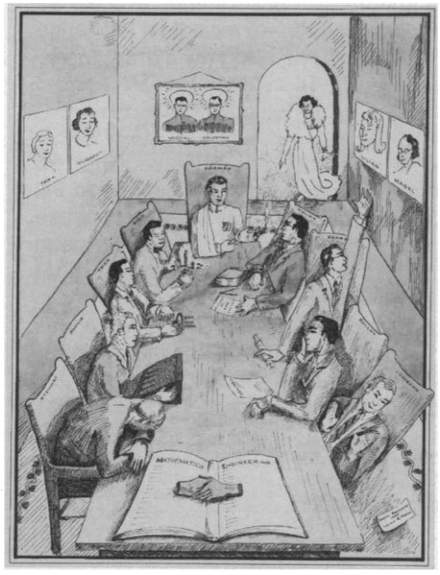
BOOK REVIEWS

Orbits of a Rocketeer

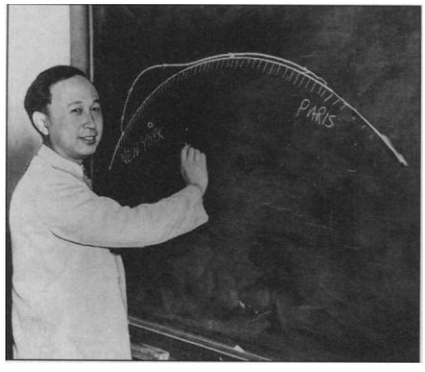
Thread of the Silkworm. IRIS CHANG. BasicBooks, New York, 1995. xx, 329 pp. + plates. $27.50 or Can$38.75.

Iris Chang calls Tsien Hsue-shen, the subject of this fascinating short biography, the Chinese Wernher von Braun. And not without reason—he was the genius of Communist China's missile and space programs. But her comparison is even more appropriate than she seems to realize. As her book shows, Tsien too switched countries and ideologies, working enthusiastically on weapons for very different political masters. A student of the famous aerodynamicist Theodore von Kármán, Tsien played a crucial role in American rocket programs of the 1930s and '40s and helped found the Jet Propulsion Laboratory in Pasadena, California. He almost became an American citizen before being falsely accused in 1950 of having briefly been a Communist. After being held under virtual house arrest for five years, he was deported back to China in 1955 in what was probably the greatest act of stupidity of the entire McCarthyist period. The People's Republic now has nuclear missiles capable of hitting the United States, in large part because of Tsien.



"A 1940 cartoon by Frank Malina depicting members of GALCIT," the aeronautical laboratory at the California Institute of Technology. Tsien (third from left) "is shown as indecisive about whether to stay in the United States as he flips an egg marked 'US' on one end and 'China' on the other." Theodore von Kármán sits at the head of the table. [From *Thread of the Silkworm*; courtesy of the Archives, California Institute of Technology]

As a result of her command of Mandarin and her efforts to ferret out information about, and acquaintances of, Tsien in both countries, Chang has created a more complete picture of his life than has ever existed before. *Thread of the Silkworm* is also written with verve and style, making it a highly readable as well as solidly researched example of popular history. Unsurprisingly, it also has some of that genre's flaws: inadequate references, a tendency to write for the sake of effect, and technical and factual errors. The latter are mostly unimportant, but it should be noted that the V-2, not the WAC Corporal, was the first man-made object to leave the Earth's atmosphere and that China was not the only country to launch a live nuclear warhead on a relatively untested missile—both the United States and the Soviet Union did it earlier.



"Tsien demonstrating the flight of a theoretical jet in class at Caltech, 1949 or 1950." [From *Thread of the Silkworm*; Hearst Newspaper Collection, Special Collections, University of Southern California Library]

Chang cannot be blamed much, however, for the book's biggest problem. Despite her best efforts, Tsien remains a distant, almost unreachable figure whose motivations are often mysterious because he refused to be interviewed, was aloof even during his two decades in America, then became the servant of a totalitarian regime. The book ends on a depressing note, as Chang describes Tsien's complete self-abasement to the most absurd aspects of Maoist politics. Yet none of this should be allowed to obscure the contribution she has made to the history of rocketry in the United States and China.

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Inside ESA

Launching Europe. An Ethnography of European Cooperation in Space Science. STACIA E. ZABUSKY. Princeton University Press, Princeton, NJ, 1995. xiv, 261 pp. $49.50 or £14.95.

The European Space Agency (ESA) was established in 1975—although its roots go back another decade—to promote cooperation among the various European nations in space research and technology. Over the last two decades ESA has established a solid reputation for high-quality space technology and successful space missions, most notably in its regular launch of satellites on the European-built Ariadne rocket. Not surprisingly, ESA and its predecessors have been seen as proof that the disparate cultures and countries of the European community can indeed be united in pursuit of a common objective.

Stacia Zabusky, however, is less interested in the results of cooperation than in knowing of what exactly it consists. More specifically, she wants to know how the assorted scientists and engineers in ESA's Science Programme cooperate (she conducted her field research in the Space Science Department at the European Space Research and Technology Centre), why they often deny that there is cooperation, and why they continue to cooperate when it is evidently such a difficult process.

Cooperation, she suggests, is not the consequence of political agreement or administrative fiat. Neither politicians nor bureaucrats bring about cooperation in ESA, notwithstanding their statements endorsing this outcome. Instead, cooperation emerges from the daily work of scientists and engineers, even though much of this work is riddled with conflict. Consider, for example, the combination of a spacecraft with its scientific payload (such as a space probe). Scientists favor the biggest and most complex payload possible, to maximize the amount of data to be gathered, whereas engineers worry about the design and construction of the spacecraft and view the payload as inessential technology. The paradox of cooperation, in Zabusky's analysis, is that it is produced by these disputes.