THE VINLAND MAP: TEACHING NOTES

SPOILER ALERT! I recommend you read through the whole exercise on your own before reading beyond the next paragraph.

I developed this exercise in a series of Critical Thinking and Philosophy of Science classes. It can raise a huge range of issues about knowledge; testing and confirmation bias; skepticism and how not to be gullible; the relationship between scientific and historical and common sense thinking; the relationship between key concepts like fact, belief, theory, reality, fiction, and truth; how to or whether we can draw a clear line between science and pseudoscience… even (I have kind of baked this in, see below, #3) questions about what we can learn from facts versus what we can learn from much subtler clues like writing style. I have used this exercise in individual classes — and also had one summer class in which it expanded to consume multiple profitable hours over several days.

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Some background. Although the Vinland Map has been studied intensively for over sixty years, a consensus really only emerged around 2021. As recently as 2009, some scholars were insisting that it must be genuine (per roughly #4 below); the new consensus is that it's a fake (per #3 below.)

I have greatly simplified some of the forensic issues. If you want to know more, the Wikipedia article (https://en.wikipedia.org/wiki/Vinland_Map) is a good place to start, as is this piece from Yale: https://news.yale.edu/2021/09/01/analysis-unlocks-secret-vinland-map-its-fake. If you have several hours to spare, try this conference video: https://www.youtube.com/watch?v=z1YXS8dbY2I.

In teaching, I recommend that you pause between Parts I and II and make some time for a discussion of what a scientific or historical theory is, or does. Or just ask: *What's a fact? What's a theory? How are they related?* Then get students to read out the five stories / theories in Part II. Some notes here on each:

#1 has lots of specific historical detail. That should count in its favor… until you check the details. Although superficially (mostly) plausible — at least it sounds like a news story — all of it is invented. And some of it is actually not plausible. You could *perhaps* make ink out of tea and horse manure, but you could not have done so in fifteenth century Scandinavia because tea didn't exist in Europe then. And you *cannot* fool a carbon-dating analysis using uranium ore, because carbon dating technology doesn't work that way. (Great side-project: What *is* radiocarbon dating? How does it work? *Could* you fool it? Short answer: probably not.)

#2 is very similar to #1, but is perhaps more plausible initially because it accepts that the vellum itself is old and generally avoids the *scientific* nonsense. However, instead it's full of other kinds of nonsense, which you can discover easily by considering where you've heard the word "tagliatelle," or by looking up John Paul II, the Bodleian Library, the date of the trial of Galileo — or even by noticing that the confession by the non-existent Moretti is in Spanish, presumably the wrong language.

#3 is a bit of a bait-and-switch. Our alarm bells ought to ring because the style suggests causal dismissal of other theories, few facts, and a generally unscholarly approach. (This is a great place to discuss how you learn to "smell" a fake website or an unreliable social media post!) However, the facts check out (e.g. "iron-gall ink" is a real medieval thing; the outline of Greenland does appear to have been copied from a much later map). Anyway, it tells the story that most scholars now believe.

#4 is pretty compelling, and should be — at least initially. We truly don't know how anyone managed to make the map so well, and it's hard to see both where they could have acquired that genuine but unused

piece of medieval vellum, and how to get around the "bookworm fingerprint" problem. In fact, however, those two problems are connected: what scholars now believe is that the forger found their unused vellum in the back of *Speculum Historiale* and removed it from there to create the map. And the "surface contamination" theory, which would explain away the titanium dioxide, seemed plausible for a long time; it was decades before improved methods showed the chemical went all the way *through* the ink and was nowhere else on the map. Finally "some scholars are prejudiced about the achievements of the Vikings" may or may not be true (where's the independent evidence for this claim?) but even if true that kind of claim doesn't give any *independent* reason for preferring #4. In fact, we might say that throwing around hasty accusations of prejudice gives us reasons for doubting the motives of the accuser, not the accused. Ultimately it's an *ad hominem*: an attack on the theorists and not on their evidence.

#5 is, well, fun, and I'll leave it to you to let students run away with a discussion of *what exactly* makes it unconvincing. Pinning that down isn't as easy as it looks. (I once had just this part of the exercise go for more than an hour. And adults as well as kids have said: "Uh… obviously the 'Sombrero Galaxy' is a fake thing" —- wrong!) I have found that it can take anywhere from 20 seconds to a whole class before someone has a light bulb moment and says: "Wait. If the basic story about the Gørkk *is* true, then we almost certainly would *not* know half the things we're told *in the story*. So it's self-defeating!"

Regarding the "bonus challenge": the very beautiful (and real) Sombrero Galaxy is 30 million light years away. So if the Gørkk can travel at close to the speed of light (but not faster, which Einstein says is impossible) then it's 30 million years one way and they must have been in transit 100 times longer than *Homo sapiens* has existed. Traveling at speeds comparable to our own current technological limits (1/10,000th the speed of light), they would need longer; about 300 billion years, which is more than twenty times longer than the age of the universe.

Feel free to adapt this, and let me know how it goes. Also, you may want to compare a similar exercise I use with younger children through my story *A Noise in the Night*.

THE VINLAND MAP, PART ONE: SOME FACTS

The "Vinland map" appears to be of Viking origin. It came to light in 1957 when two book dealers brought it to the attention of London's British Museum. It was acquired by Yale University in 1965. Take a good look at the map and see how many places you can (and cannot!) identify. Here are some facts scholars have agreed on more or less from the beginning:

1. The map is drawn in ink on a piece of parchment (dried animal skin); the skin has been carbon-dated to about 1400-1440.
2. It seems to show fifteenth-century Viking knowledge of Europe, parts of Asia and north Africa, Greenland, and what appears to be a part of the east coast of North America, labeled *Vinlanda Insula* — Vinland Island. (This latter fact is consistent with archeological discoveries made only in 1960, *after* the map was discovered.)
3. The text on the map claims specifically that Europeans reached "Vinland" well before the map itself was made, in fact as early as the eleventh century, 400 years before Columbus. This too is consistent with modern archeological evidence, and not wholly surprising since it is known that the Vikings reached Iceland by about the year 870.
4. The map's ink contains some traces of titanium dioxide, which is a modern synthetic chemical. Also, there are some puzzling geographical anomalies; for example, Greenland is drawn more accurately than Scandinavia.
5. "Book worms" are a variety of insects that eat old manuscripts, generally burrowing through from one page to the next, and wormhole patterns in the Vinland map *exactly* match those in the *Speculum Historiale*, an unquestionably genuine medieval book that has pages missing.

Next we'll look at five stories or theories that might be taken to explain what we know.

THE VINLAND MAP, PART TWO: FIVE STORIES, OR EXPLANATIONS, OR THEORIES

In science, in history, and in life, we often have to choose which among competing stories or explanations or theories to believe, based on imperfect evidence. Questions to bear in mind: *What's a fact / evidence / a theory / story / hypothesis / explanation? How are they related? What factors make a theory seem fishy, or plain ridiculous, or reasonable-but-unpersuasive, or plausible, or even… true?*

Imagine hearing each of the following stories. Based on what you do know, can you put them in a rough order, from most to least believable? *Why* do you rank them that way? Finally: if you could Google just two or three facts to help you to become more confident in your judgment, *which* facts would you check? Or can you be confident of your judgment(s) *without* doing any extra research? (Again, why?)

#1: "The whole map is a forgery. Eugene Jacobsen, of Amarillo, Texas, sold it to Chicago antiquities collector Myron Abell in 1956 in order to pay off debts. Abell said later that he was suspicious, but he managed to pass it off as genuine to experts in London, and later at Yale University, where it is now. Later, Yale scientists ran improved forensics tests, didn't like what they saw, and tracked the map back to Jacobsen. At that point, he admitted that the map had been made from scratch by his grandfather, Knut Jacobsen. The older man was an industrial chemist by training but also an enthusiastic amateur historian who became obsessed with the idea that America was "really" Scandinavian. He created the map in the late 1950s using a steer skin from his own ranch (rubbed with uranium ore, to fool the detectors) and an ink he'd made by mixing black tea with horse manure — a common technique in the early Middle Ages."

#2: "The skin is genuinely medieval, but the map itself is a forgery and can be dated with certainty to 1628, when it was created in Rome by the famous Jesuit scholar Beniamino Xavier Moretti, who was a friend of Pope John Paul II and personally involved in the trial of Galileo. Moretti was also responsible for the fraudulent Codex Tagliatelle in the Vatican's Bodleian Library. According to another document recently discovered there, in 1632 he signed a deathbed confession, and his last words were "La cosa que era vinlandes - sí, obviamente, lo hice" – *The Vinland thing - yes, sure, I did it*."

#3: "Get real! The skin's genuine, sure, but the map has to be a forgery! The outline of Greenland is *way* too modern! And the language looks genuine, superficially — it's medieval Latin and all — but there's a bunch of mistakes in it. And the ink looks pretty genuine too, superficially — it's a so-called iron-gall ink, which everyone used back then — but it's full of titanium dioxide, a modern chemical. Gotcha!"

#4: "The whole map is almost certainly genuine, despite all those skeptics. Nobody has ever explained how anyone could have forged something so historically convincing, or who did it, or why. (Anyway, where would they have acquired a *genuine but unused* piece of medieval vellum?) As for the alleged problems, they can all be explained away. The titanium dioxide, for example: it's obviously a case of later surface contamination. And the real clincher is the bookworm holes: nobody has ever denied that the *Speculum Historiale* is genuine, and the map was clearly ripped from the same book. The truth is, some scholars are prejudiced about the achievements of the Vikings."

#5: "Amazingly enough, the whole thing is a forgery created by a species called the Gørkk — hyper-intelligent silvery-blue wombat-like creatures who come from a planet at the left-hand end of the Sombrero Galaxy. There's a piece about them on weirdcosmicmystery.com. They did the map because they thought it would be fun to see if humans were smart enough to figure it out. They did the Mona Lisa too, and most of Shakespeare. But the government is denying that the Gørkk even exist."

Bonus challenge: estimate how long it took the Gørkk to get here.

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