



Offbeat Oregon History

Would inventor's silver steam-powered airship have worked?

BY FINN J.D. JOHN
For the Sentinel

Ironically enough, it was on the first day of winter — the winter after the 1929 stock-market crash that kicked off the Great Depression — that Oregon inventor Thomas B. Slate's dream of a business empire built on shiny silver steam-powered airships received its death blow.

Slate had left his native state several years earlier and made a fortune by inventing and commercializing the production of "dry ice" — frozen carbon dioxide. Then he'd left, sold his company and moved to Glendale, Calif., to launch a new venture: A nationwide line of passenger airships based on a revolutionary design he had worked out.

At first glance, the design looked ridiculous — like a piece of science-fiction hopefulness sketched out by an amateur without the benefit of any scientific or engineering knowledge. This initial appearance — together with the fact that Slate was best known for his innovations in dry-ice manufacture rather than for his aeronautical work during the First World War — has fooled more than one observer into assuming its inventor was just another rich guy with too much money and not enough knowledge, trying to force the laws of physics to conform to his dreams.

The Slate dirigible was shaped like a colossal teardrop, with a big blunt front and a tapering-away tail. A long, streamlined cabin stretched along the bottom, with room for about three-dozen passengers and crew to dwell in comfort and luxury during the anticipated 36-hour transcontinental journeys the airship would make.

Its hull was made entirely of aluminum, built in strips that were folded together in a specially patented gas-tight manner and riveted in place, with deep symmetrical grooves leading from the nose back to the tail. At the front of the hull, on the tip of the nose, could be seen an improbably tiny, odd-shaped fan or propeller of sorts; at the tail, an equally improbably tiny set of control surfaces — rudder and horizontal stabilizers.

These elements were at the heart of the revolutionary design that Slate had created. The fan on the front was an impeller — a steam-powered blower that sucked great volumes of air out of the space just ahead of the airship and blasted it out to the sides in a great sheet of wind. This sheet of wind would be drawn to curve around the front of the airship by the venturi effect, creating a cushion of moving, partially evacuated air that would suck the hull forward even as it buffered the big airship from atmospheric turbulence. This artificial wind would have abated considerably by the time it reached

the tail surfaces, but it would still be quite strong enough that only very small ailerons and rudders would be needed.

Pipe-dreamy as this plan sounded, it apparently worked fantastically well — at least, it worked fantastically well on the scale models Slate had tested in the wind tunnel at New York University. If the models scaled, Slate reckoned the full-size dirigible would require just 400 horsepower to transport 21,000 pounds of airship, passengers, crew and luggage through the air at up to 100 miles per hour.

This propulsion system would make Slate's design ridiculously cheap to operate. In addition, the system of offloading passengers via an elevator car traveling up and down a cable hanging beneath would make it possible to operate with complete independence of airfields and other expensive ground infrastructure — except for hangars to park the big things in when not in use.

Slate envisioned a nationwide airline network served with his big silver-teardrop airships shuttling passengers anywhere and everywhere in comfort, luxury and profitability. And the first step toward that goal was to get his first prototype model into the air so that all the doubters could see that his revolutionary propulsion system would work.

So the inventor got busy in his giant blimp shed, working on construction of the first model — which, with an eye toward public relations, he dubbed the "City of Glendale."

Throughout the spring, summer and fall of 1929, the City of Glendale took shape. City residents flocked to the airfield on each of the days when it was taken out and tested. Slate worked tirelessly to get the big airship ready for its maiden voyage.

As the ship neared its launch date, Slate made a few changes here and there; the high-pressure boiler was giving him trouble, so he left it out and purchased a big radial aircraft engine. It's not clear whether this was a temporary measure for testing, or if he'd actually given up on steam as a power distribution system.

Finally, the big day came. In what would later seem a bitterly ironic twist, it was the first day of winter. But it was a warm day, and a beautiful one. Out came the City of Glendale, ready to show what it could do.

But as the Slate Aircraft Company crews busied themselves getting the big bird ready, the warm Southern California sun was beating down directly on the aluminum hull, and it was warming up. Soon the helium inside was expanding ... and it soon became clear that the pressure-release valve had gotten stuck.

A sharp, explosive pop rang out. Bystanders ducked; it sounded like a gunshot. And then another, and another. Rivets were being torn out of

the big dirigible's hull.

And then, with a sigh of escaping gas, the City of Glendale settled wearily down onto the tarmac and lay over on its side.

Slate was, of course, dismayed. But as yet he had no idea that his dream had just been destroyed. That came when the big dirigible was back in the shop, a week or two later, when he and his construction crews came to a horrible realization:

The envelope was not fixable. Because of the way each piece of aluminum interlocked with every other piece, the only way to replace the missing rivets and torn strips of aluminum would be to disassemble the whole thing, like a jigsaw puzzle, and start from scratch.

Had Slate used screws instead of rivets, that would have been do-able, although hardly pleasant. But when he'd engineered the big dirigible, he hadn't even considered the need to periodically repair pieces of the hull.

Slate got busy immediately, trying to raise the funds he'd need to build a second model. But the world had changed radically just two months before, on Oct. 29, 1929. The country was just plunging into what would become the Great Depression. Investors had stopped investing and started trying to salvage as much of their nest eggs as they could. There was no money available.

Some attempts were made to re-start the project after the disaster. Nothing worked out, though. Finally, in 1931, the Slate Aircraft Company filed for bankruptcy.

After the company failed, Slate's son Claude took the lead in trying to interest others in picking up where his father had left off, even sending a proposal to the U.S. Congress with an eye toward earning a grant. Nothing came of this at the time, probably partly because of the counterintuitive nature of the engineering systems Slate developed. After 1937, reviving the idea became almost an impossibility, as the Hindenberg disaster had soured almost everyone on the very idea of airship travel.

Eventually, Thomas Slate and his family found their way back to Oregon and settled back into life in Slate's old home town of Alsea. He continued to invent things, and his patent filings continued to show a Tesla-like ability to re-imagine and innovate. They included a cyclone-generating device for removing smog from the air, a radically re-imagined flying-boat design. He died a week before his 100th birthday, on Nov. 26, 1980.

(Sources: Slate Aircraft Co. Website, slateaircraft.com; Benton County Historical Society, bchsnw.org; Flight Magazine, Feb. 7, 1929; Radecki, Alan. "Slate's Strange Dirigible," vintageairphotos.blogspot.com, 20 Aug 2013)

LETTERS TO THE EDITOR

Thanks, Dian

Dian Missar passed away last week. She was a founding member of the Blackberry Pie Society and served as our secretary for many years. Her moral certitude combined with her unwavering, yet gentle approach to progressive political activism sustained the Blackberry Pie Society's creative, fun and innovative approach to raising political awareness in Cottage Grove.

We will carry on without her, but we will never stop asking ourselves, "What would Dian do? What out-of-the-ordinary idea would she come up with?"

We will do our best to imagine the answer, but we are all well aware we can never replicate or even emulate what she would have done or said. Dian was our creative rudder, and we miss her as will countless others in the Cottage Grove community that she so loved and nurtured.

The Cottage Grove Blackberry Pie Society:
Cathy Bellavita
Leslie Rubinstein
Steve Kilston
Julie Parker
Gail Hoelzle
Alice Doyle
Brian Forge

Freedom of speech is protected

If there is any truth to what I heard on NPR this morning than we should be shocked.

Donald Trump would, if elected, propose to bring libel suits to all press organizations that have ever made false accusations or lies against him. (NPR this Saturday morning on KLCC at 9 a.m.)

Anyone who has ever read the U.S. Constitution will see that the First Amendment specifically protects the freedom of speech of everyone. Donald Trumps' lat-

est comment really is an insult to freedom of speech, and to the Constitution. Just because he disagrees with press coverage is well known. That he would make threats to curtail this puts him in good company with Vladimir Putin of Russia, who has no regard for one of our most dear rights. Do we want to live in a society where the press is censored or even self-censors itself out of fear of reprisals?

Charles Ames
Cottage Grove

Other costs?

I just read the article outlining the costs for the proposed new tax levy regarding the building of the new Harrison school and all the other costs. As I was going down through the list of items wanted with the new bond levy, I read the "other costs" item totaling \$6,173,285.

If this tax bond is going to get my "yes" vote, I want to know what the other \$6 million-plus is exactly. I know of no one who would give me a loan for "other costs" without knowing exactly what I was asking for.

I believe it is only by being fair and being transparent with the bond amount that a passage of the bond will succeed. And by the way, I did vote yes for the new high school, but a voter must have better information on where our hard-earned money will be going.

Rod Cameron
Cottage Grove

Editor's Note: In a Monday meeting, South Lane Superintendent Krista Parent said that many of the "Other Costs" concern the furnishings, building permits, fees, etc. necessary to build the new Harrison Elementary School. Parent also stated that she would request an itemized list of those costs from BLRB Architects, a list that will appear in an upcoming Sentinel.



Green vegetables protect the heart

BY JOEL FUHRMAN, MD
For the Sentinel

Green leafy vegetables are superior to other foods in their nutrient density, and un-

surprisingly, greater intake of leafy greens is associated with reduced risk of cardiovascular disease. Greater consumption of cruciferous vegetables (a family of vegetables known for their

anti-cancer effects, it includes many leafy greens such as kale, cabbage and bok choy), are similarly associated with lower risk of death from cardiovascular disease and from all causes.

Oxidative stress is known to be a significant contributor to the development of cardiovascular disease. Our antioxidant defenses are a combination of dietary compounds and the body's own antioxidant enzymes, and there is evidence that when we eat cruciferous vegetables, their phytochemicals signal the body to produce its own protective antioxidant enzymes by activating a protein called Nrf2.

Nrf2 is a transcription factor,

a protein that can increase or decrease the expression of certain genes. Nrf2 works by binding a specific sequence present in genes called the antioxidant response element (ARE). In the presence of certain phytochemicals, Nrf2 travels to the nucleus of the cell to induce that cell to produce natural antioxidant enzymes and protect against inflammation. Essentially, Nrf2 is a messenger through which beneficial phytochemicals from the diet turn on the body's natural antioxidant and anti-inflammatory protection mechanisms.

For example, one study on sulforaphane (a phytochemical found in broccoli) showed that once activated, Nrf2 suppresses the activity of adhesion molecules on the endothelial cell surface to prevent binding of inflammatory cells and therefore retard atherosclerotic plaque development. Another study

showed that sulforaphane and other isothiocyanates (cruciferous vegetable phytochemicals), by activating Nrf2, blocked inflammatory gene expression and oxidative stress in endothelial cells inhibiting aging of the vascular tree. Sulforaphane also helps maintain the integrity of the blood-brain barrier, a vascular system that is crucial for proper brain tissue function, via activation of Nrf2. The point is that cruciferous vegetables are essential for excellent health and promotion of maximum lifespan.

Other phytochemicals that can activate Nrf2 include anthocyanins (found in berries), EGCG (found in green tea) and resveratrol (found in grapes and peanuts). Exercise may also activate Nrf2. In contrast, smoking suppresses the protective actions of Nrf2; human endothelial cells exposed to the blood of smok-

ers compared to non-smokers showed decreased Nrf2 expression, reducing antioxidant defenses. Not surprising that smoking and green vegetables have opposite effects!

Research on phytochemicals and the protective effects Nrf2 is still in its early stages, and as we learn more, we can expect exciting advances in the understanding of how phytochemicals work to promote health and extend lifespan.

Dr. Fuhrman is a #1 New York Times best-selling author and a board certified family physician specializing in lifestyle and nutritional medicine. Visit his informative website at DrFuhrman.com. Submit your questions and comments about this column directly to news-questions@drfuhrman.com.

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If you would like to submit an opinion piece, Another View must be no longer than 600 words.

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