



Episode 803, Story 3: Transatlantic Cable

Tukufu Zuberi: Our final case investigates the strange story behind this odd piece of ocean debris. August 16, 1858: the tapping of a telegraph pad transmits an historic message: "Glory to god in the highest; on earth, peace, goodwill toward men." The message spans the vast distance of the Atlantic Ocean in a matter of seconds. But while the promise of near instantaneous communication between the continents is intoxicating, that first cable is fragile and quickly fails – silencing the signal. How could 19th century engineers solve the challenges of laying a reliable cable across thousands of miles of ocean? More than a century and a half later, New Jersey native, Art Johns thinks he may have discovered an important link in a chain of communications that changed the world.

Art Johns: My family was on vacation and I think we may have found a piece of history.

Tukufu: I'm Tukufu Zuberi, and I'm meeting Art in his home town of Somerset, New Jersey.

Art: Nice to meet you. Please come in.

Tukufu: Thanks. So what do we have here?

Art: I suspect this might be a piece of one of the early transatlantic cables.

Tukufu: Okay, where do you get this thing from?

Art: We found it on Cape Cod; we were vacationing there in 1984 and we came across this on the Nauset Beach.

Tukufu: So was this just sticking up out of the beach?

Art: That's just about right. It looked as if it was a rubber band that had been snapped and had coiled up into a big kind of ball of cable so we got a hacksaw and we cut a section out of it. We actually made a joke that as soon as we cut through the cable all communications to Europe ceased.



Tukufu: So, how do you think this cable got to the beach?

Art: The previous winter a freighter had run aground in that area. And we always speculated that ship running aground might have disturbed the cable or cut the cable and allowed it to coil up on the beach.

Tukufu: Okay, what exactly is your question for me?

Art: My question is, is this one of the early transatlantic cables?

Tukufu: Do you mind if I just sit here for a moment and check out the cable and see what I can see?

Art: Of course. I'll be in the back room.

Tukufu: One thing, this is a dirty object. Luckily I brought some gloves. This rust could have accumulated in a 100 years. But it may have accumulated in a few years. Maybe there's something about these concentric circles of metal that will be informative. Is this how the cable that was laid on the bottom of the Atlantic looked? I don't know. Before transatlantic cables, the United States was a much more isolated nation. When President Lincoln was assassinated, the news took twelve days to get to Britain. But the cables – which were submarine telegraph wires – made communications across the Atlantic almost instantaneous. For the first time, the waking economic giant of the United States was plugged into the news of the day – and the movement of financial markets – in Europe. I've tracked down some images of cross-sectioned 19th century submarine cables. Many of them are similar to Art's. However, none of them are exactly like Art's cable. I'm learning a lot about how these cables worked. They all have rings of metal bars around, they all have some kind of insulation, and they all have a copper core which would carry the message. An engineer named Cyrus Field spearheaded the laying of the first transatlantic telegraph cable in 1858. It ran from Ireland to Newfoundland – that's more than 800 miles north of where Art found his cable. But it seems that later cables – laid by different investors and engineers – snaked south, too. According to this map, a couple of the later cables came straight



into Cape Cod. I'm traveling to Kingston, Rhode Island, to meet historian John Steele Gordon, who has written a book about the laying of the first transatlantic cables. This is a piece of cable.

John Steele Gordon: It certainly looks like a 19th century submarine cable. You can see armoring and then this is tarred hemp on the outside here.

Tukufu: The hemp coating protected the concentric metal rings, or armor, from rust and decay. That armor, in turn, protected the copper transmission wire. John explains that protecting and strengthening the early cables was a priority. The first cable, laid in 1858, failed after only a few weeks of operation.

John: I just happen to have a piece of the first one with me.

Tukufu: Wow.

John: It was very badly designed. And they tried to push too much electricity down it and they blew it up. It only worked for two weeks. It didn't work very well for two weeks. We have a complete transcript of everything transmitted over the 1858 cable and almost all of it essentially is "what?"

Tukufu: Despite that technical failure, John explains that the first transatlantic cable set the popular imagination on fire.

John: This was a big deal. It was the moon shot of the mid-19th century. The idea of being able to communicate instantly with Europe was just electrifying to the time. To give you an idea of how big a deal it was, there's a fresco in the Capitol dome that was decorated in the late 1860's and it shows Neptune Venus carrying the Atlantic cable across the ocean.

Tukufu: Well that's something to look for the next time I'm looking at the dome. John says that the later cables were much more robustly designed, thicker, and better armored. Would those cables have looked like this one?

John: They would look very much like that, yes.



Tukufu: Okay.

John: But by the end of the 19th century there was a cat's cradle of cables all over the world.

Tukufu: John tells me transatlantic cables were big business, both for the investors laying the cables, and for the turn of the century economy as a whole.

John: It allowed New York and London markets to operate together. And Wall Street loved the Atlantic cable.

Tukufu: How did they actually get this stuff in the water?

John: Well they would coil the cable, hundreds and hundreds and hundreds of miles onto a ship in these great big drums. They would just dig out the whole middle of the ship essentially. And then they would feed it off the end with cable laying machinery.

Tukufu: I ask John if there's any way to prove that this is one of those historic cables.

John: Well one thing that's very distinctive about 19th century submarine cables is a substance called gutta percha.

Tukufu: Gutta percha?

John: Gutta percha was a natural plastic. It came from a tree in Southeast Asia. And up until the 20th century that's what they used for insulation of the message bearing wires in the middle of the cable.

Tukufu: So to determine if my cable was actually from the 19th century, I would need to know that it has gutta percha in it?

John: Yep. And if you identify it as gutta percha then it's certainly a 19th century submarine cable.



Tukufu: Thank you very much. I'm heading to the University of Rhode Island, where I've arranged to conduct a test on Art's section of cable. I'm meeting Professor Chris Brown in the university's spectroscopy lab.

Chris: I see you brought your artifact with you?

Tukufu: I did. Chris explains that he needs to take a small sample from one of the rings of insulation, in order to conduct a comparative analysis. Gutta percha was once used for everything from golf balls to walking sticks.

Chris: The only use of gutta percha today is for filling root canals.

Tukufu: All right.

Chris: So we obtained a sample of the gutta percha from a dentist's office.

Tukufu: Chris shows me the unique chemical makeup of the dental gutta percha.

Chris: We're going to compare your unknown with this standard.

Tukufu: Chris explains that this machine – a spectrometer – consists of a diamond probe. When pressure is exerted on the probe, infrared radiation is introduced. The spectral fingerprint is a measurement of the degree to which certain wavelengths of infrared light are absorbed by the sample. So this is the fingerprint from my cable?

Chris: Exactly. The next part of this is to compare fingerprints. On the top we have your sample. On the bottom we have the dental sample.

Tukufu: And how do you translate this?

Chris: We can see that every peak in the gutta percha appears in your unknown sample. It's a perfect match.



Tukufu: So I have gutta percha in my submarine cable?

Chris: Exactly. It's definitely gutta percha.

Tukufu: But which cable was it? I'm heading to Nauset Beach near Orleans, Massachusetts. Art was vacationing with his family in this area when they found the cable in 1984. I wonder what happened to put that piece of cable on this beach on that day. Art told me that he remembered hearing something about a shipwreck near here a few months before he found the cable. I head to the Orleans Historical Society, to meet historian Bonnie Snow. I'm trying to find out about some kind of boating incident which occurred in 1984 down at Nauset Beach. Do you know of anything?

Bonnie Snow: We had a shipwreck; a freighter that came ashore.

Tukufu: Do you have any information about that?

Bonnie: Oh, yes we do, and I will go look it up. And why don't you make yourself comfortable.

Tukufu: Thank you. This is fascinating. It seems that a Maltese freighter named the *Eldia* found itself in trouble during a violent spring storm in 1984. This is just a couple of months before our guy, Art, visited the beach. With winds topping 80 miles an hour, the *Eldia*, despite weighing close to 10,000 tons, was helpless. The ship slammed into Nauset Beach. Luckily, all 23 crew members were saved. Listen to this: after the beach was cleared of the vessel several feet of heavy cable was discovered in the sand. Further investigation revealed that when the *Eldia* dropped both her anchors she snagged a telegraph cable of the French Cable Company. In all of my research into Art's cable, this is the first I've heard of the French Cable Company. Bonnie suggests that I visit a small museum run by local volunteers in Orleans. I'm meeting the museum president.

Tukufu: How you doing?

Jack: Hi, I'm Jack Barritt. What can I do for you?

Tukufu: I'm Tukufu. I'm trying to find out about this cable.



Jack: Well we have quite a bit of cable around here; this was an active telegraph station.

Tukufu: Jack tells me that the French Cable Company ran at least three transatlantic cables to the coast of Massachusetts in the late 19th century.

Jack: In 1898 they laid a cable directly to Brest, France. It was the longest cable ever laid at that time.

Tukufu: It was also the first transatlantic cable that did not require a relay stop in the Atlantic provinces of Canada.

Jack: This was really the first direct connection from the United States to Europe. Why don't we go into the operations room and we can show you actually how the equipment operated?

Tukufu: So how did this work?

Jack: Well, when they were sending a message it was coming through a small copper wire that's over 3,000 miles long. The electrical energy received at this end was just strong enough to move this hollow glass tube known as a siphon pen.

Tukufu: Wow! That's very thin. Jack tells me different electrical signals sent over the cable would move the pen in opposite directions.

Jack: If the pen wrote up, that was a dot in Morse code. If it wrote down, that was a dash. Things were not as clearly marked as you might expect.

Tukufu: Now my piece of cable was found in 1984. Have you ever seen anything like this?

Jack: Well yeah, that looks suspiciously like a piece of cable we have in another room.

Tukufu: Can we compare them?

Jack: Let's do it right now.



Tukufu: Look at that.

Jack: This is the cable that most closely resembles your cable.

Tukufu: Wow.

Jack: We see in the center the same seven-stranded copper wire. It's a pretty good match.

Tukufu: So my piece of cable washed up with the *Eldia* in 1984 off of Nauset Beach. Could this have been part of the cable that stretched all the way to France?

Jack: I doubt it. The direct line of from France came right through here.

Tukufu: Jack explains that the direct line from France entered the Orleans town cove from the northeast. Art's cable was found several miles to the south on Nauset Beach.

Jack: Because of its location, your cable couldn't have been part of the cable going directly to France.

Tukufu: Really? What Jack says next explains exactly what Art found on the beach. I can confirm that this is a piece of submarine cable from the 19th century.

Art: No kidding? That's really interesting.

Tukufu: This cable was some really important stuff when you think of it. It was part of a communication revolution. But I tell Art that figuring out which cable it was took a little doing. And I was able to find an answer for you after visiting a little museum in Orleans, Massachusetts. I explain that, because of where the cable was found, it was not a piece of the cable built in 1898 that went directly from Orleans to France. So what was my piece of cable part of? Jack tells me that Art's section was likely from an 1899 relay cable laid from Orleans to New York City.

Jack: This is really an extension of this whole direct connection with France.



Tukufu: That connection was an amazing part of history. Jack explains that during World War I, encoded orders to General John Pershing's army in Europe were sent from Washington via New York City, passing through Art's section of cable on their way to France.

Jack: They were important enough that we had the marines stationed here during World War I to make sure that this was not interrupted by any sabotage.

Tukufu: So your piece of cable was historically significant. It played an important role economically, politically, and militarily for the United States in its relationship with Europe.

Art: Wow. That's great. Great news. It's wonderful because we have this artifact knocking around the house for so many years and we never really knew the story of it, and now we do.

Tukufu: During the first half of the 20th century, the French cable carried thousands of messages, including news of Charles Lindbergh's successful transatlantic flight, and the German invasion of France during World War II. But soon, other technologies, like wireless telegraphy, began competing with submarine telegraph cables. And in 1956, the first transatlantic telephone cable was laid – a technology that swiftly made telegraph cables obsolete. The French cable sent its final message on November 24, 1959.