

# Inconsistency of Biography of Tsien Hsue-Shen

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**Abstract:** Tsien Hsue-Shen, an expert of mechanics, the “King of Rocketry” of China, lived in US for twenty years long. Iris Chang (by a book in 1995) and Judith R. Goodstein (by a report of a conversation with Lee Alvin DuBridge in 2003) gave accounts of Tsien’s biography. In 2013, “Exhibition of Achievements of People’s Scientist Tsien Hsue-Shen” toured to universities in Shanghai and Chinese cities of Beijing, Kunming, Chengdu, Wuhan, Lanzhou and Huhehaote, displaying a different version of Tsien’s activities in US and declaring that Tsien read and studied, with great concentration, the philosophy of Marxism during his stay in US. In the present article, the Marxism reading is questioned, interpreting that Tsien’s success stems from the technology that he learned in US rather than the philosophy of Marxism. Tsien left behind puzzles, as well as rockets, missiles and satellites, as his legacy. His legend remains mysterious and inconsistent even today.

**Key words:** Tsien Hsue-Shen, biography, inconsistency, philosophy, rocketry, Marxism, Anti-Duhring, Dialectics of Nature, Capital, puzzles

## **Introduction**

On December 11, 2011, the centennial of birth of Tsien Hsue-Shen, “Tsien Hsue-Shen Library & Museum” was established in Shanghai Jiao Tong University, China, and opened to the public. In 2013, “Exhibition of Achievements of People’s Scientist Tsien Hsue-Shen” toured to universities in Shanghai and Chinese cities of Beijing, Kunming, Chengdu, Wuhan, Lanzhou and Huhehaote.

Who is Tsien Hsue-Shen ?

It is said that Mao Ze-dong, chairman of People’s Republic of China 1949-1976, called him “King of Rocketry”. He is famed as a national hero in the People’s Republic of China for his leading role in and outstanding contribution to developing Chinese industry of rocket, missile and satellite.

### **Story of Tsien Hsue-Shen Told by Iris Chang**

Tsien lived a “legendary” life, of which Iris Chang published an excellent biography. In the Introduction of the book, *Thread of the Silkworm*, Chang writes:

Thread of the Silkworm is the story of Tsien Hsue-shen—a man who hasn’t set foot in the United States for almost fifty years and who is known in his country only to a handful of aging scientists. Yet he is considered so important to Chinese space development that newspapers in the People’s Republic repeatedly refer to him as the “father of Chinese rocketry,” prompting even science fiction author Arthur C. Clarke to name a Chinese spaceship after him in his novel 2010: *Odyssey II*.

His life is one of the supreme ironies of the Cold War. Not only was Tsien Hsue-shen ( also known as Qian Xuesen) the mastermind and driving force behind the first generation of nuclear missiles and satellites in China (including the infamous Silkworm antiship missile that was later used against the United States during the Persian Gulf War), he had been trained and nurtured for fifteen years in the United States, leaving only because, indirectly entangled with the Chinese role in the Korean war, trumped-up charges of Communism forced his deportation to the People's Republic of China.

Who is Tsien? Born in 1911 as the son of a minor education official in China, he first came to the United States in 1935 on a Boxer Rebellion Scholarship. Taken under the wing of Theodore von Kármán , a brilliant aerodynamicist at Caltech, Tsien helped lay down the foundation of the Jet Propulsion Laboratory. Both during and directly after World War II, Tsien was given clearance to work on classified government projects, despite the fact that he was legally a Chinese national. His work in the fields of fluid dynamics, buckling of structures, and engineering cybernetics made possible the early American entry into the space age.

In 1949, just as China was falling to the Communists, Tsien made the decision to become a U.S. citizen. What he had not counted on, however, was the fact that at this time the United States was entering a period of

Cold War hysteria. Many scientists would be caught in its whirlwind.

Tsien would be one of them. During the summer of 1950, a bare year after his return to Caltech as the new Robert Goddard Professor of Jet Propulsion, he was accused of being a former member of the Communist Party—a charge that he vehemently denied. The accusation, however, set off a chain of events that resulted in Tsien being taken into custody and locked in a cell for more than two weeks.

Confused, if not panicked, by what was going on, he lost twenty pounds. Upon his release from jail, the Immigration and Naturalization Service started deportation hearings with the expressed purpose of sending Tsien back to China—even though it possessed not one scrap of concrete evidence that Tsien was indeed a Communist.

Despite his own protestations of innocence and further protestations from those who had worked closely with him for many years, Tsien was found guilty and for the next five years lived confined to his house, under the constant surveillance of the FBI. It was a secrete cooling-out period. Finally, on September 17, 1955, he was deported to China.

After Tsien was exiled, things began to happen in China at an incredible speed. “From the beginning, 1956 was a year of furious activity,” wrote William Ryan and Sam Summerlin in *The China Cloud*. “China’s strategic missile program...began to take shape during early 1956,” wrote Stanford professors John Lewis and Xue Litai. It was

“fascinating,” Sidney Drell exclaimed in the foreword to their book, *China Builds the Bomb*, how “such a sophisticated technological/military feat could have been accomplished by a poverty-stricken nation with limited industrial and scientific resources—a feat all the more amazing for being accomplished amid the enormous political turmoil of Great Leap Forward.” Missile specialist P.S. Clark observed: “The most important person to return to China was Tsien Hsue-shen. ...By combining knowledge of the Soviet and American systems—although they were outdated—the Chinese could begin a space program.” Ernest Kuh, an electrical engineering professor at the University of California at Berkeley, testified: “Tsien revolutionized the whole of missile science in China—of military science, for that matter. ...He is the leading scientist and engineer in the country.” Zhuang Fenggan, who worked as Tsien’s assistant in Beijing and is now the vice president of the China Association for Science and Technology, said: “Tsien started the rocket business from nothing.” Without Tsien, Zhuang said, China would have suffered a twenty-year lag in technology. “We wouldn’t have the prestige China has in developing a space industry to such an extent today. ...He was the top scientist and most authoritative person.” [1]

### **Story of Tsien Hsue-Shen: Yucon Tsien’s Version**

In addition to others, the “Exhibition of Achievements of People’s Scientist Tsien Hsue-Shen” in China tells:

1. "In 1937, Tsien Hsue-Shen was introduced by his schoolmate Malina to the Study Group of Marxism-Leninism of California Institute of Technology and took part in it. Tsien, together with other members of the group, studied many works of philosophy including 'Anti-Duhring' by Engels."
2. "Tsien Hsue-Shen read and studied 'Dialectics of Nature' of Engels with great concentration during his period of working in California Institute of Technology."
3. "Tsien Hsue-Shen has come into contact with Marxism since his days of youth. He read and studied, with great concentration, a number of classical works of Marxism including 'Capital' during 1950-1955 when he struggled for returning to his motherland."

The leading sponsor of the Exhibition is Tsien Hsue-Shen Library & Museum. (Cooperative sponsors are the local libraries or museums of the touring exhibition.) The director of the Library & Museum is Yucon Tsien, the son of Tsien Hsue-Shen. Therefore, the story told by the Exhibition is genuinely of Yucon Tsien's version.

It is very strange that each of the three books of Marxism alleged for Tsien's use in US and displayed by means of photos in the Exhibition is the version of Chinese translation, rather than that of Russian, English or German.

### **Question about the "Anti-Duhring" Reading**

Including "Capital", "State and Revolution" and the "Manifesto of the Communist Party" on P84 and P116 of 222, File 100-8196 of FBI for Malina released on the Internet, tells nothing about "Anti-Duhring" by Engels.

Describing the activities of the group that Tsien joined and mentioning noting of

“Anti-Duhring” in Chapter 8, The Suicide Squad, of Thread of the Silkworm, Chang tells:

In 1938 Malina introduced Tsien to an intellectual discussion group at Caltech. The members met for evenings of music and political discussion at the homes of some of the older, married scientists. Sometimes the meetings were held at the two-story, white stucco home of Jacob Dubnoff, a Caltech biologist who owned an excellent high-fidelity music system. But most of the time they gathered at the home of Sidney Weinbaum, who worked as a research assistant in the chemistry department.

...

Once every few weeks, after supper at about 8:00, guests began to arrive at Weinbaum’s gray bungalow on Steuben Street. Inside some twenty or thirty Caltech students sprawled out on the furniture and chairs of the living room. Tsien would come neatly dressed in vest, tie, and polished shoes; he was often accompanied by Malina, a tall, lean figure with a razor-fine moustache and immaculate dress. They were a dignified contrast to the more sloppily dressed Bohemian crowd around them. Frank Oppenheimer, the brother of the famous physicist Robert Oppenheimer, was dressed in a manner more characteristic of the group. He was a tall, awkward figure with tattered sleeves, cigar ashes sprinkling the front of his shirt, and fingers still dirty from the laboratory.

This was a group of Caltech intellectuals drawn together by concern

for number of international crises: the Great Depression and the rise of Nazism and fascism in Germany, Italy, and Spain. After witnessing widespread unemployment and hunger in the United States, many students wondered if the predictions of Karl Marx would indeed soon come to pass: that capitalism as a system was doomed to break down into global chaos. Consequently, they saw the rise of socialism in Russia as a fascinating experiment. As pacifists, they were also alarmed when Germany occupied Austria, broke the Munich agreement by seizing all of Czechoslovakia, and assisted Franco in establishing a fascist state in Spain.

Tsien found the group sympathetic to the plight of China. In July 1937, Japanese and Chinese forces had clashed at the Marco Polo Bridge near Beijing, a conflict that quickly escalated into full-scale war. (For Tsien, the impact of the war was not only emotional but financial: the scholarship stipends to all Boxer scholars in the United States were cut by half, from one hundred to fifty dollars a month.) Then in December 1937, Japanese troops moved into Nanjing, where they perpetrated one of the worst orgies of rape and massacre in world history. During the weeks that followed, the Japanese killed between two and three hundred thousand Chinese in the city. The atrocities received worldwide coverage, and Tsien followed the events closely in the newspapers. Here were students who shared his feelings of outrage and despair, and it must have been



soothing to be around them.

The discussion at the Weinbaum home followed a certain procedure. The gatherings were somewhat more formal than a party and somewhat less formal than a university discussion class. On a coffee table in the living room were a spread of publications, many of them Russian. Once every two to three weeks, a few attendees would prepare book reports that would be read before the group. The books included the works of Karl Marx, John Strachey, Joseph Stalin, and Vladimir Lenin. A lively question and answer session followed, as the audience debated the theories and viewpoints presented in the literature.

The meetings would end with music and refreshments. There was a large community of musicians in Hollywood in the 1930s, many of whom had worked in theater orchestras during the era of silent film. Some spent the day recording the tunes of composers like David Raskin for the major studios and on occasion relaxed at night by playing classical music at the Weinbaum home. When professional musicians were not present, the Caltech scientists would form their own amateur string group. Malina, son of a high school band leader, would join Weinbaum at the piano. Frank Oppenheimer would play the piccolo with such consummate skill that he could have passed as a professional. Tsien was learning how to play the alto recorder, and sometimes at these parties he would sit in a corner and pipe away.

Ever the loner, Tsien remained in the background. Sometimes, he sat completely silent, deep in concentration as he matched wits with Weinbaum over a game of chess or over the more complex war game of kriegspiel. He preferred to listen rather than talk, sitting on the sidelines as political arguments broke out and continued into the night. And, as Malina recalled, the evenings almost always ended with a stimulating argument. [1]

We may cite another version of the activity of the group Tsien was in. In Judith R. Goodstein's article "A Conversation with Lee Alvin DuBridge –Part II" published by Physics in Perspective, DuBridge, president of Caltech 1946-1968, said:

I don't know who was in it. But there was a little group here, as there were at many universities back in the Depression days. They said that there must be a better economic system, and maybe the Russians had found it. Tsien's version of his association with that group was as follows. When this charge was first brought up, he came in to me and said, "I don't understand this." And I said, "Well, did you have any connections with a Communist group?" And he said, "Well, there was a group of people here that had social gatherings. When I came over to this country, a stranger, two or three of these Caltech people invited me to their house for a little social gathering and I went several times." He said, "I guess there was some talk about politics; but it was mostly just talk about

general things, and I regarded them as purely social events. I certainly didn't sign up in any way with any Communist Party. And I didn't even remember the word 'communist' being mentioned at these affairs.' [2]

As we read, the group was not mentioned to be involved in "Anti-Duhring" reading at all, as Thread of the Silkworm tells.

### **Question about the "Dialectics of Nature" Reading**

The Exhibition displays an article titled "We Should Attack Problems of the Deepest Layer of Scientific Theories" written by Tsien Hsue-Shen himself in China for the Academicians' Forum. In the article he writes :

"I lived in US for a long time. Though I studied and worked in the fields of technological science, I was also interested in scientific theories. At that time, those whom I esteemed most in my heart were A. Einstein and N. Bohr. Since coming back to my motherland, it has been possible for me to read 'Dialectics of Nature' of Engels, ..."

Tsien's words imply that Tsien Hsue-Shen himself was forbidden to read "Dialectics of Nature" of Engels during his stay in US, and then, logically, he did not read that work of Engels. This is in contradiction with the display of the Exhibition that Tsien read and studied 'Dialectics of Nature' of Engels with great concentration during his period of working in California Institute of Technology.

Furthermore, was Tsien not allowed to read "Dialectics of Nature" of Engels during his stay in US, in terms of US laws?

It is well-known that The First Amendment (Amendment I) to the United States

Constitution prohibits the making of any law respecting an establishment of religion, impeding the free exercise of religion, abridging the freedom of speech, infringing on the freedom of the press, interfering with the right to peaceably assemble or prohibiting the petitioning for a governmental redress of grievances. It was adopted on December 15, 1791, as one of the ten amendments that comprise the Bill of Rights.

It is reasonable that freedom of reading has been lawful in US since the freedom of the press was adopted on December 15, 1791. And then Tsien 's words could not be explained properly.

Concerning Tsien's attitude to Marxism and Leninism, we may cite Chapter 19, Hearing, of Thread of the Silkworm:

Tsien repeatedly emphasized that he was not a Communist, in either belief or action. When asked whether he preferred the GMT or the Communist regime in China, Tsien responded that he owed his allegiance to neither government but to the people of China. As for his feelings towards Marxist-Leninist thought, Tsien said that one reason he went to Weinbaum's parties was to learn more about the philosophy. When asked, "Were you unfavorable to Marxism and Leninism at that time?" Tsien responded: "I am unfavorable to them, definitely, now. At that time, I was still in the process of finding them out." [1]

### **Question about the Marxism Reading During 1950-1955**

The question should be: was it possible for Tsien Hsue-Shen to read any work of

Marxism when he was supervised and inspected by FBI during 1950-1955, considering US laws?

Tsien published an excellent book entitled “Engineering Cybernetics” in 1954. Then, did Tsien manage to finish the book-writing with great effort and to read and study Marxism works with great concentration simultaneously, and consider that both the businesses were parallel of importance for himself, during the period of 1950-1955 when he was waiting the chance to return to China? Or, was the book-writing just a cover to shield the Marxism-studying from exposure?

Furthermore, the chance could not be excluded that Tsien did not read Marxism works during 1950-1955 at all. Not mentioning Marxism works in Chapter 20, “Waiting”, of *Thread of the Silkworm*, Chang says:

With no other choice but to live one day at a time and to keep intellectually alive, Tsien continued to work and teach and await the next step , whatever it might be, whenever it might be. He turned to other fields of research, such as the study of games and economic behavior. In 1954, he published a textbook entitled *Engineering Cybernetics*, a book on systems of communication and control. It too would be well received.

Years later, Wallace Vander Velde, an MIT professor and renowned expert in cybernetics, would describe the book as “remarkable” and “an extraordinary achievement in its time.” Wrote Vander Velde of the book:

In 1954, a decent theory of feedback control for linear, time invariant systems existed and servomechanism design was an established

practice. But Tsien was looking ahead to more complex control and guidance problems—notably the guidance of rocket-propelled vehicles. This stimulated his interest in the systems with time-varying coefficients, time lag and nonlinear behavior. All these topics are treated in this book.

But Tsien went further to deal with optimal control via the variational calculus, optimizing control and fault-tolerant control systems among other topics! He visualized a theory of guidance and control which would be distinct from, and would support, the practice of these disciplines. This has certainly come to be, and his pioneering effort may be thought of as a major foundation stone of that effort which continues to this day. [1]

### **What Is True?**

According to Iris Chang, Tsien Hsue-Shen repeatedly emphasized that he was not a Communist, in either belief or action. However, according to Yucon Tsien, who was only seven years old leaving US with his father, Tsien Hsue-Shen was a honest reader, or follower, or believer, or worshiper of Marxism in his early days, even when he lived in US and before he returned to China, no matter whether he was a member of the Communist Party USA or not, and no matter whatever purpose Yucon Tsien would pursue by exposing the “facts”. Then what is true? What reputation would Tsien Hsue-Shen gain or lose, politically or morally, as a result of the exposure, from different views, if any, of Chinese and American people?

The Exhibition tends to infer, by the story of Marxism-reading, that the source of the achievements of Tsien Hsue-Shen should be the philosophy of Marxism. However, it is logical to infer that Tsien's rocketry stems from the scientific and technological knowledge, which he learned from Theodore von Kármán and other professors when he was trained and nurtured in MIT and Caltech, and experience accumulated by working in the Jet Propulsion Laboratory. We may cite the observation of Missile specialist P.S. Clark again: "By combining knowledge of the Soviet and American systems—although they were outdated—the Chinese could begin a space program." It is obvious and logical that, at least, the American system does not stem from the philosophy of Marxism. It was constructed by technology of US.

Tsien Hsue-Shen passed away in 2009, leaving behind puzzles, as well as rockets, missiles and satellites, as his legacy. He is loaded with query and criticism as well as fame and glory. If not in US, Tsien Hsue-Shen is one of the most controversial figures in China. His legend remains mysterious and inconsistent even today.

## **References**

- . [1] Iris Chang, *Thread of the Silkworm* (New York: BasicBooks, 1995) pp. 10-12, pp. 95-97, p.186, pp. 191-192 (e-version).
- [2] Judith R. Goodstein, "A Conversation with Lee Alvin DuBridge –Part II," *Physics in Perspective* 5 (2003), 281-309.

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