LINUS PAULING: CRANK OR GENIUS?(Accuracy in Media 1994)

Jon Franklin, a two-time Pulitzer Prize winner for the Baltimore Sun, recently spoke bitingly of reporters who spread what he called the "myth" that Agent Orange, the defoliant used in the Vietnam War, caused cancers, birth defects and other medical calamities. Many of these reporters had the attitude, "Now we're going to hang the bastards," he told media writer David Shaw of the Los Angeles Times. "A lot of them were advocates. This sickened me. It really shook me as a journalist."

Although Franklin named no names, perhaps one man he had in mind was Richard Severo, who ballyhooed the Agent Orange myth in The New York Times in the 1970s when he covered the environment. Severo's zest for advocacy journal- ism, among other problems, eventually caused editors to relegate him to less controversial assignments, including writing obituaries. The same fate befell Alden Whitman in the 1950s after it was revealed that he had long been a member of the Communist Party. Whitman converted Times obituaries into a potent propaganda weapon, glorifying villains such as Mao, as long as they were on the left. Severo recently proved himself to be as adept as Whitman in polishing the images of departed leftist scoundrels.

Severo's subject was Dr. Linus Pauling, who died of cancer on August 19 at age 93. His hero's sendoff in The New York Times covered almost a full page. Severo called him a "brilliant chemist and an untiring political activist," who received Nobel Prizes both for chemistry and peace. (Bart Barnes, in The Washington Post, gave somewhat more stinting praise, calling Pauling both "brilliant and controversial.")

But in polite deference to Pauling's prominence as a far-leftist.

This article was based on research provided by Dr. Thomas H. Jukes, a member of AIM's National Advisory Board.

Severo's lengthy obituary skirted around kookier details of his career. In his own field of chemistry, Pauling was frequently criticized as grabbing credit for research done by colleagues. When he ventured into medicine, as a windy advocate of Vitamin C as a cure-all panacea for everything from the common cold to AIDS and drug addiction, Pauling defended such quacks as a California physician who treated cervical cancer with coffee and buttermilk enemas. He was tantamount to a food faddist poster boy during his last decades.

In political affairs, Pauling was the epitome of the useful idiot so skillfully exploited by the Soviet Union during the Cold War. He lent his name---and prestige as a Nobel laureate---to a nuclear ban campaign orchestrated by the Kremlin. That the campaign put his own nation at risk did not concern Pauling, a chronic publicity hound. Wearing his trademark black beret, Pauling pranced on picket lines from Washington to San Francisco, a puppet of Soviet operatives working to weaken America's defense and internal security agencies.

Dr. Thomas Jukes, professor of medical physics at the University of California at Berkeley, and a member of AIM's national advisory board, was a Pauling watcher for years. He questioned whether Pauling's celebrity was due to original work or a knack for self-promotion. Jukes wrote, "Was Pauling mentally superior to practically all other human beings? Did his mind work faster and better than any others? He alleged that his meditations produced insight that revealed the answer to scientific problems. Did he have unique mental powers in this regard? Was he a real scientific super-giant? Or was he unusually skilled at using the ideas of other people and publicizing them as his own?"

As an example of Pauling's glory-grabbing, Jukes cited his claim to the discovery of the alpha helix in protein structure, a landmark event. James Watson, in his book The Double Helix, described how Pauling had presented his claim during a lecture: "The words came out as if he had been in show business all his life. A curtain kept his model hidden until near the end of his lecture, when he proudly unveiled his latest creation. Then, with his eyes twinkling, Linus explained the

specific characteristics that made his model--the alpha helix-uniquely beautiful."

But as Jukes noted, "The alpha helix was not his discovery. It was that of a black colleague, Dr. Herman Branson." Branson later became president of Lincoln University in Pennsylvania. Branson gave his account of the discovery in a 1984 letter to persons writing a Pauling biography.

In 1948-49, while working under Pauling at the California Institute of Techology, Branson was asked to do research on how amino acids might be arranged in a protein molecule. To summarize a very technical scientific matter, Branson proposed a single helix. Pauling disagreed with Branson, telling him that it was "too tight" to fit a protein molecule. But Branson went ahead and constructed a model showing the alpha helix. A Pauling associate named Corey saw it and said, "Well, I'll be damned." Branson wrote up his findings in the summer of 1949 and went on to other work.

A year later Pauling wrote up the discovery listing Corey and Branson as co-authors. In 1988 he published a book in which he took all the credit for the discovery, saying that he found it by folding paper. Branson was not mentioned. Branson wrote that he "resented" how Pauling had handled the matter.

Pauling's biographers, Ted G. Goertzel and his parents Victor and Mildred, wrote, "In the case of DNA, Pauling rushed into print with a paper that incorporated errors so basic that they should have been caught by any student who has mastered Pauling's introductory chemistry text....Apparently Pauling was willing to risk making errors in the hope that he would be given credit for publishing the first, even if partly incorrect, model of DNA."

Jukes showed that Pauling took credit (along with colleagues) for findings concerning molecular disease that actually had been documented by a British scientist, Dr. A.E. Garrod, in 1908---when Pauling was seven years old.

IgNobel Conduct

Pauling's most publicized legacy, his advocacy of mega-doses of Vitamin C to counter cancer and' the common cold, well could be a legacy of harm to human health. Pauling's zealotry persuaded millions of Americans to put their faith in Vitamin C. Unfortunately, few of these persons realized the dangers they incur by following Pauling's advice.

Pauling commenced his Vitamin C crusade in 1966, when (at age 65) he casually remarked at a banquet that he would like to live 15 or 20 years longer. A man named Irwin Stone suggested taking massive doses of Vitamin C. Rather than doing any scientific research on whether the substance actually helped human health, Pauling eagerly signed on as a Vitamin C advocate. His book, Vitamin C and the Common Cold, published in 1970, was a national best-seller for weeks. He claimed that one gram daily would cut the incidence of common colds by 45 percent for most persons, and that others might need larger amounts. A second edition, issued in 1976 as Vitamin C, The Common Cold and the Flu, recommended even higher dosages.

No less than 16 clinical studies concluded that Pauling was preaching nonsense. One of the stronger dismissals came from the American Psychiatric Association, in contesting Pauling's claim that vitamin therapy might alleviate schizophrenia. The APA wrote, "The credibility of the megavitamin proponents is low. Their credibility is further diminished by a consistent refusal over the past decade to perform controlled experiments and to report their results in a scientifically

acceptable fashion. Under these circumstances, [the APA] considers the massive publicity which they promulgate via radio, the lay press and popular books...to be deplorable."

Severo's obituary did mention that researchers at the Mayo Clinic and elsewhere had challenged Pauling's claim about the efficacy of Vitamin C as a cancer preventative. But he gave surprisingly short shrift to a tumultous episode involving Dr. Arthur B. Robinson, a onetime Pauling student who later worked at the Pauling Institute of Science and Medicine. In the 1970s Robinson did clinical tests on mice to evaluate the physical effects of high dosages of Vitamin C. To the dismay of his mentor, Robinson discovered that the quantities of Vitamin C recommended by Pauling doubled the incidence of skin cancer.

Pauling responded by firing Robinson and destroying his laboratory data and killing the experimental mice. He also accused Robinson of "amateurish" science. Robinson sued Pauling and his institute for libel and slander and collected an out-of-court settlement of $575,000--of which $425,000 was for damages, the remainder for legal fees. (An exhaustive account of the Robinson affair ran in Barron's on June 11, 1979.)

The Robinson case was important because it showed that Pauling wittingly suppressed the scientific record in order to protect his unproven Vitamin C theories. Why was he so vigorous in defending a medical theory that in fact could harm persons?

Columnist Colman McCarthy, a Pauling chum, offered an interesting theory in The Washington Post (Aug. 27) for the disdain with which the medical community held his idol. "Such conventional treaters of colds as physicians beholden to drug companies and their high-priced pills tried to dismiss Pauling as a dabbler in quackery," McCarthy wrote. Perhaps. But as Dr. James Lowell wrote in Nutrition Forum in May 1985, 'The largest corporate donor (over $500,000) to Pauling's institute has been Hoffman- La Roche, the pharmaceutical giant which is the dominant factor

in world-wide production of Vitamin C. Many of the institute's individual donors have been solicited with the help of Rodale Press (publishers of Prevention magazine) and related organizations which have publicized the institute and allowed the use of their mailing lists."

The New York Times's distortion of the validity of Pauling' s work continued after the glowing Severo obituary. On August 28 the Times published a letter from Stephen Lawson, chief executive officer of the Linus Pauling Institute, continuing the argument that Vitamin C helped reduce the incidence of cancer, and dismissing debunking by scientists at the Mayo Clinic and elsewhere.

Dr. Victor Herbert, of the Mount Sinai School of Medicine, rebutted Lawson in a letter which the Times did not publish. He wrote, "Vitamin C is not only worthless against heart disease and cancer, but harmful..."

The Faddists' Friend

Another facet of Pauling's career ignored by the Times was his record of defending fellow faddists, including some accused of highly questionable medical practices. In 1984 he appeared before the California Board of Medical Quality Assurance on behalf of a Mill Valley physician who attended a 56-year-old woman diagnosed as having treatable cervical cancer. The physician chose to treat her with no less than 99 remedies, including coffee and buttermilk enemas, herbs and enzymes. She died.

Twin boys aged four years, who complained of earache, were treated with coffee enemas twice daily and 70,000 units of Vitamin A. Pauling's testimony was that coffee enemas might have had value because they clean out the lower bowel. Despite Pauling's efforts, the physician lost his license.

In another case, Pauling defended a vitamin promoter who sold by mail a paper test to measure Vitamin C levels in the urine. He claimed that keeping a constant flow "probably offers 100 percent protection against bladder cancer." He also asserted that Vita- min C could cure drug addiction. The postal inspectors put the man out of business.

Barmy Bomb Banner

"I am not a Communist. I have never been a Communist. I may say I have never been a concealed Communist," Pauling assured the Senate Judiciary Committee on November 15, 1955. Nonetheless, his major political activity was on behalf of what Secretary of State Dean Acheson in 1951 called "the most concentrated and farflung propaganda effort of the international Communist movement in the postwar period."

The movement, commenced in Paris in 1949 by several Communist front groups, sought to collect 400 million signatures world-wide on the "Stockholm Peace Petition," which endorsed a Soviet plan for regulating nuclear energy which a majority of the United Nations had repeatedly rejected. As Dean Acheson stated, "What the appeal in effect called for was the banning of any use of the atomic bomb, without any admission of the desirability of banning the tremendous armies and armament the USSR and its satellites have maintained since 1945...."

Pauling entered the campaign in the 1950s, soliciting fellow scientists throughout the world to sign petitions endorsing the ill- concealed Soviet plan. His petition drive got thousands of signatures and was praised by the Moscow press.

Hailed before the Senate Internal Security Subcommittee in 1960, Pauling claimed that the numerous Communist front groups with which he associated himself were independent of Moscow. He could not explain why he turned to a Communist publishing house, New Century Publishers, Inc., to reprint a broadside he wrote against nuclear warfare.

Nor did Pauling see anything amiss about participating in a "World Conference Against Atomic and Nuclear Bombs" in Tokyo in 1959 which concluded that "U.S. imperialism is the most vicious enemy of all the people of the world." He maintained he opposed nuclear war for fears about the biological effects of radioactivity.

But Pauling hustled maximum publicity from his bomb-banning work, and he received the Nobel Prize for Peace in 1962. When President Kennedy invited Nobel laureates to a White House dinner, Pauling spent the afternoon picketing his host with a sign, "We Have No Right to Test." The New York Herald Tribune decried the "extravagant posturings of a placarding peacenik." President Kennedy, to his credit, ignored Pauling and followers and negotiated a tolerably workable test ban treaty with the USSR, rather than committing the U.S. to a unilateral halt.

Oxford University scientist R.J.P. Williams summarized Pauling's career in Nature Magazine on November 1, 1989: "From being a public figure of high stature with an idealistic philosophy, to being viewed as a lonely crank, is indeed a fall as great as in any classical tragedy."

One conclusion that can be drawn from all this is that it proves that advocating leftist, pro-Communist positions is an effective way of blinding obituary writers at The New York Times to serious character flaws and crazy conduct.

What You Can Do

Send the enclosed cards or your own cards or letters to Arthur O. Sulzberger, Jr., publisher of The New York Times, urging him to halt the kid-glove treatment of leftist radicals in Times obituaries, and to Donald E. Graham, publisher of The Washington Post, commending him for publishing Dan Southerland's series telling the truth about Mao Tse-tung.

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Plaudits for Pauling: http://lpi.oregonstate.edu/ss01/plaudits.html
A symposium on structural biology on May 18th will celebrate the 50th anniversary of the publication of the alpha-helix protein structure by Pauling, Corey, and Branson.

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from http://www.pnas.org/misc/classics1.shtml

The Protein Papers

by cbrownlee{at}nas.edu
PNAS Staff writer

In April of 1951, readers who turned the pages of PNAS were treated to a surprise of multiple proportions: seven studies from the same authors, published back-to-back, all on the subject of protein structure (1-7). The papers extended prior research published a month earlier in PNAS (8) and another paper published a year earlier in the Journal of the American Chemical Society (9). Grouping the papers together for maximum attention, authors Linus Pauling and Robert Corey must have realized the bombshell they had dropped on the scientific world. Knowledge of the inner workings of proteins--molecules often referred to as the building blocks of life--would be the key to understanding biology at the molecular level. Grasping the structure of these molecules would give scientists a head start on understanding how proteins function in the body. Pauling and Corey's research, now over a half-century old, guides today's biotechnology revolution and the search for hundreds of disease cures--drugs that may someday conquer Alzheimer's disease, cystic fibrosis, Mad Cow disease, and many forms of cancer.

An Unlikely Alliance

Deciphering the nuances of protein structure took the skills of Pauling, Corey, and an earlier third partner, Herman Branson. Branson, a young African-American physicist, played an important role in verifying the feasibility of Pauling and Corey's earlier protein models. While some believe he may have deserved greater credit for his part (10), Branson received just one mention--as a collaborator on the first PNAS paper, published in March of 1951. He later went on to publish other physics research and served as president for two historically black universities.

Pauling and Corey collaborated for years before and after their famous protein articles, and the two formed an unlikely alliance that

proved fruitful throughout their careers. Pauling, an Academy member and chairman of the PNAS editorial board from 1950 to 1955, loved to entertain and charm scientific audiences with his showmanship. Corey, however, despised social events of any kind. A polio attack during Corey's childhood rendered him partially paralyzed and he had a quiet, severe disposition. His unwillingness to attract attention made him the perfect partner to provide the gregarious Pauling with hours of methodical labor and careful attention to details.

"In Corey's day, each of the calculations [needed to determine protein structure] was very, very long and painstaking. It took a person like Corey, who was willing to sit for many, many hours and do these demanding calculations," said David Eisenberg, an Academy member who researches protein structures at the University of California in Los Angeles.

Pauling's imaginative thinking and earlier work with chemical bonds gave him the basis for putting Corey's calculations for bond lengths and angles to good use. Unlike other scientists trying to tackle protein structure at the time, Pauling understood the myriad ways atoms can join and pack together to create biological molecules. The two scientists worked well together and complemented each other's skills.

"A long-term collaboration in science at a very high level is rare, and I think it takes unusual pairs to be able to do it. Pauling and Corey had that capacity to work together," said Eisenberg.

An Amazing Accomplishment

Instead of tackling the structure of an entire protein, the two scientists' efforts centered on discrete bits of proteins--tiny crystals made up of repeating units called amino acids. When numerous amino acids link together to form chains, the chains assemble into one of several different configurations. Because an entire protein can encompass hundreds of these configurations folded into a tangled and sometimes impenetrable bundle, Pauling and Corey focused on elucidating the structure of each configuration one by one.

"Proteins in our bodies have very defined, recognizable structures at the molecular level--they're not amorphous like water or jelly. But many people weren't aware of that before these papers," said Michael Levitt, chair of the Structural Biology Department at Stanford University, Academy member, and member of the PNAS editorial board.

To decipher each configuration's structure, Pauling and

Corey first took x-ray pictures of crystals from several types of proteins. The pictures, along with a decade of deliberation, helped the two researchers construct models of their hypotheses.

After several trials of model-making, and just as many errors, Pauling finally hit on the first--and still most important--structure defined in his protein papers. While confined to bed with a bad cold, Pauling claims that he amused himself by drawing chemical structures on pieces of paper. By twisting the paper to simulate chemical bonds between segments, Pauling finally grasped the structure of the alpha helix.

A Twist of Genius, But Some Mistakes

The alpha helix is a coil that looks very much like a stretched telephone cord. Hydrogen and oxygen atoms on every fourth amino acid are joined together through hydrogen bonds, a type of weak chemical attraction.

Pauling's background in studying many types of biological and inorganic molecules gave him a distinct advantage in seeing this helix structure. While many of his contemporaries tried to force an even number of amino acid residues into each turn of the helix, Pauling realized that a nonintegral number was the answer. The number of residues per turn in Pauling's final model was 3.6.

"The researchers who came up with earlier theories were crystallographers. They were used to crystals in which everything is made up of integral numbers," said Eisenberg. "Pauling was a broader, structural chemist--he was able to think outside the box."

Pauling and Corey's alpha helix and a second structure they defined, the beta sheet, have since been found in almost all proteins. The two structures are often the first line of description scientists give when discussing a protein's components. However, Pauling and Corey's work was not without mistakes: research since the 1951 protein papers found the beta sheet to be twisted, not flat as suggested in Corey and Pauling's research. And other structures the two proposed--for example, the pi helix with 5.1 residues per turn--have yet to be found in nature and may not exist at all.

"Some structures, like the ones for collagen or muscle protein, are much more complicated and interesting than the ideas Pauling and Corey proposed," said Jane Richardson, an Academy member and Duke University biochemist who analyzes protein structures. Since the protein paper series, Richardson

and other scientists have discovered many other types of protein arrangements.

"But all of the ones we've discovered are less common and more specialized," added Richardson. "It's still true that the alpha helix and the beta sheet are really the big things [in proteins]," she said. "That's sort of the first-order description of a protein structure--its helix, its sheet, then the miscellaneous other structures."

Since Pauling and Corey's famous series was first published, the ideas they expounded have proceeded from hypothesis to accepted fact to common knowledge. Dramatic verification of their work came in 1958, when the three-dimensional structure of myoglobin was found to be composed almost solely of alpha helices (11). Since then, drawings of the alpha helix and beta sheet fill a prominent space in almost every biochemistry textbook. More importantly, practical data of protein structures has fueled the work of countless other scientists involved in drug discovery and basic biological research--research that earned the 1962, 1997, and 2002 Nobel prizes in chemistry, for example.

The diverse applications of protein structure research are reflected by funding from a variety of sources. Drug companies or associations dedicated to finding disease cures, such as the American Cancer Society or the Muscular Dystrophy Association, often fund studies on proteins that may cause or alleviate a particular disease. The National Science Foundation funds more fundamental protein structure research, to the tune of about 40 million dollars in current grants.

Aside from drug discovery, most protein research still happens in university labs, as it did in Pauling and Corey's day. However, as more and more structures are discovered, the scientific focus since the 1951 series has changed and expanded. In addition to experimental structures determined by crystallography and NMR for ever-larger protein assemblies, scientists also use computers to model protein interactions within the body and to predict structures based on resemblances found between the sequences of their amino acids.

Despite the diverse variety of current protein research, many scientists can trace their inspiration back to the series of papers published more than 50 years ago in PNAS. "My research would have certainly been impossible without these papers," says Levitt.

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