

Linus Pauling: Portland's Nobel Prize winner

By Larry Leonard

Webster's defines rebel as "one who resists the lawful authority of a government" and as "one who is defiant." Somehow, the image of a young man with a switchblade and a hotrod first comes to mind. All Linus Pauling reminds you of is somebody's grandfather.

This unusual man has, in his time, resisted the lawful authority of a government. In 1960, he presented a petition to the United Nations. On it were the signatures of 11,021 scientists from around the world. They wanted atmospheric atomic testing halted. A United States Senate internal security subcommittee demanded the names of the people who helped Pauling circulate the petition. They even threatened him with contempt of Congress, but he kept his own counsel. He did not reveal those names.

In 1962, he was invited to the White House for dinner. Before he went inside, he picked up a sign and joined a group of Quakers who were picketing the place. When it was time to eat, he left the sign leaning against the fence and walked in to join the president and the other guests. John F. Kennedy, greeting him in the reception line, dryly remarked, "I understand you've been around the White House for some time already."

Jackie added, "When Caroline saw you out there, Dr. Pauling, she came to me and asked, 'What has daddy done wrong, now?'"

On February 23 of this year, Linus Carl Pauling turned 85. There's little question that in many ways, this was his century. Born and bred in Oregon, his credits would make a tenured Massachusetts Institute of Technology department head weep with envy.

He has written numerous books, including: "The Nature of the Chemical Bond," "The Architecture of Molecules" (with Roger Hayward), "The Structure of Line Spectra," "General Chemistry," "College Chemistry," "Introduction to Quantum Mechanics" (with E.B. Wilson, Jr.), "No More War," the controversial "Vitamin C and the Common Cold" (in a later edition: "Vitamin C, the Common Cold and the Flu") and his more recent work, "How to Live Longer and Feel Better."

He's also authored articles, technical reports and monographs: more than 400 to date. Pauling had received 29 honorary doctorates by the late 1970s. He is a member of 16 scientific societies in 10 countries, and has been awarded more than 20 of the world's top scientific medals, including the U.S. Presidential Medal of Merit.

And he has received two unshared Nobel Prizes.

Nobody, not Marie Curie, not Albert Einstein, has done that.

This gentle intellectual began life right here. Born in Portland in 1901, his roots go deep into Oregon soil. His maternal grandfather, Linus Wilson Darling, came out west in the early 1880s. Why the young attorney decided to settle in Wasco County, at Moon Rock, is not recorded. What is recorded is that he couldn't make a living at law and so started a store.

That wasn't a hit, either, so the store was abandoned in what is now known as Darling Canyon. The family headed for Summit Springs, which is now Condon. It was there that Linus Darling's daughter, Isabel, met and married Herman Pauling. Their firstborn was Linus Pauling.

He came by his individualistic manner quite

naturally. His sister, Pauline Emmett, shared the following information from a record she compiled of the Pauling family history:

"All the Darlings were highly intelligent people, although some had quite a percentage of oddity. Will Darling, or Bill, Linus Darling's brother, was a paper hanger and a painter. He was also a confirmed spiritualist. His 'control' was an Indian named Red Cloud. Chatting with the spirits was an evening affair with Bill. He was trying to get the spirits to tell him the location of the lost gold mine in the Lone Rock Country.

"Linus' aunt, Stella Darling, was a safe expert. She could open any safe and had a national reputation. She once traveled to London, England, to open a safe."

Pauline was born in the east, then the family all moved to Lake Oswego to run a drugstore. A second daughter, Lucille Jenkins, was born there. When Linus was five, they moved to a home in Portland.

He could read and write by then. A few years later, his father penned the now-famous letter to the *Oregonian*, asking assistance in the form of a reading list for the child. Young Linus studied Darwin and Dante before most kids mastered comic books. At 17, he was a freshman at Oregon Agricultural College, now Oregon State University.

"He lacked one credit for his high school diploma," remembers Jenkins. "It was an academic dispute between Linus and the principal. But I'm sure they didn't even require him to take a test at the college. I recall he was the

youngest freshman that was taking calculus."

In 1922, he received his bachelor of science degree, then went on to graduate study at the California Institute of Technology. A Guggenheim Fellowship followed and Pauling was off to Europe to study with the world's leading theoretical physicists. When he returned to Cal Tech, he assumed a full professorship in the chemistry department, soon becoming chairman of the division of chemistry and director of the Gates and Creslin Laboratories. He was 36 at the time.

"Linus was *always* thinking," said Jenkins. "His mind was just active all the time, wondering about

this and that and the reasons for them. I recall so vividly one time when we were waiting for the train at the Jefferson Street depot, to come out to visit Grandma and Grandpa in Oswego. It was a very cold morning and Mother and I were standing close together, and Linus was walking around a little bit in the cold air. He said, 'Mama, I know why you don't get so cold if you are moving around. Your feet aren't on the ground but half the time!'"

Nobody is going to argue the reasoning behind that idea. (Though there might be something to it, for all we know.) The point is that the thought was original. It showed a knack, a twist of intellect.

The ability to imagine a different answer, one that nobody else has thought of, is critical to scientific advancement. An idea can lead to a hypothesis—and *that* is something you can test.

This incessant curiosity was the driving force behind the incredible career that followed. Pauling's areas of study progressed from inorganic chemistry dealing with crystals and gas molecules to the highly complex organic molecules. It was Pauling who discovered the alpha-helix, which formed the basis for understanding the molecular structure of proteins.

In 1935, he began working on hemoglobin (the element that makes your blood red). In 1945, he discovered that sickle-cell anemia, a disease that attacks only blacks, was caused by abnormal hemoglobin molecules.

In 1954 he won the Nobel Prize in chemistry for his work on molecular bonds. His later campaign against nuclear testing brought him his second

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Nobel, the peace prize, in 1962. As has been mentioned, that work reaped a whirlwind of controversy. These days, Pauling remains controversial for his views on vitamin C (or "orthomolecular medicine" as he calls the treatment of disease by affecting changes in body chemistry). His interest in the subject originated with an attack of nephritis, a kidney disease, in 1941.

He remembered the process in an August 1977 interview in *Science Digest*: "(The inflammation) gradually improved under nutritional therapy. I was essentially put on a low-protein diet, with no meat, to rest the kidney. The physician also said that I should take supplementary vitamins, one of which was vitamin C.

"Several years later, biochemist Irwin Stone got me interested in large doses of vitamin C and niacin for the treatment of schizophrenia. In 1969, I gave a talk in New York at the opening of the new Mount Sinai Medical School, and I mentioned the value of large doses of vitamin C. One of the professors of medicine wrote me a very strong letter, giving me the devil for supporting the 'vitamin quacks' and for suggesting that vitamin C had any value."

A debate followed. And Pauling dug into the studies and concluded he was not wrong on the subject. He wrote "Vitamin C and the Common Cold" and was once again in hot water.

That's not to say that his life doesn't have placid moments. A widower (his wife Ava was once his student), he enjoys the company of his children and grandchildren. Living near the Stanford University campus in Northern California, he keeps busy with research and writing projects. The issue of aging interests him greatly—its chemical and emotional aspects. There's always some new project spurring him on. Even at 85, this Oregon original remains electrically alive, intellectually vital, magnificently creative, and, yes, a little bit rebellious.

As Linus Pauling sees it

The outspoken Dr. Pauling has never been reluctant to state his opinions. Witness a small sampling inspired by current events and issues.

On funding of the space program: "I think it's pretty interesting, the discoveries made in the space program. But thousands of other discoveries could be made if the same amount of money was spent studying the human body, the vectors of disease and molecular biology."

On the teaching of creationism and evolution in public schools: "Evolution is a great body of scientific fact that should be taught to students at every stage of their educations. It's hard for me to see any justification for mentioning creationism in schools, especially in view of the fact that our

government was constitutionally set up independent of religion."

On bringing solar power to the consumer: "We know how to do the job—solar energy is part of the power supply in these space vehicles. But present technology (as it relates to consumer use) is too expensive. More money should be put into developmental research."

On scientists having a moral responsibility for their work: "Scientists, I think, have the responsibility to educate their fellow citizens and to express their opinions, but not to determine the fate of the world. I believe the people as a whole, not just scientists, should determine the fate of the world."