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# How Chris McCandless Died

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Twenty-one years ago this month, on September 6, 1992, the decomposed body of Christopher McCandless was discovered by moose hunters just outside the northern boundary of Denali National Park. He had died inside a rusting bus that served as a makeshift shelter for trappers, dog mushers, and other backcountry visitors. Taped to the door was a note scrawled on a page torn from a novel by Nikolai Gogol:

attention possible visitors.
s.o.s.
i need your help. i am injured, near death, and too weak to hike out of here. i am all alone, this is no joke. in the name of god, please remain to save me. i am out collecting berries close by and shall return this evening. thank you,
chris mccandless
august ?

From a cryptic diary found among his possessions, it appeared that McCandless had been dead for nineteen days. A driver’s license issued eight months before he perished indicated that he was twenty-four years old and weighed a hundred and forty pounds. After his body was flown out of the wilderness, an autopsy determined that it weighed sixty-seven pounds and lacked discernible subcutaneous fat. The probable cause of death, according to the coroner’s report, was starvation.

In “Into the Wild,” the book I wrote about McCandless’s brief, confounding life, I came to a different conclusion. I speculated that he had inadvertently poisoned himself by eating seeds from a plant commonly called wild potato, known to botanists as Hedysarum alpinum. According to my hypothesis, a toxic alkaloid in the seeds weakened McCandless to such a degree that it became impossible for him to hike out to the highway or hunt effectively, leading to starvation. Because Hedysarum alpinum is described as a nontoxic species in both the scientific literature and in popular books about edible plants, my conjecture was met with no small amount of derision, especially in Alaska.

I’ve received thousands of letters from people who admire McCandless for his rejection of conformity and materialism in order to discover what was authentic and what was not, to test himself, to experience the raw throb of life without a safety net. But I’ve also received plenty of mail from people who think he was an idiot who came to grief because he was arrogant, woefully unprepared, mentally unbalanced, and possibly suicidal. Most of these detractors believe my book glorifies a senseless death. As the columnist Craig Medred wrote in the Anchorage Daily News in 2007,

“Into the Wild” is a misrepresentation, a sham, a fraud. There, I’ve finally said what somebody has needed to say for a long time …. Krakauer took a poor misfortunate prone to paranoia, someone who left a note talking about his desire to kill the “false being within,” someone who managed to starve to death in a deserted bus not far off the George Parks Highway, and made the guy into a celebrity. Why the author did that should be obvious. He wanted to write a story that would sell.

The debate over why McCandless perished, and the related question of whether he is worthy of admiration, has been smoldering, and occasionally flaring, for more than two decades now. But last December, a writer named Ronald Hamilton [posted a paper on the Internet](http://www.christophermccandless.info/Ronald-Hamilton/ronald-hamilton-intothewild1.html) that brings fascinating new facts to the discussion. Hamilton, it turns out, has discovered hitherto unknown evidence that appears to close the book on the cause of McCandless’s death.

To appreciate the brilliance of Hamilton’s investigative work, some backstory is helpful. The diary and photographs recovered with McCandless’s body indicated that, beginning on June 24, 1992, the roots of the Hedysarum alpinum plant became a staple of his daily diet. On July 14th, he started harvesting and eating Hedysarum alpinum seeds as well. One of his photos depicts a one-gallon Ziploc bag stuffed with these seeds. When I visited the bus in July, 1993, wild-potato plants were growing everywhere I looked in the surrounding taiga. I filled a one-gallon bag with more than a pound of seeds in less than thirty minutes.

On July 30th, McCandless wrote in his journal, “extremely weak. fault of pot[ato] seed. much trouble just to stand up. starving. great jeopardy.” Before this entry, there was nothing in the journal to suggest that he was in dire straits, although his photos show he’d grown alarmingly gaunt. After subsisting for three months on a marginal diet of squirrels, porcupines, small birds, mushrooms, roots, and berries, he’d run up a huge caloric deficit and was teetering on the brink. By adding potato seeds to the menu, he apparently made the mistake that took him down. After July 30th, his physical condition went to hell, and three weeks later he was dead.

When McCandless’s body was found in the Alaskan bush, Outside magazine asked me to write about the puzzling circumstances of his demise. Working on a tight deadline, I researched and wrote an eighty-four-hundred-word piece, published in January, 1993. Because the wild potato was universally believed to be safe to eat, in this article I speculated that McCandless had mistakenly consumed the seeds of the wild sweet pea, Hedysarum mackenzii—a plant thought to be toxic, and which is hard to distinguish from Hedysarum alpinum. I attributed his death to this blunder.

As I began expanding my article into a book and had more time to ponder the evidence, however, it struck me as extremely unlikely that he’d failed to tell the two species apart. He wrote his diary on blank pages in the back of an exhaustively researched field guide to the region’s edible plants, “Tanaina Plantlore / Dena’ina K’et’una: An Ethnobotany of the Dena’ina Indians of Southcentral Alaska,” by Priscilla Russell Kari. In the book, Kari explicitly warns that because wild sweet pea closely resembles wild potato, and “is reported to be poisonous, care should be taken to identify them accurately before attempting to use the wild potato as food.” And then she explains precisely how to distinguish the two plants from one another.

It seemed more plausible that McCandless had indeed eaten the roots and seeds of the purportedly nontoxic wild potato rather than the wild sweet pea. So I sent some Hedysarum alpinum seeds I’d collected near the bus to Dr. Thomas Clausen, a professor in the biochemistry department at the University of Alaska Fairbanks, for analysis.



Shortly before my book was published, Clausen and one of his graduate students, Edward Treadwell, conducted a preliminary test that indicated the seeds contained an unidentified alkaloid. Making a rash intuitive leap, in the first edition of “Into the Wild,” published in January, 1996, I wrote that this alkaloid was perhaps swainsonine, a toxic agent known to inhibit glycoprotein metabolism in animals, leading to starvation. When Clausen and Treadwell completed their analysis of wild-potato seeds, though, they found no trace of swainsonine or any other alkaloids. “I tore that plant apart,” Dr. Clausen explained to Men’s Journal in 2007, after also testing the seeds for non-alkaloid compounds. “There were no toxins. No alkaloids. I’d eat it myself.”

I was perplexed. Clausen was an esteemed organic chemist, and the results of his analysis seemed irrefutable. But McCandless’s July 30th journal entry couldn’t have been more explicit: “extremely weak. fault of pot[ato] seed.” His certainty about the cause of his failing health gnawed at me. I began sifting through the scientific literature, searching for information that would allow me to reconcile McCandless’s adamantly unambiguous statement with Clausen’s equally unambiguous test results.

Fast forward to a couple of months ago, when I stumbled upon Ronald Hamilton’s paper “[The Silent Fire: ODAP and the Death of Christopher McCandless](http://www.scribd.com/doc/166341536/The-Silent-Fire),” which Hamilton had posted on a Web site that publishes essays and papers about McCandless. Hamilton’s essay offered persuasive new evidence that the wild-potato plant is highly toxic in and of itself, contrary to the assurances of Thomas Clausen and every other expert who has ever weighed in on the subject. The toxic agent in Hedysarum alpinum turns out not to be an alkaloid but, rather, an amino acid, and according to Hamilton it was the chief cause of McCandless’s death. His theory validates my conviction that McCandless wasn’t as clueless and incompetent as his detractors have made him out to be.

Hamilton is neither a botanist nor a chemist; he’s a writer who until recently worked as a bookbinder at the Indiana University of Pennsylvania library. As Hamilton explains it, he became acquainted with the McCandless story in 2002, when he happened upon a copy of “Into the Wild,” flipped through its pages, and suddenly thought to himself, I know why this guy died. His hunch derived from his knowledge of Vapniarca, a little-known Second World War concentration camp in what was then German-occupied Ukraine.

“I first learned about Vapniarca through a book whose title I’ve long forgotten,” Hamilton told me. “Only the barest account of Vapniarca appeared in one of its chapters …. But after reading ‘Into the Wild,’ I was able to track down a manuscript about Vapniarca that has been published online.” Later, in Romania, he located the son of a man who served as an administrative official at the camp, who sent Hamilton a trove of documents.

In 1942, as a macabre experiment, an officer at Vapniarca started feeding the Jewish inmates bread made from seeds of the grass pea, Lathyrus sativus, a common legume that has been known since the time of Hippocrates to be toxic. “Very quickly,” Hamilton writes in “The Silent Fire,”

a Jewish doctor and inmate at the camp, Dr. Arthur Kessler, understood what this implied, particularly when within months, hundreds of the young male inmates of the camp began limping, and had begun to use sticks as crutches to propel themselves about. In some cases inmates had been rapidly reduced to crawling on their backsides to make their ways through the compound …. Once the inmates had ingested enough of the culprit plant, it was as if a silent fire had been lit within their bodies. There was no turning back from this fire—once kindled, it would burn until the person who had eaten the grasspea would ultimately be crippled …. The more they’d eaten, the worse the consequences—but in any case, once the effects had begun, there was simply no way to reverse them …. The disease is called, simply, neurolathyrism, or more commonly, “lathyrism.”…

Kessler, who … initially recognized the sinister experiment that had been undertaken at Vapniarca, was one of those who escaped death during those terrible times. He retired to Israel once the war had ended and there established a clinic to care for, study, and attempt to treat the numerous victims of lathyrism from Vapniarca, many of whom had also relocated in Israel.

It’s been estimated that, in the twentieth century, more than a hundred thousand people worldwide were permanently paralyzed from eating grass pea. The injurious substance in the plant turned out to be a neurotoxin, beta-N-oxalyl-L-alpha-beta diaminoproprionic acid, a compound commonly referred to as beta-odap or, more often, just odap. Curiously, Hamilton reports, odap

affects different people, different sexes, and even different age groups in different ways. It even affects people within those age groups differently …. The one constant about ODAP poisoning, however, very simply put, is this: those who will be hit the hardest are always young men between the ages of 15 and 25 and who are essentially starving or ingesting very limited calories, who have been engaged in heavy physical activity, and who suffer trace-element shortages from meager, unvaried diets.

odap was identified in 1964. It brings about paralysis by over-stimulating nerve receptors, causing them to die. As Hamilton explains,

It isn’t clear why, but the most vulnerable neurons to this catastrophic breakdown are the ones that regulate leg movement…. And when sufficient neurons die, paralysis sets in…. [The condition] never gets better; it always gets worse. The signals get weaker and weaker until they simply cease altogether. The victim experiences “much trouble just to stand up.” Many become rapidly too weak to walk. The only thing left for them to do at that point is to crawl….

After Hamilton read “Into the Wild” and became convinced that odap was responsible for McCandless’s sad end, he approached Dr. Jonathan Southard, the assistant chair of the chemistry department at Indiana University of Pennsylvania, and persuaded Southard to have one of his students, Wendy Gruber, test the seeds of both Hedysarum alpinum and Hedysarum mackenzii for odap. Upon completion of her tests, in 2004, Gruber determined that odap appeared to be present in both species of Hedysarum, but her results were less than conclusive. “To be able to say that odap is definitely present in the seeds,” she reported, “we would need to use another dimension of analysis, probably by H.P.L.C.-M.S.”—high-pressure liquid chromatography. But Gruber possessed neither the expertise nor the resources to analyze the seeds with H.P.L.C., so Hamilton’s hypothesis remained unproven.

To establish once and for all whether Hedysarum alpinum is toxic, last month I sent a hundred and fifty grams of freshly collected wild-potato seeds to Avomeen Analytical Services, in Ann Arbor, Michigan, for H.P.L.C. analysis. Dr. Craig Larner, the chemist who conducted the test, determined that the seeds contained .394 per cent beta-odap by weight, a concentration well within the levels known to cause lathyrism in humans.

According to Dr. Fernand Lambein, a Belgian scientist who coördinates the Cassava Cyanide Diseases and Neurolathyrism Network, occasional consumption of foodstuffs containing odap “as one component of an otherwise balanced diet, bears not any risk of toxicity.” Lambein and other experts warn, however, that individuals suffering from malnutrition, stress, and acute hunger are especially sensitive to odap, and are thus highly susceptible to the incapacitating effects of lathyrism after ingesting the neurotoxin.

Considering that potentially crippling levels of odap are found in wild-potato seeds, and given the symptoms McCandless described and attributed to the wild-potato seeds he ate, there is ample reason to believe that McCandless contracted lathyrism from eating those seeds. As Ronald Hamilton observed, McCandless exactly matched the profile of those most susceptible to odap poisoning:

He was a young, thin man in his early 20s, experiencing an extremely meager diet; who was hunting, hiking, climbing, leading life at its physical extremes, and who had begun to eat massive amounts of seeds containing a toxic [amino acid]. A toxin that targets persons exhibiting and experiencing precisely those characteristics and conditions ….

It might be said that Christopher McCandless did indeed starve to death in the Alaskan wild, but this only because he’d been poisoned, and the poison had rendered him too weak to move about, to hunt or forage, and, toward the end, “extremely weak,” “too weak to walk out,” and, having “much trouble just to stand up.” He wasn’t truly starving in the most technical sense of that condition. He’d simply become slowly paralyzed. And it wasn’t arrogance that had killed him, it was ignorance. Also, it was ignorance which must be forgiven, for the facts underlying his death were to remain unrecognized to all, scientists and lay people alike, literally for decades.

Hamilton’s discovery that McCandless perished because he ate toxic seeds is unlikely to persuade many Alaskans to regard McCandless in a more sympathetic light, but it may prevent other backcountry foragers from accidentally poisoning themselves. Had McCandless’s guidebook to edible plants warned that Hedysarum alpinum seeds contain a neurotoxin that can cause paralysis, he probably would have walked out of the wild in late August with no more difficulty than when he walked into the wild in April, and would still be alive today. If that were the case, Chris McCandless would now [in 2013] be forty-five years old.



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