

The Pacific Crossing of a Fuzhou Flathead Pole Junk

Paul Chow (California State University Northridge)

ABSTRACT

It is well documented that Chinese sailing vessels of a certain type and length (up to 200-meter and nine-masted vessels) had sailed the waters Magellan and Columbus “discovered” half a century later. But to this day, in the eyes of the modern mariners these Chinese vessels remain a myth. Why aren’t junks seen outside of China? Why are there no junks with more than two masts? Why was there no recording of any junk crossing the Pacific Ocean? Are they fit for ocean sailing? Five fishermen and one professional diplomat took upon themselves in 1955 to seek answers to the myth. With no previous experience in sails, they took a 50-year-old Fuzhou “flathead pole junk” across the Pacific. Through hands-on experience, these seafarers discovered the junk’s unique features that made her the most seaworthy vessel they had ever set foot on, namely the watertight bulkheads, the self-draining deck, the shroud-less masts, the slanting foremast, the self-adjusting ballast tank, the battens that stretched the sails from luff to reach, the automatic reefing and an adjustable rudder that also served as a center-board. These Chinese vessels had explored the seas beyond China for thousands of years with one purpose: Trade and Cultural Exchange. Since there was not much culture and trade to the east of China before the 17th Century, the Pacific was left out. After the death of Emperor Zhu Di in Ming Dynasty, Confucians took over the ruling of the court from the adventure-seeking Eunuchs. They enforced a strong closed-door policy. Under this policy, all oversea voyages were banned. No ships with more than two masts were allowed. Violators were punishable by decapitation. As time went on, the tradition lasted to the day when steamships took over.

Keywords: Junk, Sailboat, Pacific, Seaworthiness

List of Figures

Figure 1: Junk Free China sailing into San Francisco.

Figure 2: Watertight compartments.

Figure 3: Self-draining Deck of the Free China.

Figure 4: Main mast and its stepping sideboards and struts a model of the Free China.

Figure 5: Slanting Foremast on the Free China.

Figure 6: The restored Junk Free China in display.

HISTORY

As marine archeologists race against time and the force of nature to in tsearchfor of underwater historic vessels, very few wrecks of Chinese junks have turned up. That poses a question on the Chinese nautical history, which has well documented numerous large organized sea explorations during the last 3000 years from West Zhou Dynasty to the present days including:

1066BC People of Yin: Eastward voyage in 30-40 ships

219BC Xu Fu: Discovery of Japan

210BC Xu Fu: Emigration of 3000 to Japan in 30 ships

399AD Monk Fa Xian: China-Sri Lanka-America in 3 ships

1306AD Wang Da Yuan: Venture into the Atlantic Ocean

1274AD Kublai Khan: Invaded Japan, 4000 ships sunk by Kamikaze

1281AD Kublai Khan: 2nd invasion of Japan, failed, not defeated

1405-1433AD Zheng He: 7 voyages to Indian Ocean and beyond

In Ming Dynasty, the total number of Navy ships under the rule of Emperor Zhu Di reached 3500. Zheng He's fleets alone numbered 300 in one expedition and his flagships, the Treasure Boats, measured up to 317 feet as compared to the 85 feet for Columbus' Santa Maria a century later (ref.1). But to this day, the absence of their underwater wrecks and the lack of literatures in the West on ocean-going junks made the junks a myth in the eyes of the Western mariners as well as in the minds of the marine architects worldwide (ref.2). *What is a junk?*

MYTH

Why were there no Chinese junk sighted beyond the Chinese coastal waters?

After the death of Emperor Zhu Di (1424), the adventurous Eunuch-dominated Ming court was taken over by the conservative Confucians. A strict close-door policy was adopted (ref.3). All ocean-going vessels and their records were burned. Voyages beyond the China coast were banned. Violators were subjected to punishment by decapitation. To force as certain all vessels would remain on the coastal waters, all vessels were limited to have only two masts. What was amazing was, 500 years later when steamships put an end to the 3000-year sailing epoch of China, the design of the last survivor (ref. 7) was identical to those in Ming Dynasty (ref. 8).

Who designed the junks? Where to find junks today?

To the Chinese eyes, junks, like all species of creatures in nature, owe their existence through the evolution of trial and error rather than by human designs. Traditionally each junk was built to the order of the owner. Before delivery, the junk-wright and the owner would take the junk out on a shakedown cruise to fine-tune the vessel to the owner's satisfaction. Through these hands-on tunings, the junks eventually evolved into the 9-mast Treasure Boats (ref. 4,5,6). In this process, there were no mutations, only variations. Therefore, no master junk designers were noted in history, only junk-wrights.

China has a long coastline. The only communication to the tens of thousands of islets and coves along the coast and the supply of marine products to the entire people of China were carried out by junks. The Royal British Naval Manual on China Coastal Sailing cited the junks to China seas as seagulls to a fishing village. "Where there are junks, there is safe water." When steamships came to rule the sea, where did these junks go? To look for them, it makes more sense to search above water than underwater.

Why were there no records of any Chinese junk crossing the Pacific?

When one looks at the Chinese nautical history, one notices that all the Chinese sea explorations had only one purpose in mind: Trade and Cultural Exchange. Colonialism has never entered the mind of these people who considered their land "The Center of Earth". Finding neither culture nor trade to

the east of the Center of Earth, to they left alone the Pacific Ocean just to satisfy the challenge of adventure and sailed south and west where rich cultures and profitable trade in spice, herbs and lumbers could be found.

In 1955, five Chinese fishermen came upon the last commercial vessel that had run a blockade across the Taiwan Strait with a cargo of salted fish in brine and a load of dried food stuff. She was a 50-year-old Fuzhou Flathead Pole junk, the *Free China*, built in the ancient capital of shipbuilding, Mawei. It turned out that the *Free China* was the last survivor of China's 3000-year sailing epoch. In that summer, joined by an American diplomat, the fishermen took the junk out to the Pacific Ocean and sailed eastward.

None of the sailors on the *Free China* had any knowledge of sails or sailing. After struggling for 114 days at sea (ref.10), including going through a typhoon and a storm, the *Free China* sailed into San Francisco Bay on August 8, 1955 (Figure 1, ref. 7).



Figure 1: Junk *Free China* sailing into San Francisco.

What these sailors learned from their odyssey was the characteristic features (ref.9) of the junk made her one of the most seaworthy vessels that ever sailed on the waters of the world, in fact, she was *unsinkable*.

CHARACTERISTICS OF JUNK

- **Watertight bulkheads** (Figure 2)

The *Free China* is divided into 12 compartments isolated to other byto each other by watertight bulkheads.



Figure 2: Watertight compartments.

This feature prevents water leaking from one compartment to the others, making the junk *unsinkable*. It also allows the junk to carry both liquid and dry cargos in adjacent compartments and dedicate any compartment to carry the junk's fresh water supply. The first compartment at the bow serves specifically as a ballast tank. There are two drain holes at the bottom of this compartment. They ship in water when the junk goes into a dive, softening the impact with the sea. When the bow bounces back from the plunge, water leaks out of the tank through these holes, therefore cushions the pitching motion.

Fishing boats also played an important role iFrom the security point n Zheng He's explorations. They operated forward and on the two sides of the flotilla. Besides supplying the fleet with fresh fish, they acted as sentries and feelers. In unknown waters, if there were hidden navigation hazards, the fishing boats would be the first one to encounter, therefore providing protection to the treasure boat and the supply boats from these hazards.

Some thousands of years later the modern naval architects adopted this feature to their designs of the submarines.

- ***Self-draining deck*** (Figure 3)

The deck curves on its two sides to drain water off the deck quickly. It keeps the deck dry. This feature was also adopted by the submarine designers.



Figure 3: Self-draining Deck of the Free China.

***Shroud-less masts** (Figure 4)

The masts are secured with no stays, no shrouds, no cable and no nails. In fact, no metal of any kind can be found on the junk except nails that hold the planking together. Each mast is wedged between two sideboards and shored by two fore-and-aft struts between two bulkheads. It is lifted off the keel so that its own weight acts as a self-adjusting mechanism to keep it stay tightly between the two sideboards. To step or to un-step a mast, it takes only two experienced deckhands with the aid of a single sheave tackle hung on the other mast.

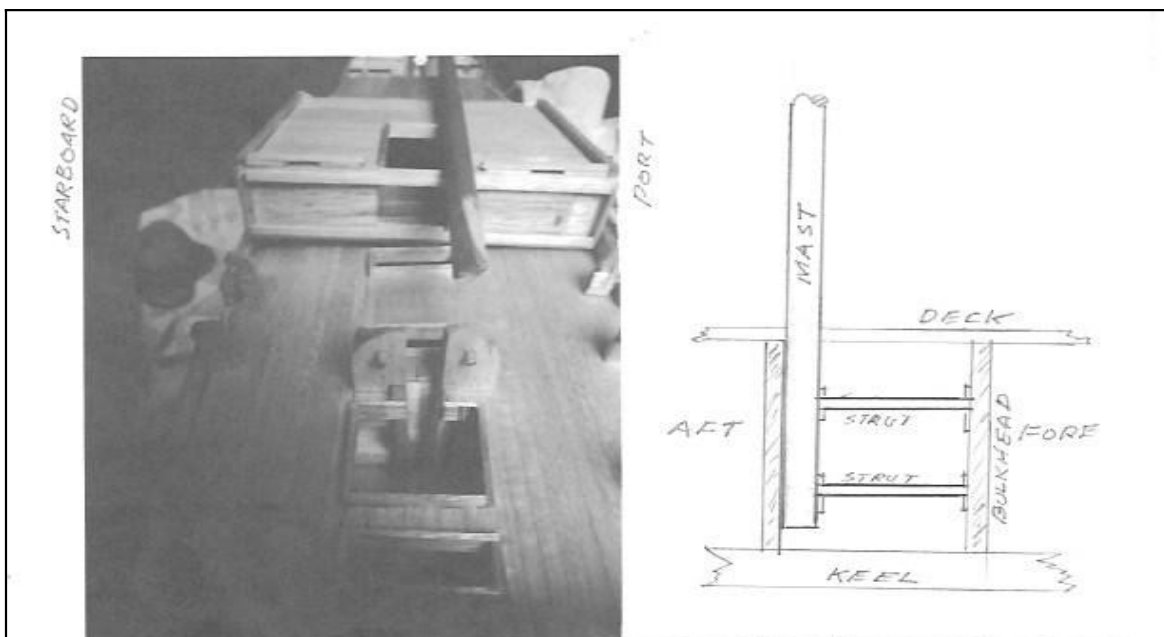


Figure 4: Main mast and its stepping sideboards and struts a model of the Free China.

***Slanting foremast (Figure 5)**

When the two-mast mandate was handed down by the Confucian administrators in the Ming Court, what they had in mind was that possessed by a vesselher and her speed. They did not realize that sailing was done by the difference of pressures between the front and back of a sail rather than by the wind pushing on the sail from one side.

On a two-mast junk, the foremast leans forward. It opens the far edge of the foresail wide as the mouth of a funnel to squeeze the wind through the narrow channel formed by its edge close to the mast and the mainsail and, thus, rushes air by the front of the mainsail at a larger speed. This creates a low-pressure region. The effect is known as Venturi or Bernouli Effect. This arrangement is the same but much more effective than the jib sail or the Genoa sail on a western yacht.



Figure 5: Slanting Foremast on the Free China.

***Lugsail & Battens (Figure 1,2,5)**

Both fore and main sails on a junk are stiffened by bamboo battens from luff to leech. Each end of the bamboo at the leech is attached to a sheet such that the surface of the sail can be controlled. At the top, the gaff sticks 10 ft above the masthead to catch stronger wind at top. When sails need to be reefed (shortened), there is no need to gather the extra canvas and tie it down as done on all western sailboats. The battens stack up at the bottom automatically to hold the sail. In 1988, the yacht *New Zealand* adopted the lugsail and snatched the America's Cup from the Americans. From then on, all the meter-boats in yacht race, and even wind surfers, changed their sails to lugsails.

were adopted by New Zealand to challenge the American Cup Race, the challenger snatched the cup from America.

***Flat Rounded Bottom and Centerboard (Figure 6)**

All junks have flat rounded bottoms as versus protruding bottoms of yachts. A flat bottom minimizes the contact surface between the hull and the water, therefore, decreases the friction that drags on the vessel. In maintenance and repairs on the bottom, it facilitates beaching. Since 1988, all meter boats changed the shape of their bottoms from protruding to round and flat.

This design introduced a large leeway in sailing. To reduce leeway, the rudder of the *Free China* measures 3 ft by 9 ft. It actss as a centerboard to her 3-foot draft. Its mere size also makes steering

more effective. When the junk sails in shallow water or heaves to in a storm, the rudder can be raised to any desirable depth.



Figure 6: The restored Junk Free China in display.

CONCLUSION

After her Pacific crossing, the *Free China* went through many changes of hands in ownership. She roamed around the San Francisco Bay for half a century and was finally abandoned on the beach of Sacramento Delta.

In 2008, a group of historic vessel preservationists, led by Dione Chen, formed a *Committee on Chinese Junk Preservation* to launch a movement in saving the 100-year old relic from distinction (ref.9). Owing to their perseverant efforts and the campaign by some cultural heritage preservationists in Keelung, led by Tseng Shu-min, the Taiwan Ministry of Culture took notice of the junk.

In 2009, a team of cultural preservation experts were assembled by the *Committee on Culture Construction* and dispatched to California under the leadership of Chiau Wen-yan to study the feasibility of bringing the junk back to Taiwan.

Finally in 2011, after relentless efforts of Wang Shou-lai and Laurence Lwo, the 106-year-old Fuzhou Pole junk of Ming Dynasty design the *Free China*, was brought back to Keelung. After restoration she is now displayed (Figure 6).

Bibliography

- Menzies, G., 2002. *1421*. Harper Collins
- Van Tilburg, H.K., 1997. *An Obsessed Mariner's Notes on the Ningpo*. Journal of the Southeast Asian Studies Student Association Vol. 1, No. 2
- Levathes, L., 1994. *When China Ruled the Seas*. Simon and Schuster
- Worcester, G.R.G., 1971. *Junks and Sampans of the Yangtze*. Naval Institute Press
- Van Tilburg, H.K., 2007. *Chinese Junks of the Pacific*. University Press of Florida
- Donnelly, I.A., 1924. *Chinese Junks*. Graham Brash (Pte) Ltd
- Chow, P., 2011. *The Junk that Challenged the Yachts*. Amazon.com
- Liu, N.S., 2008. *Voyage of the Princess Tai Ping*. Latitude 38
- Tseng Shu-Ming, 2013. *Ocean-going Taiwan Vessels*. Walkers Cultural Print, Taiwan (in Chinese)
- Chiau, W.Y., 2019. *A Study of the Historical Evidence for the "Free China" Crew Which Landed on Diaoyutai Island in 1955 and Its Implication*. Journal of Cultural Heritage Conservation, Taiwan

Biography

Paul Chow, born Beijing, China, 1926. US Citizen. Army (1944-1946 China-Burma-India); United Nations Relief and Rehabilitation Administration (1946-1951 fisherman to captain); Joint Commission on Rural Reconstruction (1951-1952 Scholar/Fishery); Ministry of Economy (1952-1955 Technologist); Junk Free China (1955 Owner/Navigator); San Francisco City College (1956-1958 Engineering); University of California, Berkeley (1958-1960 BA Physics); Northwestern (1960-1965 PhD Physics); University of Southern California (1965-1967 Research Associate Semiconductors); University of Texas, Austin (1967-1968 Research Associate, 1969 Visiting-professor, Physics); California State University Northridge (1968-1994 Assistant-professor to Professor, Physics); Zhejiang University (1980 Visiting-professor, Computer); Beijing Institute of Technology (1988 Adjoint-professor); Consultant (Control Data Corporation, World Bank); Author.