

## TRANSLATION ENIGMAS

I have been intrigued by the conundrum of how to puzzle out alien languages ever since reading H. Beam Piper's 1957 short story, "Omnilingual," as a teenager. Piper famously imagined that we could use the Periodical Table as a common Rosetta Stone to decode the language left behind by ancient Martians. *The Listeners* by James Gunn, a 1972 novel that is another favorite from my teens, was about how we would decipher messages received via Arecibo Observatory's radio telescopes in Puerto Rico. Jim's great insight was that aliens might use images instead of words to communicate with us over electromagnetic waves. Ruth Nestvold's 2003 novella, "Looking Through Lace," speculates that an alien culture might employ a mechanism like tating for their written language. In all these tales, the key to understanding the alien language is just a little bit outside our comfort zone. All these methods derive from our shared experiences as human beings. We may not understand fictional aliens' communication system until we reach the end of their story, but once we get there, the answers seem pretty obvious. Much as I'd like to believe that all humanity needs to do is pack a universal translator when negotiating with aliens, I'm pretty sure that won't really be the case.

This summer, I was struck by just how difficult the reality might be while visiting Bletchley Park, the home of Britain's Government Code and Cypher School during the Second World War. I've long been fascinated by Germany's Enigma Machine and the Bombe, a machine developed by Alan Turing and Gordon Welchman (which improved on the pre-war Polish Bomba) to decode the Enigma messages as quickly as possible. According to the Bletchley Park Guidebook, "the standard three-rotor Enigma was capable of being set to 159,000,000,000,000,000 possible combinations. . . . The settings were . . . different for the Army Air Force, Navy, and Secret Service, and most were changed daily." In *Demystifying the Bombe*, Demont Turing writes, "A successful run of a Bombe machine could reduce these large numbers to around a million possible settings in about twenty minutes." The Bombe was to a large extent a machine of "drums, which mimic the rotors in the Enigma's scrambler unit" and cables that connected to mock Enigmas. Although all 211 Bombes were destroyed after the war, one can now see a recreated version of the noisy machine in action at Bletchley Park.

Yet, despite all the drums and the cables and the math and logic that went into the Bombe's creation, the codes were ultimately broken by very human "cribs." The machine looked for standard salutations, common phrases like "nothing to report," or numbers written in full. The cribs made it possible for the Bombe to test for an Enigma machine's rotors' starting position.

Neither the Bombe nor the human codebreakers who applied further decoding techniques to convert encoded messages into plain German could have gotten very far without these cribs. Much like Piper's use of the Periodical Table, it was a shared knowledge—this time familiarity with the Latin alphabet, an understanding of German, and an awareness of common word choices—that made deciphering possible.

On the other hand, even without the use of Enigma machines to encode messages, the lack of a shared knowledge made the Navajo code talkers work unbreakable in WW2's Pacific theater. According to the New York *Times* June 5, 2014, obituary for Chester Nez—the last of the original Navajo code talkers—the code "used two layers of encryption. The first layer was the Navajo language itself, known to be understood

by only a handful of non-Navajos, none of them Japanese.” The code talkers also encrypted the alphabet by substituting Navajo words for Latin letters and “created a glossary of hundreds of words used in battlefield communication. While some were simply Navajo translations of their English counterparts, many others were poetic circumlocutions.”

The *Times* provided translations of some of these “poetic circumlocutions.” Terms like “ne-he-mah” (“our mother”) for “America,” “lo-tso” (“whale”) for “battleship,” “besh-lo” (“iron fish”) for “submarine,” and “ca-lo” (“shark”) for “destroyer” made perfect sense to me. With the right information, the Japanese would have understood these word choices, too.

I find it hard to believe that any alien method of communication will be as easy to decode as Navajo or as accessible as German idioms. If the occasion finally presents itself, there will probably be no shared experiences. Extraterrestrials may converse in infrared or in pheromones, or in something we haven’t even thought of. They might transmit their language at the speed of light or at the glacial pace of Roger Zelazny’s “Great Slow Kings.” They may perceive us, or we them, as akin to mayflies or Sequoias.

That doesn’t mean we should give up all hope of communicating with the alien. And it certainly doesn’t mean that authors should stop writing SF about alien languages. Science fiction illuminates human cultures from the past, the present, and the future, and sometimes it does so by looking at all manner of alien civilizations. Often, when we explore the alien, we get closer to an understanding of ourselves. And if we understand the human race, perhaps we actually will have a better shot at communicating with ETs when they finally show up. Plus, the entire endeavor is fun. After all, who hasn’t enjoyed that feeling of frisson once they come to understand Damon Knight’s famous “To Serve Man” is about a cookbook.