

One specimen, many stories

CARL ROTHFELS



DR. JIM PRINGLE, taxonomist at Royal Botanical Gardens, is preparing a section for a book on the flora of California. To assist with his work, he has borrowed a very interesting (and important) specimen from Kew Gardens, in the United Kingdom. This 200-year-old specimen has a fascinating story, and in its travels has been examined by many of the world's best-known botanists.

The problem

Dr. Pringle borrowed this specimen to try to solve a very frustrating problem. In the group of plants he is studying, the same name (*Centaurium muhlenbergii*) has been used to describe three different species. We are familiar with this problem in common names (how many different species do we call daisy?), but scientific names are designed to avoid this difficulty. The California problem was particularly severe because one of the species in question is a rare native plant that people want to protect, while another is a common non-native species that they want to eliminate. Sharing the same name is a recipe for confusion, if not disaster; fortunately, we have a taxonomist to the rescue.

Types of "Types"

So what went wrong with *Centaurium muhlenbergii*? Scientific names differ from their "common" counterparts in that, to be valid, a description of the plant they refer to must be published, in Latin, in a publicly accessible journal, and that description must refer to an actual specimen in a herbarium somewhere (called the "Type" specimen). That way, any researcher in the future can look back and see exactly what plant a particular name refers to by looking at the Type of that species (similarly, there's a platinum-iridium bar kept near Paris that is the Type for the metre). The Type specimen is thus the physical incarnation of the definition of the species, and as such, is extraordinarily important.

To sort out the *Centaurium muhlenbergii* problem, Detective Pringle needed to see the Type for that name — the specimen that he borrowed from Kew, shown here. Dr. Pringle's close examination of this specimen reveals that it is the rare native species, distinctive in its branching pattern, stigma shape (yes, you can see 200-year old stigmas!), and non-keeled calyces.

A tortured web

Retracing the use of the names, Dr. Pringle was able to piece together the following story. Not long after Grisebach published the name *Centaurium muhlenbergii*, the famous botanist George Bentham published *Centaurium floribundum* for a very similar species, and applied *Centaurium muhlenbergii* to something we now know is different (we call it *Centaurium davyi*.) Since *davyi* and *muhlenbergii* are different species, and since Grisebach used the *muhlenbergii* name first, Bentham's use of the name is not allowed. *Centaurium davyi* must remain *Centaurium davyi*. But what of *floribundum*? Dr. Pringle's careful analysis (and that of other taxonomists) reveals that the Type of *floribundum* is just a slightly different version of Grisebach's Type of *muhlenbergii*. Since Grisebach published first, *floribundum* is invalid, and *muhlenbergii* remains.

But the legacy of this confusion has persisted to the present day. Some people used *C. muhlenbergii* for the native species in California, and some used *C. floribundum*. The situation became even more confusing when the non-native species came on the scene in the early 20th century. Botanists trying to identify it naturally consulted textbooks on the plants of California, which didn't have the non-native species (it had only just appeared, and people didn't know what it was yet), but did have *C. floribundum*. So they assumed that the non-native species was *C. floribundum*. By the time they realized their mistake, botanists had concluded that *C. floribundum* was an invalid name for *C. muhlenbergii*, and descriptions of *C. muhlenbergii* that included features of both the non-native and the native species had been published in formal textbooks! (Don't panic folks—this rarely happens.) When someone referred to *C. muhlenbergii*, then, they might be referring to Grisebach's *muhlenbergii* (the true one), or to Bentham's *muhlenbergii* (*davyi*), or to the misidentified non-native (which has subsequently been correctly identified as *C. tenuiflorum*).

Quite the tale wrapped up in one herbarium sheet, and good thing we have Dr. Pringle to sort it all out. ✨



6. Karl Theodor Hartweg (1812–1871) was a German plant collector commissioned by the organization that became the Royal Horticultural Society to conduct botanical explorations in western North and South America. He collected these specimens during his trip through California.

7. August Heinrich Rudolf Grisebach (1814–1879) is the botanist who first published the name *Centaurea muhlenbergii*. He was the author of a book on the gentian family and of the segment on that family in Hooker's flora. When Grisebach first defined *Centaurea muhlenbergii*, he was

going to use the name *Centaurea trichanthum* but then changed his mind. Here you can see the note where he crossed off the old name and explained that he had chose *C. muhlenbergii* instead, and at the top of the page he gives a Latin description of this new species.

8. Joseph Ewan (1909–1999), best known as a historian of field biology and exploration, also studied *Delphinium* and the gentian family. His collection of publications on biological exploration and other historical topics became a unit of the Missouri Botanical Garden library named for him.

9. Rose Broome's (1939–) doctoral dissertation at Duke was on *Centaurea*. She was the first to recognize naturalized populations of *C. tenuiflorum* for what they were.

- This stamp indicates that this specimen was originally in the herbarium of **Sir William Jackson Hooker** (1785–1865). Hooker, being a frugal man, mounted four related specimens on the same sheet. He was a professor at Glasgow when Grisebach studied the specimens in his herbarium. Soon thereafter he became director of Royal Botanic Gardens, Kew. One of the most famous scientists of his day, Hooker received specimens collected by explorers in various parts of the British Empire, especially what is now Canada.
- Thomas Nuttall** (1786–1859), alternatively a resident of England and U.S.A., conducted botanical exploration in various parts of North America. He tried to do so here in Hamilton, but came down with an illness that he attributed to miasmatic emanations from Cootes Paradise, and left the area as soon as he could! His most significant expeditions included one to the headwaters of the Missouri River, on which he collected these two specimens (several plants each). Nuttall had other interests besides botany; Nuttall's woodpecker, found in California, was named for him.
- David Douglas** (1799–1834) was commissioned by what became the Royal Horticultural Society to conduct botanical explorations including a notable trip, on foot, from Washington State to Hudson's Bay. He did much of his work in southern California, where he collected the specimens Grisebach used as the Type for *Centaurea muhlenbergii*. Unfortunately, he died at 35, when he had the misfortune to fall into a pit trap just before a bull fell into the same trap, crushing him. The Douglas Fir is named for him.
- George Bentham** (1800–1884) was an English botanist, who collaborated with Hooker. Aside from speaking French, German, and Russian by the time he was seven years old, he was potentially the greatest botanist of the 19th century. He studied herbarium specimens collected by Hartweg in the Americas and wrote a book describing many new species in Hartweg's collections. He is a crucial part of our *Centaurea muhlenbergii* riddle, and had other specimens from this Douglas collection in his own herbarium.
- This Latin phrase "scrispit Grisebach" was written by a curator at Kew, and it indicates that the label is indeed in Grisebach's handwriting, which means that the specimen above it is indeed the one that Grisebach was using as his Type.