that woman could have been my mother," Wooten says, "and it's easy to imagine what she had gone through. I tried to be discreet and cry away from the family—but I still caught someone's attention. Piper came over and put her head in my lap and just insisted that I pet her. It was probably the most connected I've ever felt with a non-human."

Amid all the emotion, urgency, and expense—the archaeologists and dog handlers covered the cost of their food, lodging, and safety equipment—the teams began to develop protocols and methodologies as well as tracking the dogs' accuracy. They also realized the need for making cremains recovery part of government disaster recovery efforts. "The state of California treats cremains like a possession, not human remains," Newland says. "But on a family level, the cremains are just as important as the remains of a fire victim."

Engelbert agrees. "These are not possessions. These are not things. These are people's loved ones, human beings," she says. "They need to be dealt with respectfully. Having your loved one go to a toxic dump is devastating, absolutely devastating." Meetings with government officials have yielded no results. "Nobody's promised us anything, and I really didn't expect them to," Newland says with a sigh. "Getting on their radar is the best we can expect."

Back at the Musers' home site, the archaeologists have uncovered a ceramic cup ("My daughter made that," Tim says), a plaque with a dog's footprint, and the name "Sam" written below it ("One of our favorite dogs"), and a metal button that they think is the cremation tag, though they subsequently realize it's not. They've worked for two hours, taking large areas down to the native soil. Finally, Alex finds a pinkish deposit that could be cremains. The team examines them, and discovers telltale bits of bone.

Tim, who's busied himself offering water and granola bars to the team, is overwhelmed. "I don't have words," he says, asking if he can give Alex a hug. After the brief celebration, the team goes back to work, finding and carefully separating more of Harry's cremains from the ashes and debris. The largest deposit is sandwiched between two roof tiles.

"Hi, Dad," Tim says softly as he takes the Ziplock bag holding the cremains. He steps aside to get control of his emotions and texts family members. The replies come back: "Fantastic!!!" "Nice work. He never wanted to be forgotten...."

For the archaeologists doing recovery work, there's another benefit, in addition to thankful families. "Being able to do this, it's made archaeology relevant," Brodie says. "This was absolutely the best use of my skills," Wooten agrees, "It had a direct impact on people's lives. I'd volunteer again in a heartbeat."

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