

Exercises in Style: Is There a Best Way to Write a Case Study?

By *Clyde Freeman Herreid*

I like to think there is a little *avant-garde* in all of us. Raymond Queneau had a lot of it.

Writing in the early part of the last century, Queneau, a Frenchman with a penchant for radical experimentation with language, periodically set aside his normal duties as critic, poet, editor, and novelist to explore the possibilities of expression. His resulting *Exercices de style* is a collection of 99 versions of the same anecdote. A man boards a bus and starts an argument with another passenger whom he thinks is stepping on his toes on purpose. Two hours later he sees the same person getting advice on adding a button to his overcoat. That's the story. Repeated 99 times. Queneau declared, "my intention was merely to produce some exercises, the finished product may possibly act as a kind of rust-remover to literature to help get rid of its scabs."

The result is remarkable. There are prose versions (narrative, cross-examination, comedic, cockney, past and present tenses, passive and active voices, operatic, and dog Latin), poetic styles (free verse, haiku, sonnets, odes, rhyming slang), along with different viewpoints (mathematical, zoological, botanical, philosophical, medical), plus 79 others. Queneau's exercise inspired me to explore a few ways that a case in human evolution might be written, recognizing that many conceivable formats would not likely work in your classroom.

Following are a few of my efforts, without teaching notes, as I don't have a clue how you might use them. Don't like any? Write your own.

Coming to America— First person

I never quite believed the story my wife told me coming home after anthropology class that people from Siberia were the first to settle America. Oh yeah, I believe they came but not the way they say. Not three waves of Asians from the West traveling across Beringia, that space between Alaska and Siberia maybe 12,500 years ago. That never made sense to me. Why didn't they come earlier? Hell, it is only 50 miles across.

Humans in some form had been roaming all of Asia and Europe for millennia. *Homo erectus* got to the Middle East from Africa at least 1.8 million years ago. Neanderthals were recorded all over Europe and parts of Asia for 250,000 years. But *Homo sapiens* (that's us) were supposedly newcomers, leaving Africa maybe 70,000 years BP.

Why didn't modern people get out of Africa a lot earlier? All they had to do was paddle across the water from North Africa to Spain with a stop in Gibraltar. They must have had boats. People have always had boats. For God's sake people standing on the beaches of Morocco can see Europe. Its only 9 miles! And we just learned from an article in *Nature*

that our ancestral *Homo sapiens* were in Morocco 300,000 ago. Who needs boats? Get in the water and swim.

Speaking of boats: As I said before, the notion that people had to wait to cross the land bridge from Russia until 12,500 years ago never made much sense to me. I don't doubt that the geologists are correct that glaciers bunched up in the middle of North America would have stopped anyone from venturing south. But did they have to walk? What's the matter with boats? The Inuits have always used them to hunt seals, walrus, and polar bear. Couldn't people have just paddled from Siberia, then head south along the Pacific Coast of the United States? Clearly the 12,500 date is wrong. There are older archeological sites in the United States and ancient villages in Chile that have been dated to 18,000 years BP and in Brazil dated to 19,000—30,000 years BP. Who says they had to wait for the glaciers to recede?

Now, we have this new discovery in San Diego. Construction guys were excavating for a highway—California always needs more highways. And what do they find? Mastodon bones and maybe rock tools. The bones are broken in odd places that some experts think is clear evidence of butchering by humans. Here comes the kicker: The bones are dated at 130,000 years. Oh boy! That raised a ruckus with our archeologists. It can't be, says they.

Our species isn't supposed to have even left Africa until 70,000 years ago. How about that? Why can't the professors admit that humans had been travelling along the coast line of North America from Asia and to South America thousands of years before archeologists will admit it. In boats. 130,000 years ago. If that is too soon for *Homo sapiens* in San Diego, who was it?

Coming to America— Argumentative

Why does anyone care when people came to America? We are here and that is all that matters. I suppose it might matter in courts of law if one were to argue about land claims or right of passage along privileged routes. Indigenous tribes might demand recognition as the ancestral founders of the Americas. But should we really care if humans came across the Bering Strait or paddled down the coast? Should we care if they did it in 12,500 BP or in 130,000 BP? No matter what you choose, that is a long time ago. And does it matter which tribe has DNA that is considered ancestral to all Indians? What difference does it make except to claim bragging rights?

Maybe you just want to put the record straight. But what is the price for this navel gazing? Should the public foot the bill for millions of dollars to sort this out—to pay the salaries of academics who fuss, spat, and bet their careers over such things? What about the creationists who believe that the Earth and the Universe are 10,000 years old? They see these dates that archeologists throw around as blatant nonsense. Do we want to take sides in a religious dispute? Good grief, this sort of speculating leads to trouble without any benefits.

Why do I even bring this up? Well, just a few weeks ago, the professors were once again wringing their hands over the esoteric question of when the first hominins landed in the New World. In 1992, a highway construction crew excavating in San Diego, California, unearthed stones beside broken mastodon bones. Stored in a museum, they languished until recently when archeologists, led by Steven Holden, reevaluated the bones and stones using the newest dating techniques and forensic analysis and concluded that the stones were tools used to butcher a mastodon 130,000 years ago. Blasphemy. Stuff and nonsense, call out sceptics like Texas A&M University professor Michael Waters: “The evidence for early human occupation is not there.”

If humans did reach Southern California by 130,000 BP, this challenges not only the traditional Bering Strait migration story, but also raises the question as to who were these people. Archeological dogma says that *Homo sapiens* did not reach Asia until the earliest date of 70,000 years BP and so they could not be the ones who crossed over from Russia to become the San Diego tourist. Could it be Neanderthals or Denisovans? See what I mean, who on earth cares? Bickering and lint picking by academics brings to mind Johnathan Swift's *Gulliver's Travels*. Gulliver visits the flying island of Laputa. The king of Laputa had invested a fortune in establishing an academy of scholars conducting pointless experiments such as changing human excretion back into food, trying to extract sunbeams out of cucumbers, or teaching mathematics to pupils by writing propositions on crackers for snacks. If successful, at least these experiments might have had

some practical value. Finding dubious human tools in San Diego lacks even that virtue. As one archeologist said, “no fossils, no hominins.” No kidding.

Coming to America— Negatives

It was neither chimpanzees, nor gorillas, but humans. It was neither from Australia, nor Hawaii, but Siberia. It was neither by air, nor dog sled, but boat. It was neither over glaciers, nor through them, but around them. It was neither North, nor West, it was South. It was neither 12,500 years BP, nor 2 million years BP, but between. It was neither an individual, nor a family, but a clan. It was neither once, nor twice, but many times. It was neither mastodons, nor shell fish, but both. It was neither guns, nor nets, but spears. It was neither Clovis, nor Inuit, but before. It was neither slow, nor fast, it was relentless. It was neither Alaska, nor Canada, but California. It was neither a prospector, nor a geologist, it was a road crew. It was neither a search, nor a survey, it was an accident. It was neither eureka, nor indifference, but a puzzle. It was neither bones, nor rocks, but tools. It was neither a battle, nor accord, but a debate. It was neither certain, nor impossible, but maybe. It was neither *Homo sapiens*, nor *Homo erectus*, but Neanderthals/Denisovans. It was neither truth, nor false, but science.

Coming to America— Essentials

- Archeologists claim that *Homo sapiens* colonized the Americas from Siberia.
- The immigration occurred at least 12,500 years BP when humans travelled across the

land bridge, and when the glaciers melted and they could pass down the middle of the continent.

- The dates of colonization are in dispute, because there are ancient human sites in the United States, and Chile, and especially Brazil dating as far back as 30,000 years BP.
- Today, most archeologists argue that the earliest immigrants could bypass the glacier blockage travelling by boats along the Pacific Coast and establishing colonies inland.
- A recent discovery of mastodon bones and possible human tools in San Diego, California, has met with extreme skepticism because the material has been dated at 130,000 years BP. This is well before *Homo sapiens* were known to be in Europe or Asia.
- If the claim of human habitation in California 130,000 years ago is correct, who were the colonists: *Homo erectus*, Neanderthals, Denisovans or . . . ?

Coming to America— Official letter

To Whom It May Concern:

I beg to advise you of the following facts of which I am an interested but impartial witness. I beg you to indulge me on this listing on which I solicit your advice.

I have been appraised by friendly academics and indulgent perusing of the literature that there is dispute as to who and when the first humans entered the New World. Although there seems to be unanimity that the humans emanated from Siberia, there is discord as to how they arrived. Some are

plaintiffs for an inland route, asserting that travelers passed along a land bridge via Alaska circa 12,500 years BP. Then, when the glaciers that were initially impeding their progress melted, the travelers followed the bison and mastodons south into the heart land of the Americas. The contrarians contest that this cannot be correct because there are archeological sites throughout the Americas that predate the melting of the glaciers, most spectacularly Monte Verde in Chile dated at 14,600 years BP. They assert that this paradox can be avoided by accepting the claim that the first immigrants came by way of boats skirting Beringia, Alaska, and points beyond. I understand that while this aforementioned controversy is not resolved, there is a consensus emerging: A recent survey affirms that 86% of archeologists favor a coastal route for immigration.

The date of arrival, while contentious, has been largely accepted as no earlier than 20,000 years BP. But an astonishing claim has now been advanced by Tom Deméré, a paleontologist at the San Diego Natural History Museum in California, and archeologists led by Steven Holen of the Center for American Paleolithic Research in Hot Springs, South Dakota. They testified in the April 26, 2017, issue *Nature* that evidence exists that hominins were present in San Diego, California, 130,000 years BP. Rounded stones were found beside mastodon bones fractured in unusual positions. The bones appear to have been broken by stones used as a hammer. This is reminiscent of similar discoveries of fresh elephant remains known to be butchered by Africans. Vigorous rebuttal

comes from skeptics, namely Texas A&M University archeologist Michael Waters, who has asserted that “The evidence for early human occupation is not there.” Similar bone fractures commonly occur naturally or plausibly were inflicted by the backhoe that was used to excavate the bones by the construction crew that discovered the site.

This assertion that humans were in America 130,000 years BP opens up a new line of inquiry: If the date is correct, then who were the visitors? *Homo sapiens* is not known to have arrived in Siberia until 20,000 years BP. This opens up the possibility that it was Neanderthals, Denisovans, or even *Homo erectus* whose tools have been unearthed in China dating from over 2 million years ago.

In view of these circumstances, I would request of you, kind sir, as to what inference I should draw from these facts and the attitude you would deem appropriate in the way that I conduct my subsequent mode of life?

Anticipating the favor of an early reply, I am your obedient servant.

Coming to America— Dialogue

The Superior Court of California,
San Diego County
The State of California vs. George
Benjamin Abernathy

“*Mr. Abernathy you are charged with one count of Trespass under California Penal Code 602, and one count of Vandalism under California Penal Code 594. Mr. Abernathy, how do you plead?*”

“*Guilty, Your Honor.*”

“*Do you understand what a guilty plea means, Mr. Abernathy?*”

You have been accused of trespass and vandalism of a public building, the San Diego Natural History Museum. You were arrested at 2:00 a.m. in the exhibition called Fossil Mysteries apparently attempting to steal the tools and bones recently publicized as the earliest evidence of humans in the Americas. You are accused of entering a window after the museum was closed, constituting charges of vandalism and trespass. Do you understand that a plea of guilty may result in a prison term of up to 6 months and a fine up to \$1,000?"

"I understand sir. I do plead guilty to the trespass and vandalism, yes sir, I do. I did break a window to get inside. But I wasn't trying to steal anything. I just wanted to see the bones and tools with my own eyes."

"Guilty as charged then. If there is no objection by the counselors, we will continue . . . Hearing none, in the interest of time, the court will now move to the sentencing. Mr. Abernathy, are there any mitigating circumstances surrounding this case that you want the court to know about?"

"Yes, Your Honor. I would like to say exactly what it was I was doing."

"All right and please be brief. There other cases waiting for adjudication."

"Well sir, my biology professor at the university told us about the argument over when people are supposed to have come to America. I guess they were like Eskimos. They were supposed to have come over from Siberia maybe 12,500 years ago. You see they couldn't have come sooner because of the glaciers. But that must be wrong. A bunch of tool discoveries in the

US and in South America show that people must have gotten here thousands of years sooner. So how did they do it?"

"Mr. Abernathy, this is all very interesting, but please get to the point."

"I will, Your Honor. I just want to say that they could have gotten around the glaciers easily. By boats. Indians have always had boats. Eskimos still use them to kill whales. So the answer is simple. Boats."

"So how does that help explain what you were doing in the middle of the night in the San Diego Museum?"

"I am getting to that, sir. I just wanted to see with my own eyes the bones and stones they dug up when they were building the road. You know the ones that they say were 130,000 years old before real humans were supposed to have even been in Siberia. You see the archeologists say the bones have spiral fractures, which I guess means that they aren't normal. Some skeptics say that the breaks were made by backhoes when construction crews dug up the road. But I heard the scientists on TV who published the study say they look like the kind of fractures that people make today butchering elephants."

"And so, Mr. Abernathy?"

"I just wanted to see for myself. That's all."

"I don't see why you didn't come during normal opening hours."

"I tried sir, but they wouldn't let me see them. They said they were only available for research."

"I see. Mr. Abernathy you were just curious . . . Looking at your file, I note that you do not have any previous criminal infractions. But crimes have been committed. The

State cannot condone vandalism and trespass . . . Upon reflection, I believe a prison term does not fit the crime. But your actions do not warrant a pardon. However, if you promise me that this kind of behavior will not occur again, the court will fine you \$250 for the cost of the window and sentence you to 30 hours of community service . . . And Mr. Abernathy, I understand that the museum is in need of some assistance in their fossil acquisitions department. Please consider it."

"Next case."

Coming to America—Haiku

Broken mastodons
Travelers to unknown end
Fossils elude us

Acknowledgments

This material is based upon work supported by the National Science Foundation (NSF) under Grant Nos. DUE-0341279, DUE-0618570, DUE-0920264, DUE-1323355, and a Higher Education Reform Grant from the PEW Charitable Trusts. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the NSF and PEW Charitable Trusts.

Sources

Braje, T., Rick, T., Dillehay, T., Erlandson, J., & Klein, R. (2018, March). Arrival routes of first Americans uncertain—Response to Potter et al. 2018. *Science*, 359, 1225.

Callaway, E. (2016). Plant and animal DNA suggests first Americans took the coastal route. *Nature*. Available at <https://www.nature.com/news/plant-and-animal-dna-suggests-first-americans-took-the-coastal->

CASE STUDY

- route-1.20389
Callaway, E. (2018, February 7). Critics attack study that rewrote human arrival in Americas. *Nature*. Available at <https://www.nature.com/articles/d41586-018-01713-y>
- Ferraro, J., Binetti, K., Wiest, L., Esker, D., Baker, L., & Forman, S. (2018). Contesting early archaeology in California. *Nature*, 554, E1–E2.
- Holen, S., Deméré, T., Fisher, D., Fullagar, R., Paces, J., Jefferson, G., . . . Holen, K. (2017). A 130,000-year-old archaeological site in southern California, USA. *Nature*, 544, 479–483.
- Holen, S., Deméré, T., Fisher, D., Fullagar, R., Paces, J., Jefferson, G., . . . Holen, K. (2018). Holen et al. reply to Ferraro et al., 2018, Contesting early archaeology in California. *Nature*, 554, E3.
- Hublin, J., Ben-Ncer, A., Bailey, S., Freidline, S., Neubauer, S., Skinner, M., . . . Gunz, P. (2017). New fossils from Jebel Irhoud, Morocco and the pan-African origin of *Homo sapiens*. *Nature*, 546, 289–292.
- Potter, B., Beaudoin, A., Haynes, C., Holliday, V., Holmes, C., Ives, J., . . . Surovell, T. (2018). Arrival routes of first Americans uncertain. *Science*, 359, 1224–1225.
- Queneau, R. (2012). *Exercises in style* (B. Wright, Trans.). New York, NY: New Directions.
- Zhu, Z., Dennell, R., Huang, W., Wu, Y., Qiu, S., Yang, S., . . . Ouyang, T. (2018). Hominin occupation of the Chinese Loess Plateau since about 2.1 million years ago. *Nature*, 559, 608–612.

Clyde Freeman Herreid (herreid@buffalo.edu) is a Distinguished Teaching Professor in the Department of Biological Sciences at the University of Buffalo, State University of New York. He is also the director of the National Center for Case Study Teaching in Science (NCCSTS; <http://sciencecases.lib.buffalo.edu>) and editor of the Case Study column in the *Journal of College Science Teaching*.

Copyright © 2018, National Science Teachers Association (NSTA).
Reprinted with permission from *Journal of College Science Teaching*, Vol. 48, No. 2, 2018