603: War Balloon

Tukufu: Our first story investigates a bizarre wartime attack on the United States kept secret from the American public. April 1942. Just five months after the bombing of Pearl Harbor, the U.S. is reeling from a string of Japanese victories across the pacific. The U.S retaliates by launching bombers from an aircraft carrier to strike Tokyo. The so-called Doolittle raid does minimal damage, but the attack on their homeland deeply humiliates the Japanese military. They want revenge, and spend the next two years pushing their scientists to develop a way to strike back at the American continent. Meet Corrie MacLaggan from Austin, Texas, who wants to know if one of her grandfather’s World War Two mementos might be a piece of one of these secret Japanese weapons.

Corrie: He has been showing me a lot his artifacts from World War Two, and telling me stories, and there is just one thing that is sort of a mystery.

Tukufu: I’m Tukufu Zuberi, and I’m intrigued by what Corrie might have.

Corrie: Hi. I’m Corrie.

Tukufu: Tukufu.

Corrie: Nice to meet you. Come on in.

Tukufu: Thank you. Okay, so what do you have for me?
Corrie: Well, this is a box of my grandfather's from World War Two. And, I have a piece of a Japanese balloon. He says he was involved in some kind of a secret mission at the end of the war that involved shooting down these balloons.

Tukufu: What was special about these balloons?

Corrie: I'm not really sure. All I know is it was top secret. He wasn't allowed to tell anyone, not even his friends or family.

Tukufu: Corrie and her grandfather have been talking about his war years recently, but he can't tell her for sure exactly what the piece is.

Corrie: I want to know is this really a Japanese balloon and what was this secret mission exactly?

Tukufu: Okay. Well, let me go try to find some answers for you.

Corrie: Okay. Thank you.

Tukufu: Top secret mission, Japanese balloons...I have no idea what this is about. Let's take it out of here. Feels like paper. Looks like paper. Is it part of a balloon? I don't know. I don't know what they made balloons out of. If I'm going to authenticate this fragment, the first thing I want to do is talk to Corrie's grandfather, 87-year-old Sandy Bauman. I was thinking that maybe you could give me a little more information to go on.
Sandy: Well, I'll be glad to if I can.

Tukufu: Sandy tells me he was an Air Force pilot assigned to night patrols in a P-61 fighter along the west coast when he got called to a top secret mission in early 1945. He was told that a new and deadly threat was being launched at the United States from Japan – a fleet of bomb-carrying balloons. Sandy's job was to find these balloons and shoot them down before they dropped their deadly payload. From the beginning, it was a mission shrouded in secrecy.

Sandy: We were just ordered to fly to Paine Field in Washington, and didn't know why we were even going there. We found out when we got there that it was because there were Japanese balloons that were floating in. And we were allowed to tell nobody.

Tukufu: Is this part of a balloon that you shot down?

Sandy: I didn't shoot down any balloons.

Tukufu: So, how did you get this?

Sandy: I'm not sure how I got it somebody when we left the area, one of the high ranking, uh, officers, whose name I don't have, said, "well, you've been up here and done your best and went...here's a little souvenir for you. This is a piece that we cut off from one that actually, uh, landed. It's kind of mysterious, isn't it?

Tukufu: It is mysterious. It is mysterious. Well, let me go see what I can find out, alright?
Sandy: Alright, fine.

Tukufu: Well, thank you very much.

Sandy: You bet.

Tukufu: The official history of Sandy’s Air Force unit contains no mention of the secret counter-mission he described. But I find a lot of material online. From late 1944 to early in 1945, the Japanese launched thousands of these bomb-carrying balloons into the jet stream towards North America. The Japanese military gave them a secret codename: Project 32, also abbreviated as Fu-go. They were designed to release some kinds of bombs over the western United States, creating devastating fires throughout the region. Is Sandy’s memento really from a once-secret Fu-go balloon that quietly carried bombs across American skies? I’ve come to the Smithsonian’s National Air and Space Museum Udvar Hazy Center in Northern Virginia. I’m meeting Tom Crouch, senior curator of aeronautics, and an authority on lighter than air weapons like the balloon bomb. Tom has something he wants to show me. Now, what is this?

Tom: This is the working part of a Fu-go balloon bomb. This wooden box up here holds the batteries and aneroid barometers. These are the ballast bags.

Tukufu: Tom explains the ingenious mechanism measured air pressure, and alternately released gas and ballast bags, allowing the balloon to ride the air stream well over the U.S. mainland.

Tom: The Japanese thought that was their best bet for doing damage in the western U.S. was to
start forest fires. The white and black things that you see sticking out the side are incendiary bombs. And, ah, this thing hanging down in the center is a high explosive bomb.

Tukufu: Talk to me about what's going on in Japan at this time. Why send these balloons?

Tom: Japan at the time was literally going up in flames. Uh, the American b-29 were burning Japanese cities to the ground.

Tukufu: Japan’s military leadership was hoping their balloon bombs would make Americans feel as vulnerable to mainland attack as they did.

Tom: So this is really a desperation weapon. Uh, the Japanese had come up with this as a terror weapon that, uh, they could use to strike back at the United States.

Tukufu: Tom tells me that today many Americans are unaware of the balloon bomb offensive. That’s partly because, in January of 1945, the U.S government instituted a censorship program designed to keep information about the balloon bombs out of the press. Now, why all the secrecy, if these devices were actually dangerous to the U.S. population?

Tom: The real concern was that if the Japanese realized that the project was working, that some balloons were actually making it all the way across the ocean, uh, they might begin sending, uh, balloon bombs with chemical or biological weapons onboard. And, of course, that could have done horrific damage.
Tukufu: So how successful was this, ah, censorship program?

Tom: It was successful; it worked. By May of 1945 when the Japanese were not getting any indication that the balloons were getting through, they put their resources into other efforts.

Tukufu: The news blackout wasn't the only weapon used against the balloons. Tom confirms how secret air patrols like Sandy's patrolled the pacific coast looking to strike the balloons down before they reached the mainland. The intercept mission was called “sunset project”. So this is the kind of plane that Sandy Bauman would have flown during World War Two?

Tom: It is exactly the type, it's a P-61. They're really rare today. There are only four of these left in the world. These airplanes were built as night fighters, which means that it's designed to, uh, hunt and shoot down enemy aircraft at night. So they're radar equipped. They can see five or six miles out at potential targets.

Tukufu: Have you ever seen anything like this before?

Tom: Yeah, it kind of looks like part of a Fugo balloon envelope. And we have balloon envelopes, but they aren't here.

Tukufu: Really? Where are they?

Tom: Well, they're at our Paul Edward Garber facility in Suitland, Maryland.
Tukufu: I’ve come to the Smithsonian’s storage facility in Maryland to meet Bob Mikesh.

Tukufu: How are you doing? I’m Tukufu Zuberi.

Bob: Hello there, I am Bob Mikesh.

Tukufu: He’s studied balloon bombs for over 40 years, and is an expert on their construction. Perhaps among all these boxes and crates is an answer to our mystery. It's my understanding that you have one of these Japanese balloon bombs here.

Bob: We sure do. And here it is.

Tukufu: Fantastic. What kind of paper is this made of?

Bob: It's made from the root of the mulberry tree. And that's where they got the fibers for this manufacture of paper.

Tukufu: Now who made this paper?

Bob: Well, mostly it was done by school children.

Tukufu: School children built these balloons?
Bob: A lot of them did, yes. They would go to school about half a day and then they would disappear onto the manufacturer grounds of whatever they’re assigned to do. In this case, to make paper bombing balloons.

Tukufu: Now how many of them did they make?

Bob: Roughly…it was around ten thousand of them, of which they launched seemingly around nine thousand.

Tukufu: And how many of them arrived in the United States?

Bob: Well, that’s a good question; it’s estimated maybe a thousand.

Tukufu: Although more than 300 hundred Fu-go’s did make landfall and start small fires, their greatest nuisance was to the American war effort, diverting resources like Sandy’s mission away from overseas targets. One Fu-go even delayed plutonium production for an atomic bomb destined to be dropped on Japan, when it hit power lines in Washington State, knocking out power to the Hanford nuclear reactors. But the government censorship program had a tragic side effect. In May of 1945, a minister and his wife had taken some children on a church picnic near Oregon. The kids discovered an unexploded balloon bomb. Not knowing what it was, they tried to move it. It detonated, killing the minister’s wife and the five children. What I’m trying to find out is if this piece of paper comes from a balloon just like this.

Bob: Well, let’s compare it here more closely.
Tukufu: Our fragment looks like the material from the balloon. But bob says that to make a definitive match, we have to do a materials analysis.

Bob: Now we have laboratory analysis of the paper here. So you can take that, have a laboratory test run on your piece of paper, and compare the two and see how they come out.

Tukufu: Before I go, Bob presents me with some information from the army archives...a list of sites where bomb balloons were recovered.

Bob: You said that your...the fragment that you have came from an individual that was stationed at Paine Field. And if you'll notice, 115...

Tukufu: "Paine Field, Everett, Washington. 13 March. A badly damaged balloon and ballast dropping apparatus." Okay, this is good news.

Bob: That's it...

Tukufu: Thank you very much. Lynn Brostoff from the Smithsonian's museum conservation institute will compare our sample with authenticated pieces of a fu-go from their collection. So what do we do?

Lynn: Well, we can actually take an infrared beam, pass it through this tiny diamond crystal, and bounce it off the surface.
Tukufu: And what will that tell us?

Lynn: We can get very interesting information about the chemical nature of the coating. We’re ready to run, and this is the infrared spectrum of Mr. Bauman’s sample. We’ve already run an infrared spectrum of the Smithsonian’s sample. And we can compare them. They’re very similar, but they’re not quite identical.

Tukufu: To know for sure, Mel Wachowiak, a senior conservator at the Smithsonian, compares the structure of the samples under a high-powered microscope. First we look at the Smithsonian’s balloon bomb paper.

Melvin: Can you get a sense of the three layers there?

Tukufu: Yes I can. That is fantastic.

Melvin: The paper was said to be, at minimum, three layers thick for the balloons.

Tukufu: Next…our fragment.

Melvin: Here it’s, uh, delaminated. And I’m seeing two. They are similar, but the number of layers is not the same.
Tukufu: So, what do we do next?

Melvin: Well, the only way that we're gonna really be able to see structure in something so thin is cross-section microscopy.

Tukufu: Let's do it.

Melvin: Okay.

Tukufu: So what do we have here?

Melvin: I have embedded both samples of paper. Embedded them in epoxy and polished them so that I can see a cross-section.

Tukufu: Okay. And what did you find?

Melvin: Well, the Smithsonian example definitely has three layers of paper. It's very distinct. And the example that you brought….

Tukufu: This last test gives me the information I need for Corrie and Sandy. Your little bitty piece of paper turned out to be quite an item for investigation. Here's the big question. Is your piece of paper part of one of the Japanese balloon bombs? To answer that question, I had to get some special help.
Melvin: And, the example that you brought also has not two, but three layers. And if was presented with both samples and asked whether I could say if it was from the same item or not, I would be hard pressed. They are that close that they could be from the same object.

Tukufu: What the experts told me is that they could not tell the difference between their paper and your paper. Your piece of paper is definitely from one of those Japanese balloon bombs.

Sandy: Very, very interesting.

Corrie: It’s real.

Tukufu: Probably what you have here is a piece of a Japanese balloon bomb that landed at Paine Field.

Corrie: Wow.

Sandy: Well, thanks a lot.

Corrie: Thank you.

Sandy: We really appreciate this information.

Tukufu: It’s estimated that around 1,000 Japanese balloon bombs reached North America. Yet as of
today only 389 have been accounted for. There’s a very real possibility that many of these dangerous relics of a long ended war remain hidden almost anywhere in the seldom-visited forests and wilderness areas of the west. If you are ever out hiking and see anything that resembles this, please don’t touch it or attempt to move it. Note its exact location, and contact local authorities immediately.