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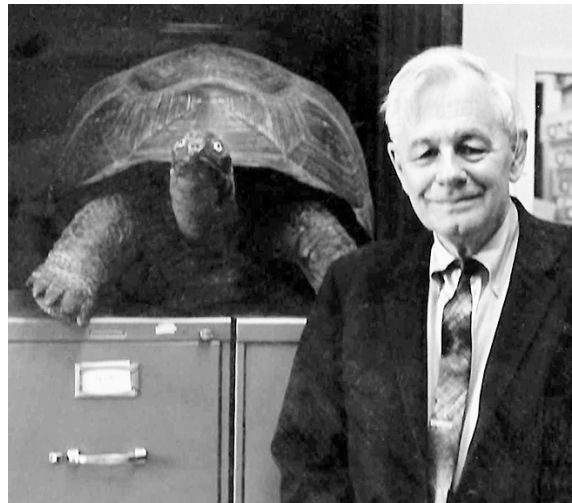
NICHES by FIRE (ty) LIGHT

I've always loved looking at fireflies, starting at the age when — like all children — I would imprison them in a jar and take them into my bedroom as a nightlight. But a few years ago, when pandemic isolation had me alone on the porch every evening during firefly season, I started to think about them in terms of niche diversification. It was clear that every firefly was not flashing with the same rhythm or intensity as every other firefly, so I was pretty sure that I had more than one species. I wasn't clever enough to figure out the number of species via flashes, so I settled for trying to estimate the number of niches that my backyard could, at least in theory, be divided into.

In ecological parlance a niche is the intersection of all the requirements/tolerances of a species. Two species in one geographical area cannot share a niche. When I first took an ecology course, I was lucky enough to study under G. Evelyn Hutchinson, now known as the father of modern ecology, and Hutch defined a niche to us as a multi-dimensional space. Being a literal sort of person, I racked my brain trying to think of more dimensions than those I'd learned about in solid geometry and — of course — failed. Desperate, I confessed to him that I just couldn't picture a multi-dimensional space. Hutch, who generally treated me as if I was a likeable but slow child, explained ecological niches to me clearly and unforgettably and explained that geometry was not part of the definition.

One seminal document in the formation the niche concept was an essay Hutch published exactly 65

years ago in *The American Naturalist* recording his inaugural speech upon being elected president of the American Society of Naturalists. It was entitled "Homage to Santa Rosalia or Why are there so many kinds of animals?" and you can read it at: <https://cdn.vanderbilt.edu/vu-URL/wp-content/uploads/sites/29/5/2022/03/20023544/2.-Homage-to-Santa-Rosalia-Hutchinson.pdf>. The shrine of Santa Rosalia (a patron saint of Palermo known only by an encrusted skeleton from the 12th century found with a cross and some beads) overlooks a small artificial pond inhabited by two species of waterbug, differentiated only by size, and the essay takes off from this observation to a wide-ranging discussion of how animals divide up the spaces they share with other animals.



G. Evelyn Hutchinson, now known as the father of modern ecology, defined a niche to us as a multi-dimensional space.

In fact, the niche concept is key to understanding ecology and some of Hutch's other students went on to build notable careers upon it, developing it mathematically or in particular ecosystems or (in the most recent version) as my fellow student Peter Grant and his wife, Rosemary, have done by analyzing how a Darwin's finch in the Galapagos can change anatomy remarkably rapidly in response to an alteration in one dimension of their niche,

such as the size or shell hardness of a key food source. A single gene, controlling beak size and/or shape, is sufficient in this case to separate two species. But often species are separated by a great deal more than a single gene, and the question of how they divide a shared environment continues to be a topic of tremendous ecological interest; for example, a beautiful paper in a recent issue of *Science* analyzed the famous

Serengeti migration pattern of zebras, wildebeests and Thompson's gazelles, showing how the eating patterns of each species creates the diet for the next species to pass through, allowing them to share this iconic grassland.

Once you've really internalized the niche concept, you start to look at everything differently.

So I tried to look at my small piece of land as if I were a male firefly, looking for a unique niche which really, in this case, meant the place with the best chance of meeting a female of my own species. I decided that food was of little importance, since I'd loaded up on fat and protein during my violent, carnivorous larval period (how glorious that was!), and that I would discount predators. So it came down to physical space, making the assumption that the males and females would share requirements for a specific time and place. Yes, they would have unique flashing codes, but surely they would want to maximize their chances of meeting a partner of their own species, and minimize their chances of being intercepted or confused by other species. Knowing nothing about fireflies *, but just as an academic exercise in thinking of my acre and a half in terms of how it could be divided up, I was amazed at the number of potential niches; that is, the number of firefly species I could host. Here are the variables I came up with; you can probably add others:

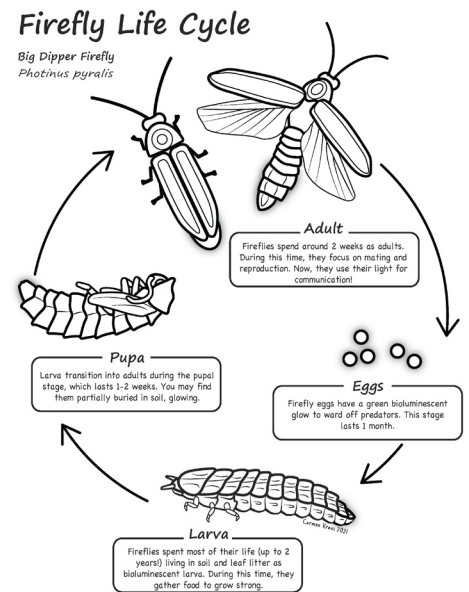
- Lawn vs. meadow..
- Under trees vs. clearings.
- How high above the ground ?
- How long after sunset? (i.e., do they divide the night up or just come out early and flash all night?)
- Weather dependent; i.e., only within certain temperature or humidity parameters.
- Seasonality? are the ones in June different species from the ones in July? Knowing that firefly lifetimes in the flying stage are one to three weeks, how many species could share a specific niche, given the length of acceptable weather conditions?

Would unique niches be helpful for earlier stages of firefly life? It seems less important, but that may simply be a function of my ignorance. Where and

* If you'd like to know about fireflies, we strongly recommend *Silent Sparks: The Wondrous World of Fireflies*, by Sara Lewis, a brilliant and beautiful book about these amazing creatures.

when do fireflies lay their eggs? When the larvae emerge, how big are they and who are they able to kill and consume? And how does their prey selection change as they change in size? (A recent paper, discovered by Doug, discusses an invasive species of firefly, which moved from South America to Spain. In its larval stage it kills and devours earthworms. The authors express concern about the damage this might do to their soil ecosystems but, given the damage that invasive earthworms are doing to our ecosystems, I confess that I longed to import this species.)

Insects are especially fascinating because so many insects are really at least two totally different organisms — a larva and an adult — occupying completely different niches, but Hutch points out that organisms can undergo tremendous changes in size over their life spans, so metamorphosis is not required for one species to inhabit a series of niches.



Everything we learn about the world changes how we see it, from the big and dramatic (Black Holes!, The Big Bang!, The Carboniferous!!) to the small (genes, microbes, niches). In fact, maybe — given our limited lifetimes and vision — the small stuff has the larger effect on our worldview. I don't think much about the Big Bang when I'm walking in the woods, but I do think about what organisms are there, why they might be living in that place; what they're eating and what their relationships are with other organisms. I think about all the organisms I don't see because they're so small. One of the big factors in ecological thinking has been the concept of food chains; how many trophic links there are in food chains for the smaller species and how few links there are for the largest. I think about the surprisingly small number of tree species in our northern forests, the thousands of species of mycorrhizal fungi that have penetrated their roots to form tiny partnerships, and how the roots and the

SPRING TRAILS REPORT

Greetings from Wonalancet where we are recovering from a strange winter. Most of the winter was somewhat warm with below average snowfall. Then in late March and early April we had two storms that dropped 27" and 14" of snow respectively. The 27" storm was the highest single storm snow accumulation since I've lived here. But unlike December snows these Spring snows melted quickly at 1000 Ft Elev. Higher elevations will probably melt out later than usual.

As usual we will sponsor four volunteer trailwork days. The dates are:

- Saturday May 18** **Spring Trails Day**
- Saturday June 1** **National Trails Day**
- Saturday July 20** **New Hampshire Trails Day**
- Saturday Sept. 28** **National Public Lands Day**

Parking issues mean we now have a process of checking with Mike Schneider schneide2@myfairpoint.net before the trails day to find out where we plan to work and where we plan to park. In any event, bring water, food, gloves, and clothing appropriate for the weather. Most of all, be prepared to spend a day outdoors deriving satisfaction from a job well done.

The Northwoods Stewardship group out of northern Vermont may help with some of our Annual Maintenance on our high trails such as Sleeper and Walden. We are still discussing this with the Forest Service. The highlight of the Trails season will be an 8 week period from early August to late September when Jed Talbot's crew will be doing trail reconstruction on the Dicey's Mill Trail. This will be our sixth season working with Jed and crew to harden Blueberry Ledge and Dicey's Mill to the onslaught of the Four Thousand Footer Brigade. During this time we have spent approximately \$300,000 on this project. We have financed the work with matching Grants. The club has leveraged approximately \$30,000 in cash and volunteer matches to fund this work.

Finally, our loyal adopters and dedicated trail volunteers will again provide the core of our trail maintenance efforts. WODC is deeply grateful for their work, without it our trail program would be a shadow of its current accomplishments.

∞ Jack Waldron, *Trails Chair*

fungi are making decisions about whether or not to deal with each other and what that deal will entail. I think about the complexity of soil webs with four (maybe more) Kingdoms (Kingdoms!) in each cubic inch — growing, killing, digesting, partnering, all the time. At least when it's above freezing. Everyone talks about the tropics and their species diversity. But honestly — if you could count up all the species in our below ground, which no one's ever done — we might win that contest. It's comparatively straightforward to think about niches in a lake or a grassland or a bog, although amazing discoveries keep being made in all of

these, but thinking about niches in soil doesn't seem straightforward to me at all. No wonder I'm looking at fireflies in my backyard: one group of organisms at a single life stage, in a limited area during one short season. And it's still complicated. And wonderful.

- Susan Goldhor



WODC ANNUAL MEETING

We'll hold our Annual Meeting on
Sunday August 18
6:30 PM
in the Wonalancet Chapel

Meeting will be preceded by
Potluck in the Grove
5:00 PM

EDITORIAL

Susan Goldhor, Doug McVicar, Jack Waldron

LAYOUT

Peggy Johnson

HISTORY'S GREATEST CLIMBS

PETRARCH'S ASCENT OF MONT VENTOUX

King Peter III of Aragon climbing to the summit of Rochemelon found there a lake inhabited by monsters. When the worthy monarch ventured to cast a stone into the water a horrible dragon appeared of enormous size which flew and darkened the air with its breath. But when Petrarch climbed Ventoux in 1336 he expanded and swelled after the fashion of moderns and moralized a little. And so on this barren summit he ushered in modernity.

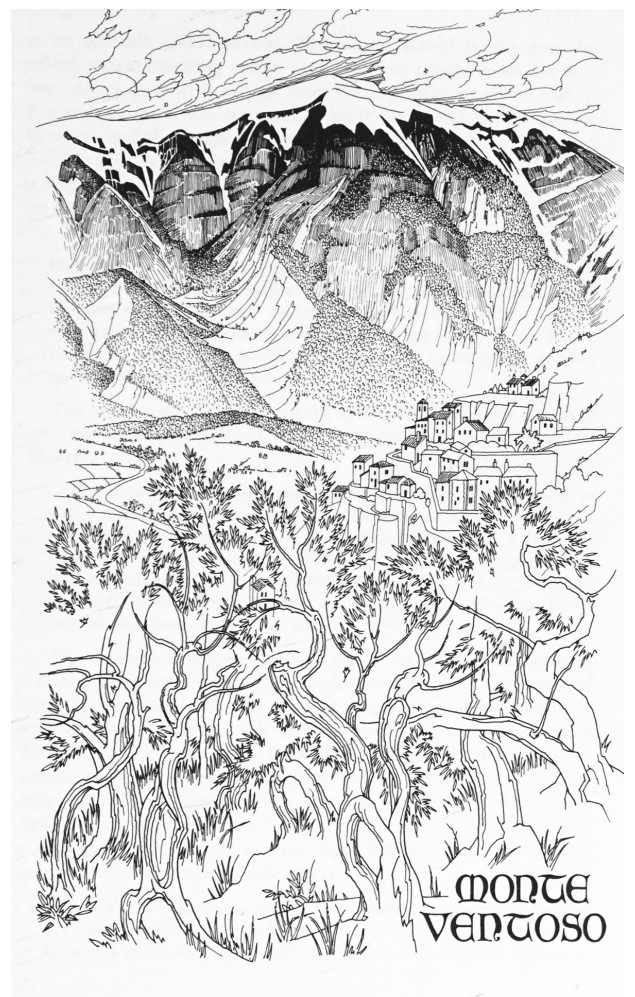
Thus wrote Brooks Atkinson, the mid-twentieth century drama critic of the *New York Times*, in his first book, *Skyline Promenades*, a philosophical yet wryly comic account of his youthful trek from Chocorua across the Sandwich Range and up to Mount Washington.

Atkinson's colorful contrast of two climbs just 86 years apart is intended to illustrate the tectonic cultural shift from the imaginative but disempowered spirit of the Middle Ages to the rebirth of ancient scientific inquiry, artistic expression and personal freedom that we now call the Renaissance.

His extravagant characterization of Petrarch is, perhaps, no great exaggeration. Petrarch is widely considered – along with his friend Boccaccio – to have been instrumental in the rediscovery of the works of ancient Latin writers, particularly Cicero, and the revival of Greek and Roman learning and thought.

Indeed, Petrarch has frequently been called the first Modern Man . . . but only since 1860 or so. In his own day, Petrarch (born in 1304) was revered mainly as a poet – the most popular poet of his era. While still a young man he was crowned Poet Laureate of Rome. By Petrarch's own account, he was called to Rome to receive his laurels one morning and around four in the afternoon of that same day received notice of his nomination to become the Poet Laureate of Paris. He had been raised in France, but identified strongly with his Italian ancestry and, after much soul-searching, which he describes in detail, Petrarch chose Rome.

Petrarch did not write only sonnets, nor did he invent the sonnet – scholars today are divided about whether its origins are to be found in Sicilian folksong or in



Arabic poetry – but he certainly popularized it and established the major form we call today the Petrarchan sonnet. He wrote hundreds of sonnets about all sorts of subjects, but especially about his obsessive love for Laura, a woman he had seen only once or twice from a distance. Even though the printing press was still a hundred years in the future, Petrarch's poems spread like wildfire. These *Canzoniere*, as they were called, were circulated in manuscript form, and presumably by memorization and public recitation. When books finally began to be printed mechanically, decades after Petrarch's death in 1374, many of the first ones were editions of the *Canzoniere*.

But what of Petrarch's famous mountain hike? The only record we have of it is Petrarch's own account of the adventure in a letter to his beloved teacher, confessor and friend, the scholar, priest (and later Bishop) Dionigi di Borgo San Sepolcro. Petrarch claims he wrote this letter late on the 26th of April 1336, immediately after returning from the hike. In the letter Petrarch says that

having grown up in the shadow of Mont Ventoux, he had longed to climb the mountain since childhood. He says his only purpose for the hike was to see what the mountaintop was like.

Of course, as our readers are well aware, congenial climbing companions can turn a good hike into a great one. Petrarch thought carefully about who he wanted to share this experience with. He considered a number of friends and rejected them all. One was too slow, another too quick, others too talkative or too quiet, too gloomy or too bubbly, and so on until he realized that the only person who could fill the role for this long-anticipated adventure was his own younger brother, Gherardo.

They made their way to the mountain and rested at an inn near the base. Early the next morning they set out with two hired servants. In rugged country on the lower slopes, they met a petulant old shepherd who told them he knew of no one who had ever reached the summit; no one except he himself, fifty years before, when he was filled with the same youthful energy as Petrarch and Gherardo. The shepherd advised them that he had returned quite beaten up and disgusted that he had been so foolish. He begged them not to make the same mistake. But after much failed exhortation, he finally recognized that the group was beyond counsel and agreed to point them toward a route or path that they could follow.

Gherardo and the servants chose the shortest course, directly up the steep ridges. Petrarch refused to follow and wandered off seeking an easier route that, although probably longer, would provide a gentler grade. Though this scheme seemed reasonable it didn't work in practice and Petrarch soon found himself falling far behind. Eventually the others stopped to rest and wait for Petrarch to rejoin them, but each time they stopped for him he wandered off again in search of an easier route and again fell behind, much to Gherardo's amusement. Though exhausted, Petrarch perceived a moral lesson in the metaphor of his tortuous mountain hike: "Thus I kept putting off the trouble of climbing; but man's wit can't alter the nature of things, and there is no way for anyone to reach the heights by going downward."

Eventually they found the highest of several summits. On that lofty spot, the "rare quality of the air" and the vastness of the open view was like nothing any of them had ever experienced. They stood stunned, looking down on the clouds. Suddenly, to Petrarch "the tales of Olympus seemed less incredible."



PETRARCH *

After a stirring interlude in this majestic environment, Petrarch – being Petrarch – turned inward. He thought back to his student days, how he had started on the path to perfection of his soul, but then lost his way. Visions of Laura had led him not only to a flood of sensational

sonnets, but also to "perverse and guilty desire" that grew to totally possess him.

There he stood on the peak of Mont Ventoux vacillating between the earthly delights of the summit and the torturing doubts of his own soul. Then he remembered that he had a copy of St. Augustine's *Confessions* in his pocket. While Gherardo looked on, Petrarch performed an act of bibliomancy: he let the book fall open and his eyes fall randomly on a single passage. And that passage, he reports, was this one:

*Men go to admire the high mountains
and the great flood of the sea and the
wide-rolling rivers and the ring of Ocean
and the movements of the stars, and they
abandon themselves!*

Gherardo was eager to hear more, but Petrarch quickly closed the book and disappeared into himself. He was angry with himself for having admired things of the world when he should have learned from the ancient

* I have been unable to find a single portrait of Petrarch created during his lifetime. On the other hand, it would take a very large gallery to display all the portraits produced after his death. This is my favorite of these imaginary likenesses. It is an oil painting on a wooden panel owned by the Walters Art Museum in Baltimore. When acquired it was described as a work from Verona, painted in the early 1500s. But later curators felt the style was wrong; it looked more neoclassical, like an image stamped on an ancient coin. Their judgement was confirmed when pigments were dated to the 1800s.

philosophers “that nothing is admirable except the soul beside the greatness of which nothing is great.”

He descended the mountain by moonlight without speaking another word.

When he got back to the inn, he hastily wrote his letter to Father Dionigi detailing his thoughts and feelings and making no effort to hide the obsession with Laura he found so shameful. He also kept a copy so that eventually all the world could see it.

This July 19th will be the 650th anniversary of Petrarch’s death in his hillside retreat near Padua. Through all that long course of centuries, he has never lapsed into obscurity. Petrarch’s ascent of Mont Ventoux, by contrast, attracted little interest until the middle of the nineteenth century when the episode was retold by Swiss cultural historian Jacob Burckhardt. An important project of Western historians during Burckhardt’s time was chopping history into distinctly contrasting eras. Burckhardt was interested in what was coming to be called The Renaissance, a time during which Greek and Roman culture and learning was being recovered in Europe.

In 1860, Burckhardt published a classic, *The Civilization of the Renaissance in Italy*, which is still studied and admired today. Petrarch is featured prominently in the book because although living in late medieval times, he seemed to Burckhardt to embody several characteristics of the Renaissance: certainly his passion for recovering ancient wisdom, but also a commitment to politics, to individualism, to nature – including the nature of human beings – and to exposing falsehoods (particularly two medieval favorites: alchemy and astrology).

Burckhardt recounts the ascent of Mont Ventoux in some detail and makes a very interesting claim: “The ascent of a mountain for its own sake was unheard of.” It’s not that climbs didn’t happen, just that they weren’t made known. Of course people have climbed mountains in many eras for many reasons, including just because they are there. Petrarch gives us no reason to doubt that is exactly what the grouchy old shepherd did. What is striking to Burckhardt is that Petrarch didn’t let his ascent go unheard of; rather he dramatically reported his adventure on Ventoux, including all the cultural connections and emotions he felt. To Burckhardt that is a sharp break with the medieval – a completely new direction making

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Petrarch “one of the first truly modern men.” And not just to Burckhardt, but also to his vast company of readers, many of whom were also writers with their own readers, and so on down to the present day.

And yet, I can’t leave everything quite so tidy. Before concluding I need to point out that scholarship thrives on scrutiny and debate, complexity rather than a good story. So of course, we must never be too certain about anything. Most researchers today doubt that Petrarch wrote the exquisitely polished three-thousand-word “Ascent of Mont Ventoux”, as he claims, while dinner was being prepared the evening after his ascent. It was probably years later, likely after Father Dionigi had already died. Some have even concluded that the entire trek may have been a work of fiction. No one has ever been able to identify Petrarch’s Laura. She may have been only a creation of Petrarch’s active mind: L’aura, an aura or a breeze. Many historians today feel that history is best understood as a continuity, rather than a succession of incompatible eras. The idea that great historical figures or great ideas change the world forever strikes many as over-simplified. Some question whether history really is linear at all, rather than, say, circular, or just not geometrically describable. Maybe we see linearity where it never was because our minds have been shaped by our media – like the lines of type you are reading now, or the one-dimensional trail under our feet, winding up a mountain that exists in four dimensions.

The fourth dimension of a mountain could be time. Mont Ventoux today is strikingly different from the isolated peak Petrarch ascended almost 700 years ago. Ventoux (6271’) today is over-developed, similar to Washington (6288’), the comparable peak in the Whites. Among the many structures on the summit of Washington is a weather station which recorded a 231-mph wind. Among many structures on the summit of Ventoux is a weather station which recorded a 199-mph wind. Washington has an auto road to the summit; Ventoux has two. Washington has been a place for grueling foot races, Ventoux for the Tour de

France. Seventeen Tours de France have passed over Ventoux (during one of which an unfortunate cyclist who had over-drugged died on the mountain, uttering – according to cycling legend – these last words: “Put me back on my bike!”).

But no matter how far mankind degrades the natural environment of mountains by trying to turn them into human utilities – and no matter whether Petrarch actually climbed Ventoux or went there only in his imagination – his call from the summit for us to reflect on our experience will probably endure as long as we humans retain our curiosity about ourselves and the world around us.

– Doug McVicar

FOREST SERVICE LOGGING UPDATE

The US Forest Service plan for logging in the Sandwich Range has moved forward another step. The project – roughly a third of which will access the forest through the Ferncroft parking area – would treat some 648 acres with logging of various intensities, and an additional 306 acres with prescribed fire.

The Forest Service (FS) evaluated almost 600 comments submitted by the public last year and issued a revised Environmental Assessment (EA) including at least six additions based on public feedback. But the bottom-line finding of no significant impact did not change. The EA is now final.

The FS also released a Decision Notice on the logging project. Based on public feedback, the Decision Notice incorporates two changes in the plan: 1) a 66’ buffer zone along WODC trails, and 2) 10 acres exempt from logging along the CMC Brook Trail on Mount Chocorua. The Decision Notice is a draft, not yet finalized.

When the Draft Decision Notice was published, the FS opened a formal 45-day Objection Period. During this time those who had already submitted specific comments and felt their comments were not evaluated following the requirements of the National Environmental Policy Act (NEPA) were allowed to object. About 60 objections were submitted to the FS Reviewing Officer for this project, Derek Ibarguen, who is the WMNF Forest Supervisor (based in Campton).

Ibarguen must deal with each objection, but he has a



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range of options. Probably some objections will not meet NEPA criteria and will be rejected immediately. He may rule on others himself, or he may consult the Saco District Ranger (based in Conway) who oversees the design of the project. There is also the option of meeting with objectors to seek better understanding.

The length of time this will take is not presently known, but the FS expects to begin operations this summer. No cutting can begin – and no lawsuit can be filed – until the objection process is completed. Therefore, this is the best opportunity to prevent costly, time-consuming and risky litigation. A nationwide survey of over 1000 FS land management cases showed that the FS won about half, settled about a quarter and lost about a quarter.

∞ Doug McVicar

Photo of Hutch in his office: Courtesy Susan Goldhor private collection

Firefly lifecycle: EcoReach UGA

Fireflies in jar: Getty image

Rendering of Monte Ventoso from *Petrarch and His World*, Alison Mason Kingsbury, 1963, courtesy Cornell Digital Library.

Photo of Mont Ventoux now by Vinvin F, Wikipedia. Cropped, rotated and retoned. Lic under CC BY-SA 2.0

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