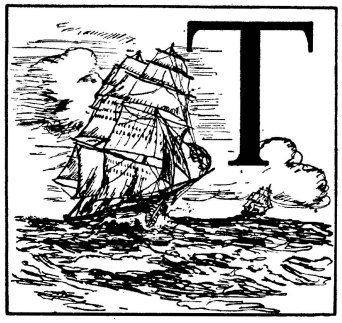
V

THE CLIPPER SHIP "FLYING CLOUD"



THE construction of merchant ships is a child of the desire to trade; a desire which began to find complete expression in the United States only after the War of 1812 had come to a successful conclusion. In the years preceding that struggle both England and France, mutually at war and actuated by the dual purpose of injuring each other and of preventing our prospering merchant marine from becoming the common carrier of the world, had issued edicts forbidding any neutral nation to trade with the enemy. These decrees were vigorously enforced by the seizure and confiscation of millions of dollars worth of American shipping. The treatment had the desired effect. The adz, the hammer, and the caulking iron lay idle in our shipyards until Congress created a navy to protect our trade.

With the peace of 1814 began an era of wooden shipbuilding which was to have its climax in the white winged clippers of 1850. The perfection then attained came through an intelligent study of many poor or indifferent ships, and with the coöperation of a Congress which has since shown a conspicuous lack of ship-mindedness.

By the legislative weapon which prohibited foreign vessels from bringing to our shores cargoes from any but the country under whose flag they sailed, the exasperating obstructions presented to American enterprise by foreign laws were speedily broken down. Shipbuilding experienced a boom profoundly influenced for a time, however, by the form and rig of vessels previously built for war. The straight rise of floor from the keel toward the bilge, the small sheer, the short lower mast surmounted by an immense hoist of topsail were all typical naval practice, as were indeed the hemp rigging, the broad channels, the immense tops to the masts, and the maximum beam still only two-thirds of the length from the bow.

The immediate predecessors of the clipper ships were the famous New York-to-Liverpool packets; a fleet of dry, speedy, handsome ships which were so excellent in their appointments and so superbly handled, that their success in gaining for us a monopoly of the passenger, mail, and express traffic to Europe was as inevitable as was the envy it engendered abroad. Up to 1850 the packets were one- or two-decked vessels with a poop-deck aft and a topgallant forecastle forward. The registered tonnage of 900 to 1,000 tons afforded sufficient space for the stowage of freight in the hold, some of the lighter cargo going between decks when insufficient room below made this necessary. The steerage passengers lived in the 'tween deck space amidships, the more fortunate in the well appointed cabins aft which were lighted not only by port holes, but by deck skylights, candles, and whale-oil lamps.

In their prime, the packets offered the only regular passenger and mail service between the United States and the Continent. Rain or shine, in calm, in fog, or in a

gale, one of the Black Ball liners sailed for Liverpool on the first and sixteenth of every month.

Such packets as the *James Baines* and the *Red Jacket* were able to make the run from New York in twelve or thirteen days. The secret of their great superiority in speed over the ships of other nations lay, to a large extent, in the way in which they were handled. Captains of the British East Indiamen ordered all light sails furled at sunset, no matter how fine the weather. Royals were stowed and the yards sent on deck as regularly as the sun went down. If the evening sky was lowering the topgallant sails and the mainsail were stowed, and a single reef taken in the topsails. These precautions seemed too conservative to the Yankee skippers. From the time they cast off until the time they ran their lines ashore at their destinations the packets were driven day and night, and in all sorts of weather, to the utmost speed possible. Though decidedly the fastest ships built up to that time, much of their speed was due to the skill and energy of their commanding officers.

This was well understood at the time. Writing in 1835, De Tocqueville* said: "The European sailor navigates with prudence; he only sets sail when the weather is favorable; if an unfortunate accident befalls him, he puts into port; at night he furls a portion of his canvas; and when the whitening billows intimate the vicinity of land, he checks his way and takes an observation of the sun. But the American neglects these precautions and braves these dangers. He weighs anchor in the midst of tempestuous gales; by night and day he spreads his sheets to the winds; he repairs as he goes along such damage as his vessel may have sustained from the storm; and when he at last approaches the term of his voyage, he darts onward to the shore as if he already descried a port. The Americans are often shipwrecked, but no trader crosses the sea so rapidly. And as they perform the same distance in a shorter time, they can perform it at a cheaper rate.

" . . . I cannot better explain my meaning than by saying that the Americans affect a sort of heroism in their manner of trading. But the European merchant will always find it very difficult to imitate his American competitor, who, in adopting the system I have just described, follows not only a calculation of his gain, but an impulse of his nature."

Such were the antecedents of the clippers and their crews, ushering in the golden era which came in the early 1840's. After countless centuries upon the sea, man at last created an altogether perfect thing: magnificent, flawless, final; the ultimate development of the wooden sailing ship in construction, in speed, and in beauty. Its day was short. It was also faultless.

The evolution of the clipper ship was much accelerated by a demand for the fast transportation of teas, spices, coffee and dried fruit from the Orient, but the great stimulus came when gold was discovered in California. The resulting rush of emigration created a trade wholly unparalleled in the history of the route around Cape Horn. Provisions, furniture, clothing, tools, and hosts of enthusiastic treasure seekers clamored to be hurried to this new El Dorado.

In the year 1847-1848 only four ships cleared from Atlantic ports, bound for San Francisco. In 1849 seven hundred and seventy-five vessels made the voyage. Speed and cargo capacity were the great essentials. Each month clippers were launched which were to displace more water and to spread more canvas than ever, expressly intended to excel everything which the science of naval architecture had previously produced.

* De Tocqueville: *Democracy in America;* American translation by Reeve, page 403.

At the very climax of this development Donald McKay built the *Flying Cloud;* queen of the sea, mistress of the waves, a vessel whose excellencies have never been equalled or excelled.

McKay was *the* designer of clippers. Many other men of genius were his competitors, among them Thatcher Magoun of Mystic River fame, but no one of them approached the heights of achievement attained by the Nova Scotia boy who built his ships in East Boston.

He was born in 1810 at Shelbourne. At sixteen he began to learn his trade in the shipyards of New York. So rapid was his progress that before the age of thirty he became a master shipwright, and in 1841 was the junior partner of Currier & McKay, shipbuilders, of Newburyport, Mass. To the astonishment of everyone the vessels which this yard produced proved superior to those designed and built in New York or Baltimore. The favorable attention of shipowners followed as a corollary.

The firm of McKay & Pickett, formed in 1843 for the building of packet ships, had equal success; too much success to allow its continuance, for Enoch Train, an influential Boston merchant, soon heard of the superior mechanical ability and energetic manner of Donald McKay and persuaded him to open a yard in Boston. Newburyport is not fifty miles away, yet it was on a trip to Europe for the purpose of establishing a Liverpool office for his projected packet line, that the influential merchant first heard of the great builder of ships.

At the age of thirty-four Donald McKay opened his famous shipyard at the foot of Border Street, East Boston. Here came into being the superlative sailing ships of all time. Even their names enliven the imagination and conjure up visions which can never fail of beauty: the *Flying Cloud*, the *Lightning*, the *Stag Hound*, the *Sovereign of the Seas*, the *Westward Ho*, and the *Great Republic*.

The untiring energy of this great man produced nearly sixty ships, all of which he designed and superintended during the construction. On September 20, 1880, he set sail for that unknown port to which all flesh departs, leaving behind him achievements superior to those which have exalted many lesser men. Yet with the same colossal inability to appreciate worth which made it possible for an ignorant tenant to burn McKay's models for firewood during the recent coal strike, the City of Boston has never erected even a brass plate to his memory.

Those who know the facts visualize him not alone in terms of hollow water-lines, of towering rigging, and of rapid voyages, but also in terms of the industrial methods which he perfected. He was not only a naval architect; he was also an efficiency engineer.

Previously all frame timbers had been hewn out of the rough log with a broad axe, and timbers required to be cut lengthwise were sawed through by hand. McKay had visions of better things. He erected a steam sawmill in his yard for the performance of both these operations. The saw hung in a mechanical device by which the operator could tilt it in either direction as desired. In this way the bevel of the cut could be controlled. With the aid of this machinery three men were able to saw out the frames faster than a dozen could put them together.

Another improvement, which McKay's fertile brain introduced, seems absolutely indispensable now. A derrick made its appearance in his yard to lift the heavy timbers and beams into place; a far more rapid and less expensive method than the brute force exerted by a gang of laborers. Where men had formerly carried huge planks on their shoulders, oxen now dragged the timber to the derrick by means of which other teams exerted the force to swing the member into place.

Inevitable changes in the kind of timbers used for the building of ships took place. The accessable New England oak, which for two hundred years had supplied the shipbuilding industry, was running low. The demand for southern lumber increased. Where the modern shipbuilder orders steel plates and shapes of the required size, McKay made a complete set of patterns for the timber of his vessels. These were carried into the woods during the winter where a gang of men felled trees of the requisite form and number to produce every timber called for, hauled them to the rivers before the spring thaws, and loaded coasting steamers by which the trees were sent north where skillful men fashioned them into ships.

The *Flying Cloud* was originally contracted for by the merchant who persuaded McKay to come to Boston: Enoch Train. For the rest of his life he regretted that he sold her for $90,000. to Grinell, Minturn & Co. while she was still on the stocks. This New York house, after her launch on April 15, 1851, fitted her out for the California trade where flour was bringing $40.00 a barrel, sugar $4.00 a pound, boots $45.00 a pair, and laudanum $1.00 a drop. The miners could wash $100. to $1,000. worth of gold dust in a day, and what few supplies were available had to be transported from the east coast. "Easy come, easy go." Freight rates at thirty-five cents a cubic foot would have been profitable. The ship owners easily obtained a dollar a cubic foot, and even a dollar and a half. Sometimes the profit from one voyage would pay the original cost of the ship. Eleven months after she was finished the *Great Republic* had earned $200,000. Great fortunes were amassed — and lost — in the merchant ventures of those heroic days.

With high hopes of great financial return Grinell, Minturn & Co. watched the *Flying Cloud* sail out of New York harbor on her maiden voyage, June 2, 1851. Little did they realize that she was destined on this voyage to exceed by forty-two miles the fastest day's run ever made under sail or steam up to that time, and that her speed to San Francisco was to be equalled only twice; once by herself and once by the *Andrew Jackson*,* but never to be beaten by anything except a boiler and an engine.

Twenty-one days out she crossed the equator. On August 31, 1851, eighty-nine days and twenty-one hours from her New York anchorage, she was anchored in San Francisco harbor. On her fourth voyage, arriving April 20, 1854, she lowered the elapsed time by thirteen hours, a record never beaten.

The first voyage was a national triumph. It reduced by twenty-five per cent the records of two years before. For four consecutive days she had averaged 314 miles. On August 1st she logged 374 nautical miles, an average of nearly sixteen knots. In twenty-six consecutive days she sailed 5,912 miles. In order to give some conception of the heroic conduct of Capt. Josiah Perkins Creesy and his men, Arthur Clark quotes an abstract of the *Flying Cloud's* log:†

"June 6th (three days out from New York). Lost main and mizen topgallantmasts, and maintopsail yard. — June 7th. Sent up main and mizen topgallantmasts and yards. — June 8th. Sent up maintopsail yard. — June 14th. Discovered mainmast badly sprung about a foot from the hounds, and fished it. — July 11th. Very severe thunder and lightning, double reefed topsails, split fore- and maintopmast staysails. At 1 P.M. discovered mainmast had sprung, sent down royal and topgallant yards, and studding sail booms off lower and topsail yards to relieve strain. — July 13th. Let men out of irons in consequence of wanting their services, with the understanding that they would be taken care of on arriving at San Francisco. At 6 P.M.,

* 89 days, 20 hours pilot to pilot; 90 days, 12 hours anchorage to anchorage.

† Clark: *The Clipper Ship Era*, page 179.

Photograph by Edwin Levick, New York

MODEL OF THE CLIPPER SHIP "FLYING CLOUD," BUILT BY H. E. BOUCHER MFG. CO.
FOR FREDERICK C. FLETCHER

carried away the maintopsail tye and band round mainmast. — July 31st. Fresh breezes, fine weather, all sail set. At 2 P.M. wind southeast. At 6 squally; in lower and topgallant studding sails; 7, in royals; at 2 A.M. in foretopmast studding sail. Latter part, strong gales and high sea running. Ship very wet fore and aft. Distance run this day by observation is 374 miles. During the squalls 18 knots of line was not sufficient to measure the rate of speed. Topgallantsails set. — August 3d. At 3 P.M. suspended first officer from duty, in consequence of his arrogating to himself the privilege of cutting up rigging, contrary to my orders, and long-continued neglect of duty. — August 25th. Spoke barque *Amelia Packet*, 180 days from London for San Francisco. — August 29th. Lost foretopgallant mast. — August 30th. Sent up foretopgallant mast. Night strong and squally. Six A.M. made South Farallones bearing northeast ½ east; took a pilot at 7; anchored in San Francisco harbor at 11:30 A.M. after a passage of 89 days, 21 hours."

Captain Creesy was a Marblehead boy, born in 1814. When appointed to the command of the *Flying Cloud* he had already proved his worth as a skipper in the China and the East Indies trade, exhibiting that unusual combination of qualities essential in the sea captain of that period. Beside the mastery of navigation, he possessed the physical strength to manhandle even the roughest of his rough crew. The poised, courteous manner necessary in dealing with the gentlewomen of breeding who were often on the passenger list was also expected of him. These antipodal requirements produced a remarkable type of man; robust, abrupt, dictatorial, gracious, genteel, polite.

One of the able successors of Captain Creesy was Capt. Alexander Winsor who, from the port of New York, first set sail as the commanding officer of the *Flying Cloud* on Friday, December 9, 1859. In the next three years he made two voyages in her to China, not around Cape Horn, but via London and the Cape of Good Hope. An account from his "journal," describing the near loss of the ship in a typhoon, while en route from Foochow to London, is here printed for the first time by courtesy of his grandson, Mr. Bancroft Winsor:

"Wednesday, August 8, 1860

"Begins with brisk breezes from N.E. and dark cloudy weather, standing to E.S.E. by the wind. Weather looks threatening, sent down royal yards, put double gaskets on all the furled sails and double reefs in the topsails. Barometer falling fast, typhoon coming on. At 4 P.M. passed between Pinicle and Crag Islands. Saw them both. Wind increasing and steady heavy rain. Furled the mainsail and jib at 10 P.M. close reefed the topsails, furled the foresail and mizen topsail. Now it is blowing hard and a big sea. Bar'tr 29.20 at midnight, it is blowing furiously; at daylight the wind veered E. and E.S.E. and increased, if possible. Now at 8 A.M. it is perfectly frightful. Cannot see three seas off. Wind howling in the rigging so that I cannot make a man hear me four feet off. Raining in torrents and the sea making a complete break over the ship fore and aft, deck full of water, spars and water casks adrift, lashings cannot hold them and at 8 A.M. the starboard anchor washed off of the bow. Stove out all the ring bolt and everything it was lashed to. I may safely say the ship is completely under water. I never saw anything like it before and the most lamentable part of it is that we are on a lee shore and driving almost square on about 20 or 25 miles off and utter destruction is our fate unless we can wear the ship around and that seems to me an utter impossibility, but I must make the effort. I called all hands to me and told them our situation and begged them to use their utmost strength on the braces. The ship is under two close reefed topsails and how they have stood so long is a wonder to me. We succeeded in wearing the ship safely. Now she heads up N.E. and lies

four points off the land and goes ahead four knots, and makes not more than three points lee way and if our mast and sails stand we can go clear of the land. Ship makes some water but nothing alarming. Carried away main spencer gaff and lost foretop-mast staysail and jibs washed off of the boom and blowed to pieces. So ends the day. Barometer 28.60

"Thursday, August 9, 1860

"The gale continues with all its force, but the barometer begins to rise a little, now 28.70. It is astonishing to me how our masts have stood as they have. At 4 P.M. it began to show signs of abating. Less rain and clouds broken. At 6 P.M. less wind but an awful sea. Decks full of water and ship laboring hard. At midnight strong breezes, high sea, but good weather. Did not make any sail till about daylight. Then wore ship and let two reefs out of the topsails and set all hands to repairing damages. At meridian made all sail. In examining the ship I find her very badly strained all over, the butts all started in the decks and waterways, plank shear, etc. and the copper a good deal broken abreast of the fore rigging. She has suffered in every part. Still I think there is but few ships that could have done so well and come out with so little damage, and not another that could have brought us off of a lee shore as she did. I feel that we all owe our lives to her superior sailing qualities and extra strength. Nine-tenths of the ships in the world would be obliged to put into port for repairs after experiencing such a gale as this, but in two days our ship will be in good order again."

The crews were a motley lot. Never were they pure American stock, but invariably a queer patchwork of nationalities of whom the best were Scandinavian. Some were deep water sailors of wide experience. Some were from coasting vessels. Some were adventure seekers of no nautical experience whatsoever whose only reason for signing on was to get to California.

The officers navigated their ships by sheer force of character, often maintaining their authority over the more desperate and mutinous members of the crew with a brawny fist, a belaying pin, or even a capstan bar. The discipline of our merchantmen became, due to the self-reliance of our officers, superior to that of any other nation. Its excellence went hand in hand with the preëminent place held by that of our navy.

Good sailors received excellent treatment and were in great demand; refractory and incompetent ones were dealt with by he-man methods. There was no other way. The safety of the ship depended upon it. Under the expert, if physical tutelage of the mates, the carpenter, the cook, and the boatswain, even a green crew of rough characters soon learned to "shake a leg" when the captain issued an order. The rule, which has even in recent years been painted above the wardroom door of one of our battleships, was then very much in force: "Growl you may, but obey you must."

The crew was never quite the same on any two voyages, either in individuals or in numbers. Some general conception of its make-up may be gathered from the following table:

Captain	1
Mates	4
Boatswains	2
Carpenters	2
Sail Makers	2
Stewards	3
Cooks	2
Able Seamen	75
Boys before the mast	10
Total	101

The tedium of the rapid click, click, click of a capstan and the regular tramp around of the crew's feet as they reeled in the warp by which their ship was slowly hauled out of dock, was relieved by the rough singing of chanties, usually senseless, often obscene in their wording, but always producing in the sailor that elusive, enigmatic something which martial music creates within the soldier. Chanties were a part of the enthusiasm of the times.

"A Yankee sloop came down the river,
Hah, hah, rolling John,
Oh, what do you think that sloop had in her?
Hah, hah, rolling John,
Monkey's hide and bullock's liver,
Hah, hah, rolling John."

And so on in endless repetition until the line was cast off or the anchor was apeak, as the case might be. The first mate, in charge on the forecastle with the third mate and boatswain as assistants, would yell through his trumpet, "Avast heavin' there for-'ard." Or in obedience to the captain's orders issued from the quarter deck, "Lay out there some of you and loose them head sails. Aloft there my hearties and spread the royals. Hey, you in the green shirt, look alive. Ease down them clewlines handsomely or I'll have ye up before the Old Man for playing jump rope. Ease down handsomely I say. Overhaul the buntlines. Belay there. That's well. Now on the main topsail sheet, rouse her home, my bullies, rouse her home."

At sea, with all sails set, in a crisp northeasterly breeze, and the gear shipshape, the old salts undertook the education of the lubbers before the mast. "Know the longest name of any rope aboard, son? Well, I'm looking at it right now. Naw it isn't either. It's the main t'gallant st'u'n sail boom tricing line. Take a good look the next time you lay aloft and don't get caught on that question again or I'll split yer damned head open to see wher's yer brains."

The racing of rival clippers was enthusiastically watched by the inhabitants of two continents, the classic example being that of the *Ariel*, the *Taeping*, and the *Serica*. These three vessels left Foochow, China, May 30, 1866, on the same tide. So evenly were they matched that even after a race half way around the globe all three ships were docked at London on the same tide of September 6th.

Days of wooden ships and iron men; days of oak and hemp and northeast wind when sailors were hairy-chested superhumans, and ships, complex, sensitive, vagarious structures whose vanity and exasperating deviltry were sufficient grounds for their being affectionately classed as feminine gender, even without the additional impossibility of predicting, in spite of long experience, exactly what a ship would or would not do under given conditions. These were precisely the characteristics for which a true sailor loved his ship. He knew that for all her foibles she would not fail him when the waves dashed high, if only he in turn would take good care of her.

But like the beautiful coquettes of the land, the day of the clippers was short-lived. The more dependable if more homely steamships captured the affections of the merchants, although deep-water sailors had nothing but contempt for "such contraptions" and for those who stoked their furnaces.

In 1863 the *Flying Cloud* was sold to James Baines of Liverpool, England, to compete in the Australian wool trade. The combination of the Civil War and the inevitable decline which came to the California trade, did much to discourage shipping in America. But the final blow, from which the clippers could never recover, fell with the universal adoption of steam, a transition in which England took the lead and from

which she emerged once more mistress of the seas. Hampered by prejudicial laws enacted by a Congress chiefly recruited from our fertile plains, American vessels have been driven from the sea. The one exception is our coastwise trade, in which foreign-owned ships are forbidden to engage.

The *Flying Cloud*, like our merchant marine, is no more. Her last days were spent with Maskey & Co. in the unromantic business of carrying lumber from St. John to London. In 1874 she ran aground on Beacon Island bar just off the New Brunswick coast, broke in two, and was burned in June, 1875, for whatever of her metal could be salvaged.

"Sic transit gloria mundi." The *ship*, in the old sense of the term, has gone forever. In its place we have a floating power plant. The black hull of the clipper and her spread of white canvas are to be found only on the indelible pages of history. Black smoke and white steam, oil burning boilers, and the unspeakable noise of Diesel engines betoken the advance of science and the demise of romance on the seas.

How altogether human it is that the service performed by steam toward the perfection of the sailing ship is almost never alluded to. Nevertheless the appearance of steam tugs by which it was possible to get a ship in and out of her berth made it possible to design the clipper for speed and seaworthiness alone without attention to the conflicting demands of handiness in restricted waters. The result was greater size, increased lengths, and therefore more speed.

The chantey, the creak of the running rigging in the blocks, and the sing-song, colorful orders of the mate are sounds which have been replaced by the gasping noises of exhaust steam and the ringing of the engine-room telegraph. The whine of the wind in the shrouds of the clippers was the swan song of the merchant sailing ship.

Hull

In order to gain the favorable attention of merchants on the water front the clippers had to be attractive as well as swift. The *Flying Cloud* was a marvel of neatness and finish. Her lines, concave forward and aft up to a few feet above the water-plane, became gradually convex as they rose from there to the gunwale. The sharpness of the bow, however, was preserved entire, with a plain simplicity altogether beautiful.

Her stern was semi-elliptical in form and corresponded well with the after-body. Upon it appeared her name and port of hail, the name being also inscribed on each side of the bow. Even the novice cannot fail to appreciate her grace and beauty.

Plan XI was traced from what is alleged to be Donald McKay's original line drawing, now part of the Clark Collection at the Massachusetts Institute of Technology. Capt. Arthur Clark's known friendship with Mr. McKay makes this assertion entirely possible although it is the author's personal opinion that the drawing was made for the Captain from the figures given on page 77 of Henry Hall's "Report on the Shipbuilding Industry of the United States," written in 1884 for the Department of the Interior. Exactly the reverse may well be the case. In any event the lines may be taken as authentic.

The old confusion between the displacement and the tonnage rating, already discussed in connection with the *Mayflower* and the *Constitution*, is met again in the *Flying Cloud*. The method of arriving at her registered tonnage was no more sensible than any used for previous ships.

Let "L" be the distance measured on the deck from the fore part of the stem to the after part of the stern post; "B" the maximum breadth outside the planking; "D"

Photograph by Edwin Levick, New York

MODEL OF THE CLIPPER SHIP "FLYING CLOUD," BUILT BY H. E. BOUCHER MFG. CO. FOR FREDERICK C. FLETCHER

the depth of hold from the plank of the deck to the ceiling of the hold (actually this was assumed as ½ B). The tonnage was then calculated by the formula:

$$\text{Registered tons} = \frac{(L - \frac{3}{5}B) \times B \times D}{95}$$

A tabulation of the hull characteristics of interest to the naval architect would include:

Length knight heads to taffrail	235′ - 0″
Length on deck	225′ - 0″
Length load water-line	209′ - 6″
Length of keel	208′ - 0″
Moulded beam	40′ - 0″
Beam, extreme	40′ - 8″
Depth, moulded	23′ - 9″
Deadrise	30″
Tumble-home	6″
Sheer	3′ - 0″
Height between decks	7′ - 8″
Registered tonnage	1783
Displacement at 20′ draft	2375.7
Displacement at 17′-6″ draft	1951
Tons per inch immersion at 17′ - 6″	13.91
Area load water-line	5660 sq. ft.
Area midship section	486.9 sq. ft.
C. of B. above base	11.23 ft.
C. of B. abaft amidships	2.15 ft.
Inertia of water-line	530467 ft⁴.
Metacentric radius	8.28 ft.
Water-line coefficient	0.682
Midship line coefficient	0.820
Block coefficient	0.515

The amount of theoretical information which the shipbuilders of 1850 had was remarkable when one considers that they had no such model tank experiments to follow as are now available. They knew that equal cargo capacity and greater speed could be obtained by increasing the beam instead of having so flat a floor. They knew that the lines of the bow could be filled in with less detriment than those of the stern. They knew that a vessel with a rising floor could go about her business when off a lee-shore, while one with a flat floor would be going bodily to leeward. They knew how to balance the conflicting claims of capacity and velocity so that the volume of cargo transported in a given year would be a maximum.

The clippers were first built with extremely sharp floors and sailed with a drag. Some of the Baltimore-built vessels drew sixteen feet aft and only eight feet forward. After 1850 the long, sharp bow was considered the best for speed, the maximum cross-section was placed half-way aft instead of two-fifths of the length from the stem, and the ships sailed on an even keel.

Nearly 1,000,000 feet of oak, and over fifty tons of copper, exclusive of sheathing, went into the hull of the *Flying Cloud*. The following excellent description of her hull was written by Duncan MacLane of the "Boston Atlas":

"Her keel is of rock maple, in three depths, sided 16 in. and moulded 44″, or 37″ clear of the garboards; deadrise at half-floor 30 in., rounding of sides 6 in., and sheer about 3 feet. Her bow below the plank sheer is slightly concave, and at the load displacement line may be about two inches concave from a straight line. As it rises, however, the lines are gradually modified until they assume the convex, to correspond with her outline on the rail.

"At 18 feet from the apron inside, on the level of the between-decks, she is only eleven feet wide. She has the sharpest bow we ever saw on any ship. Although she is ten inches fuller on the floor than most of the other barge clippers which have been built here. She has neither head nor tail-boards, but forming the extreme, where the line of the sheer and the carved work on the naval hoods terminate, she has the full figure of an angel on the wing with a trumpet raised to her mouth. The figure is finely designed and exceedingly well executed and is a beautiful finish to the bow. It is the work of Mr. Gleason, who made the figure-head for the 'Shooting Star.'

"Her name, in gilded letters, is let into the curve of the bow, between the mouldings of the rails, and it also ornaments the quarters.

"Her great length, and boldly defined sheer, give her a splendid appearance broadside on. Her lines aft are fuller than those forward; and her stern which is elliptical, is small and neat, and is formed from the line of the plankshеer. Her name and port of hail are carved and gilded upon it, surrounded by finely-designed ornamented work. In her general outline, she bears some resemblance to the 'Stag Hound,' but though her bow is somewhat sharper, she is ten inches fuller on the floor than that splendid ship.

"Her bulwarks are five feet from deck, or rather her main-rail is that height, surmounted by a monkey-rail 16 in. high. She has topgallant forecastle thirty feet long fitted for the accommodation of one watch of the crew, and carrying in after wing two W. C. Abaft the foremast is a house 41 ft. long by 18 wide by 6½ high, which contains quarters for the other watch, also the galley and other apartments. Her poop-deck is the height of the main-rail, 68 ft. long, surrounded by an open rail on turned stanchions. In the front of the poop is a small portico, which protects the entrance to the cabins, of which she has three. The first contains the pantry, and state-rooms for the officers, and the second, or great cabin, is beautifully wainscoted with satinwood, mahogany, and rosewood, set off with enamelled pilasters, cornices, gilt work, etc. The panels are of satinwood, Gothic in their form, and are set in mahogany frames edged with rosewood. The after cabin is small, and is fitted in the same beautiful style. It contains two useful apartments, and is otherwise neatly arranged.

"A few particulars of the style of her construction will show that she is a very strong vessel. We have already stated that her keel is in three depths, moulded 44″, and sided 16 in.; her floor-timbers average 12″ by 17″ on the keel, and are bolted in the usual style with 1¼″ copper and iron bolts, and she has three depths of midship keelsons, which combined are moulded 45 in., and sided from 17″ to 15″, making her nearly 9 feet through her back-bone. She has also two depths of sister-keelsons, 16″ x 10″, crossbolted at right angles and diagonally through the naval timbers. Ceiling on the floor 4½″ thick, square-bolted, and on the bilge there are two keelsons, 16″ x 10″, extending the whole length of the vessel. She has also a stringer 10″ x 16″ on which the lower ends of the hanging knees rest, and all the other ceiling in the hold is 7″ thick, scarphed and square-fastened. Her lower deck beams 15″ square, and those under the upper deck amidships 9½″ x 16″. Hold stanchions are clasped with iron above and below, and are also kneed to the beams and kelson. Her ends are almost filled with long pointers and hooks, some of the pointers extending almost 40 ft. along the skin.

"Her chain lockers are in the hold abaft the foremast, and abaft the mainmast she has a large iron tank for water. The hanging and lodging knees connected with the beams of both decks are very stout and closely fastened. The between-decks waterways are 15″ square, the strake inside of them 10″ x 14″, and that over them 10″ x 16″, bolted in superior style. Under the upper deck beams she has a clamp 7″ thick; the rest of the ceiling between it and the standing strake over the waterways is 5½″

thick. She has a long and stout hook forward, and the thick work aft is carried round the stern. The stanchions are of turned oak, secured with iron rods, bolts, screws, and nuts, and the deck planking is of hard pine, 3½ in. thick. Her combings and mast-partners are well kneed off, and securely bolted.

"The upper deck waterways are 12″ x 14″, with two thicknesses, and the coering board is 6″ x 16″. Her bulwark stanchions are of oak, and between the main and rack rails there is a stout clamp, which extends both forward and aft. The main rail is 6″ x 16″. Her garboards are 7″ thick, the next 6″, the third 5″, and the rest of the planking on the bottom 4½″. Her wales, of which she has 18 strakes, are 5½″ x 7″, and she is planked up flush to the planksheer. The boarding of her bulwarks is neatly tongued and grooved, and altogether is beautifully finished. Outside she is black, — inside, pearl color.

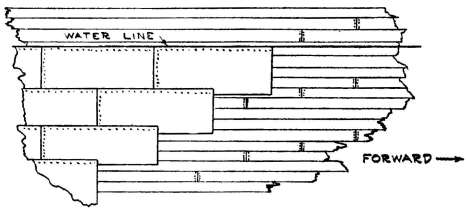


FIG. 43. COPPER SHEATHING

"Her frame is mostly superior white-oak and scantlings of southern pine; she is copper fastened. Her hood ends are bolted alternately from either side, through each other and the stem, so that the loss of her cutwater would not affect her safety or cause a leak. She is easoned with salt, has air-ports below, brass ventilators along the line of her planksheer and in the bitts, and Emerson's patent ventilators for clearing the hold. She is a full rigged ship, and her masts rake alike 1¼″ to the foot.

	MASTS				SPARS		
	Length	*Dia.*	*Heads*		*Length*	*Dia.*	*Yd. Arms*
Fore	82	35	13	Fore	70	20	4-6″
Top	46	17	9	Top	55	15	5
Topgal.	25	11		T'gal.	44	10	3
Royal	17	10		Royal	32	7	2
Skysl	13	8½	Pole 5	Skysl	22	6½	1½
Main	88	36	14	Main	82	22	6
Top	51	18	9½	Top	64	17	5
Topgal.	28	12		T'gal.	50	15	3
Royal	19	11		Royal	37	10½	2
Skysl	14½	9½	Pole 5½	Skysl	24	7	1½
Mizzen	78	26	12	Crossjack	56	16	4
Top	40	12½	8	Miztop	45	11½	4½
T'gal.	22	9		T'gal.	33	10	2¼
Royal	14	8		Royal	25	7	1½
Skysl	10	7	Pole 4	Skysl	20	6	1

Main deck to truck 200 ft. } different authorities
" " " " 166 " }

"Bowsprit 26½″ dia. 20 ft. outboard, jibboom 16½″ dia., divided at 16 feet from the cap for inner and 13 for outer jib, with 5 ft. end; spanker boom 55 ft., gaff 40, main spencer gaff 24 ft. and other spars in proportion."

The bottom of the hull was copper sheathed to protect it from barnacles and other marine growth. In putting on sheathing the copper plates were nailed over the planking from the water-line down, beginning at the after end and working forward. Had

the butt edges been forward instead of aft, the resistance to propulsion through the water would have been increased. Similarly, the longitudinal laps being up instead of down did not offer resistance to the water as it came up from under the hull.

From the sheathing to the rail-cap, the hull was painted entirely black. Some few clippers had a boot-top, as a narrow, colored stripe along the water-line is called. In tabular form the painting scheme was:

Black
- Hull above sheathing
- Bowsprit
- Channels

White
- Deck houses
- Rail cap and monkey rail
- Inside the bulwarks
- Small boats

Light Blue
- Waterways
- Tops of deck houses

Natural
- Masts
- Jib boom beyond bowsprit end
- Yards
- Decks

The usual practice was to paint the lower masts white to the tops. The *Flying Cloud* and a few other ships kept their lower masts scraped bright and varnished.*

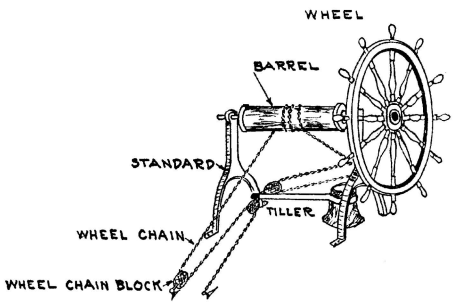


FIG. 44. STANDARD STEERING GEAR

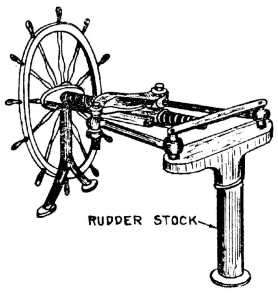


FIG. 45. PATENT STEERING GEAR

HULL FITTINGS

Steering Gear

The standard steering gear in use at the time consisted of two tackles which were operated by a barrel attached to the wheel, and which in turn caused the tiller to be thrown from side to side. This mechanism, all except the steering wheel, was covered by a little deck house, making a very neat appearance.

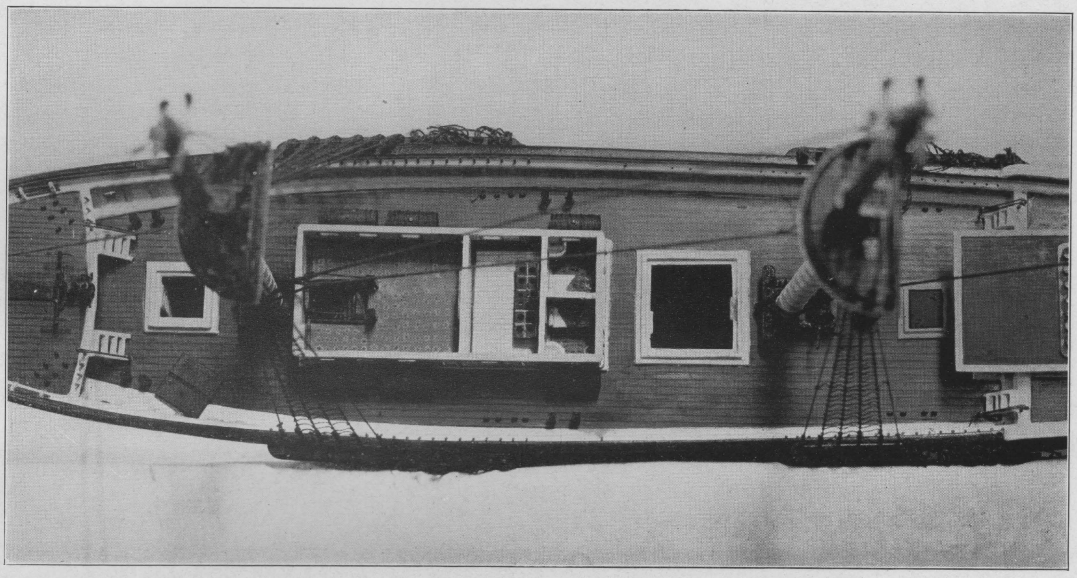
But this was not the gear installed on the *Flying Cloud*. She had a patented steering gear which avoided all lost motion. The wheel turned a great screw, the two ends of which were threaded in opposite directions. Sleeves travelled on these two threads and operated a yoke on the rudder stock, one pulling, one pushing as the wheel was turned over. A ship-shape, oval cover protected the mechanism from the elements and left the deck entirely clear.

The helmsman stood on a wooden grating which offered him a surer footing besides the advantages of being dryer and warmer. Instead of the double chain which on the *Constitution* prevented the rudder from being carried away by a storm which might unship it, the *Flying Cloud* had but a single chain.

Side Lights

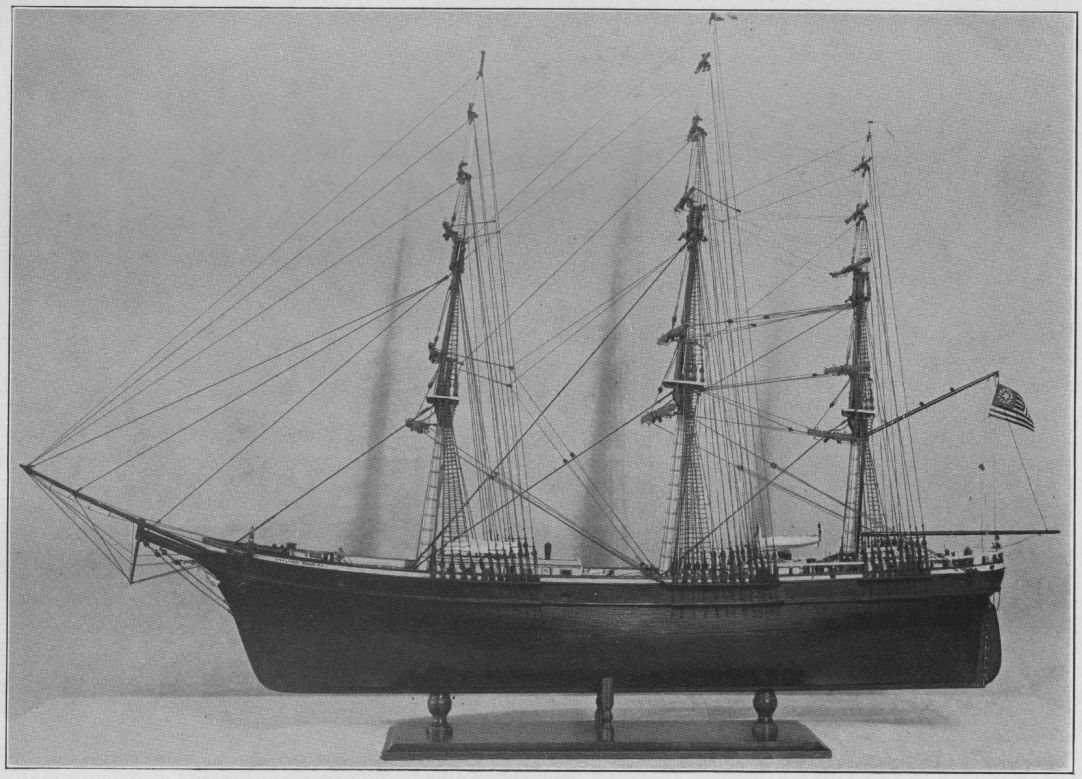
When Grinnell, Minturn & Co. first dispatched their famous clipper, the red light of the port side and the green to starboard had not yet come into use. It was a custom

* Fletcher Model; Henry Hall: *Report on the Shipbuilding Industry, etc.*



DECK VIEW OF THE MODEL OF THE CLIPPER SHIP "FLYING CLOUD," BUILT BY F. VAN L. RYDER

The top of the deck house is here removed, showing the cabin forward with its mahogany staircase leading below. In the center is the galley with its ranges. The after end is divided into two staterooms, with bunks, wash bowls, etc.



MODEL OF THE CLIPPER SHIP "FLYING CLOUD," BUILT IN 1927 BY F. VAN L. RYDER

soon to be adopted, however. In connection with his research on this point the author was told by an old sea captain an excellent story worthy of preservation. Returning from a long voyage, a certain skipper was endeavoring to make port before complete darkness fell. He encountered an out-going vessel carrying side lights, whereupon the man on watch shouted "Tell the Captain there's a blooming drug store coming down the channel!"

The early clippers, like the packet ships, carried a white light at the bowsprit cap during the hours of darkness. An additional precaution was the flare kept in readiness in the waist for the purpose of warning passing vessels or signalling a pilot.

Hawse Pipes

One on each side led directly to the forecastle through which the anchor chain was carried to the pump-brake windlass later described under equipment. The adoption of chain anchor cables in place of hemp made little alteration in the size, location, or design of the hawse pipe itself. In spite of the many advantages of the chain, clippers occasionally were still fitted out with hemp cables.

Figurehead

Conforming with the general practice of her time, the beauty of the *Flying Cloud's* bow was increased by a figurehead. On each side of her bowsprit rose the wings of an angel, whose outstretched hands held a golden trumpet through which, if only the Creator had given life to the wood carver's image, might have sounded a reply to the wreathed horn of old Triton himself.

Bitts

In order to tie the ship up alongside a dock, a series of bitts were fitted along her deck. The heavy wooden bitts of former days were now replaced by cast-iron ones, held fast to the ship's timbers by long, wrought-iron bolts. These were much neater in appearance, less destructive to the hawsers, and easier to use than their massive predecessors.

SPARS AND RIGGING

There were many different rules laid down at various times for the proportions of the spars of merchantmen. For example — the following explicit directions are found in the "Kedge Anchor," which went through several editions in 1854:

Mainmast equal to two-and-a-half times the ship's beam.

Foremast equal to eight-ninths the mainmast.

Mizenmast equal to five-sixths of the mainmast.

Bowsprit two-thirds of the mainmast, one-third of which ought to be in-board.

Main-topmast three-fifths of the mainmast.

Main-topgallant-mast one-half of the main-topmast, exclusive of the pole, which is generally one-half the length of the topgallant-mast or a little longer.

Fore-topmast three-fifths of the foremast.

Fore-topgallant-mast one-half of the length of the fore-topmast, exclusive of the pole, which is half the length of the topgallant-mast.

Mizen-topmast three-fifths of the mizenmast.

Mizen-topgallant-mast one-half the length of the mizen-topmast, and the pole one-half the length of the topgallant-mast.

Jib-boom the length of the bowsprit, two-thirds of which length is rigged without the bowsprit-cap.

Main-yard twice the ship's extreme breadth.

Main-topsail-yard two-thirds of main-yard.
Main-topgallant-yard two-thirds of main-topsail-yard.
Fore-yard seven-eights of main-yard.
Fore-topsail-yard two-thirds of fore-yard.
Fore-topgallant-yard two-thirds of the fore-topsail-yard.
Royal-yards two-thirds the length of the respective topgallant yards.
Cross-jack-yard same length of main-topsail-yard.
Mizen-topsail-yards the same length of the main-topgallant yard.
Mizen-topgallant-yard two-thirds of mizen-topsail-yard.

Spritsail-yards five-sixths of the fore-topsail-yard. *Remarks:* Some have the spritsail-yard the length of the fore-topsail-yard, or nearly so; if it should be much shorter, the jib-sheets will chafe against the spritsail-braces.

Spanker-boom the length of the maintopsail-yard; it is however made sometimes longer, and sometimes shorter, according to fancy. Mizen-gaff two-thirds of the spanker-boom — liable to the same variation. Topsail yard-arms to be long enough to haul out close-reef-earing.

It has been customary to allow for every three feet of the mainmast's length, one inch of the diameter in the partners; nine-tenths of an inch in diameter in the middle, between the partners and the extremity of the head, and two-thirds under the hounds, and all other masts in the same proportion; and with these proportions masts have been usually made; I am, however, of opinion that one-quarter of an inch to the foot is much better.

For every four feet of their length, allow one inch of diameter in the slings, and half that diameter within the squares at the yard-arm.

Yards

The following table, a study of which will show how little Donald McKay was influenced by the rules of other men, yet how consistent in his own practice, was prepared by Mr. St. Clair Smith, Jr., and is here printed by his kind permission. Attention is called to the fact that the length of a yard-arm must be added to each end of Mr. Smith's "L" as given for the yards, in order to get the total length of the spar.

"FLYING CLOUD"

L=length in feet. Y.A.=length of yard arms in feet. D=diameter in inches. M.H.=lap of the mastheads in feet.

REGISTERED TONNAGE

Flying Cloud	1782	*Flying Fish*	1505
Staghound	1535	*Sovereign of the Seas*	2421

FOREMAST

	L	D	M.H.	Top	D	M.H.	T. Gal.	D	Ryl	D	Sky	D	Pole	D
Flying Cloud	82′	33″	13′	46′	16″	9′	25′	10″	17′	9″	13′	8″	7′	6″
Staghound	82′	32½″	13′	46′	16″	9′	25′	10″	17′	9″	13′	8″	7′	6″
Flying Fish	82′	33″	13′	46′	....	....	24′	....	16′	....	12′	..	..	..
Sovereign of the Seas	89¾′	41″	16′	50′	19″	10′	27½′	14″	18′	11½″	....	..	10′	6½″

FORE YARDS

	Lower			Top			T. Gal			Royal			Skys'l		
	L	D	YA	L	D	YA	L	D	YA	L	D	YA	L	D	YA
Flying Cloud	70′	21″	4½′	55′	14″	5′	44½′	10″	3′	32′	8″	2′	22′	6″	1½′
Staghound	72′	20″	4½′	57′	15″	5′	42′	10″	3′	32′	7″	2′	24½′	6½″	1½′
Flying Fish	70′	....	....	55′	....	..	41′	....	..	32′	..	..	22′	..	..
Sovereign of the Seas	80′	22″	5′	63′	17½″	5½′	47′	14″	3½′	37′	8″	2½′	....	..	..

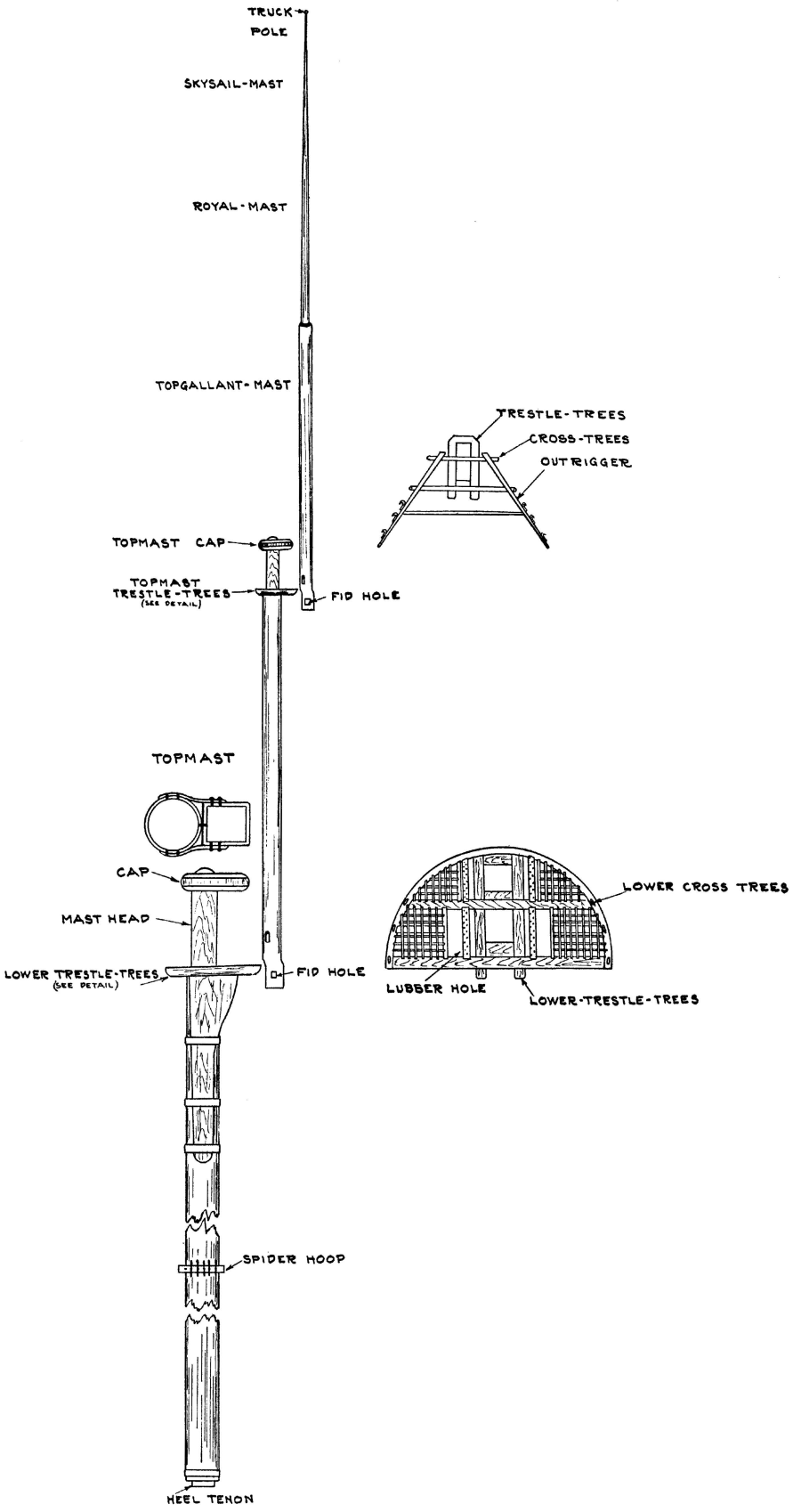


FIG. 46. MAST AND FITTINGS

MAINMAST

	L	D	M.H.	Top	D	M.H.	T. Gal.	D	Ryl	D	Sky	D	Pole	D
Flying Cloud	88′	36″	14′	51′	20″	9½′	28′	12″	19′	11″	14½′	10″	10′	6″
Staghound	88′	33″	14′	51′	17½″	9½′	28′	12″	19′	11″	15′	10″	9′	6″
Flying Fish	88′	....	...	49′	....	....	27′	....	18′	....	14′	....	..	..
Sovereign of the Seas	93′	42″	17′	54′	19½″	11′	30′	15″	20′	12″	14′	10″	8′	6″

MAIN YARDS

	Lower			Top			T. Gal			Royal			Skys'l		
	L	D	YA	L	D	YA	L	D	YA	L	D	YA	L	D	YA
Flying Cloud	82′	24″	4½′	64′	16″	5′	50′	15″	3′	37′	11″	2′	24′	8″	1½′
Staghound	86′	22″	4½′	68′	17″	5′	53′	15″	3½′	42′	10½″	2½′	32′	7″	1½′
Flying Fish	80′	....	....	64′	....	..	49′	....	..	39′	....	..	31′	..	..
Sovereign of the Seas	90′	24″	5′	70′	20″	5½′	54′	15″	4′	42′	11″	3′	35′	9″	2′

MIZENMAST

	L	D	M.H.	Top	D	M.H.	T. Gal.	D	Ryl	D	Sky	D	Pole	D
Flying Cloud	78′	24″	12′	40′	12″	12′	22′	9″	14′	8″	10′	7″	6′	5″
Staghound	78′	26″	12′	40′	12½″	8′	22′	9″	16′	8″	11′	7″	6′	5″
Flying Fish	78′	....	....	38½′	....	....	21′	....	14′	....	10′	....	..	..
Sovereign of the Seas	82¾′	34″	14′	43′	16″	9′	24′	11″	17′	9½″	....	....	8′	6″

MIZEN YARDS

	Lower			Top			T. Gal			Royal			Skys'l		
	L	D	YA	L	D	YA	L	D	YA	L	D	YA	L	D	YA
Flying Cloud	56′	14″	4′	45′	11″	4½′	33′	10″	2½′	25′	7″	1½′	20′	5″	1′
Staghound	60′	16″	4′	48′	11½″	4½′	36′	10″	2½′	27′	7″	1½′	22′	6″	1′
Flying Fish	59′	....	....	44′	....	..	34′	....	..	26′	..	..	21′	..	..
Sovereign of the Seas	70′	20″	4′	56′	15″	4½′	43′	11″	3′	32′	7″	2′	....	..	..

The rake of all masts was 1¼ inch per foot. This caused the wind to lift instead of to depress the vessel. It obviated the tendency to pitch. It made the bracing of the yards more easy. The difficulty of saying with absolute authority what the spar dimensions of any of these old ships were is emphasized anew by the discrepancies found between this table and that on page 117. As a matter of fact both are possibly correct for differing periods of her career.

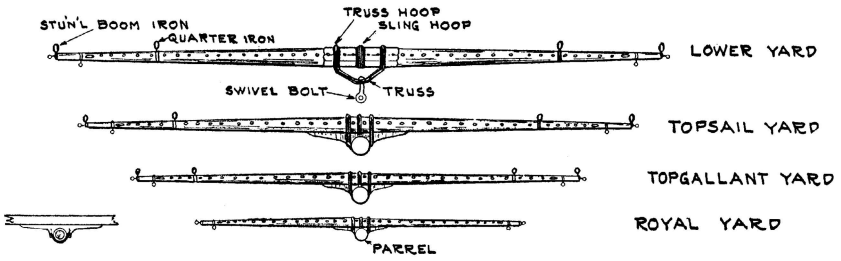


FIG. 47. SPARS

Model enthusiasts are reminded that the lower masts rest on the keelson. Their entire length is decidedly not above the deck. In the *Flying Cloud*, for example, the heights of the lower masts above deck are: foremast, sixty-four feet; mainmast, seventy-one feet, six inches; mizenmast, sixty feet.

The bowsprit, twenty-six and one-half inches in diameter, projected outboard for twenty feet; above it, the jib-boom, sixteen and one-half inches in diameter, stretched fifty-two feet forward of the stem.

The length of the spanker boom was fifty-five feet and its diameter eighteen inches. The spanker gaff measured forty feet, with a twelve-inch diameter.

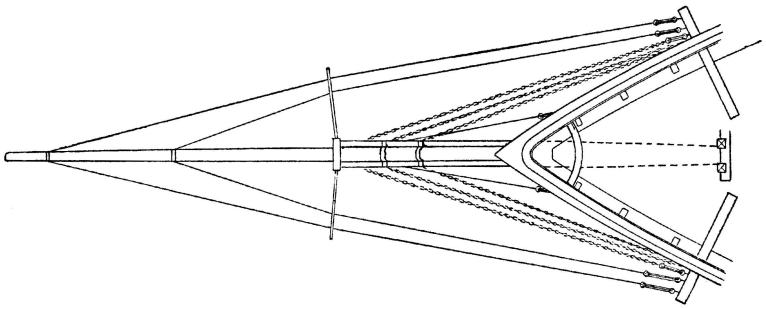


FIG. 48. BOWSPRIT

All standing rigging was tarred in order to protect it from the weather. A rule for compounding the mixture by which to do this reads like a cooking recipe:— ½ barrel of tar, 6 gallons of whiskey, 4 pounds of litharge, 4 pounds of lamp black, 2 buckets of boiling beef-pickle or hot salt water. Mix well and apply immediately.

Spare deadeyes, made in two pieces with a small bolt to hold them together, were to be found in the gear locker; a provision for temporary repairs at sea without having to remove a chain-plate to the smith shop, should the standing rigging break a deadeye.

All rigging was cable laid. Such rope consists of nine strands, each strand having an equal number of yarns. These nine strands are laid into three by twisting three of the smaller ones into one large one. The three larger ones are then laid up, or twisted together, in a left-handed direction.

Shroud-laid rope is made in the same manner except that it consists of four strands instead of three, and a small strand which runs through the middle termed the heart of the rope.

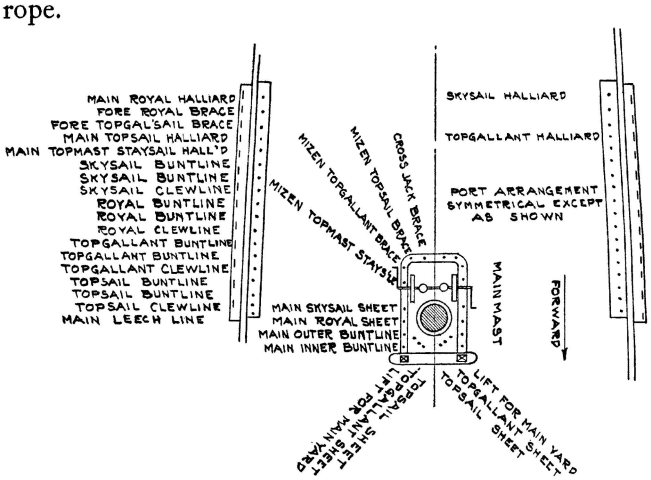


FIG. 49. BELAYING PIN ARRANGEMENT AT THE MAINMAST

The chain sheet pendants, shown on Plan XII, were probably not found on the *Flying Cloud* during her first voyages. Their accuracy was guaranteed by an old sailor who professed familiarity with the ship. Apparently, however, the hemp sheet pendant retained its simplified form for some time after 1850.

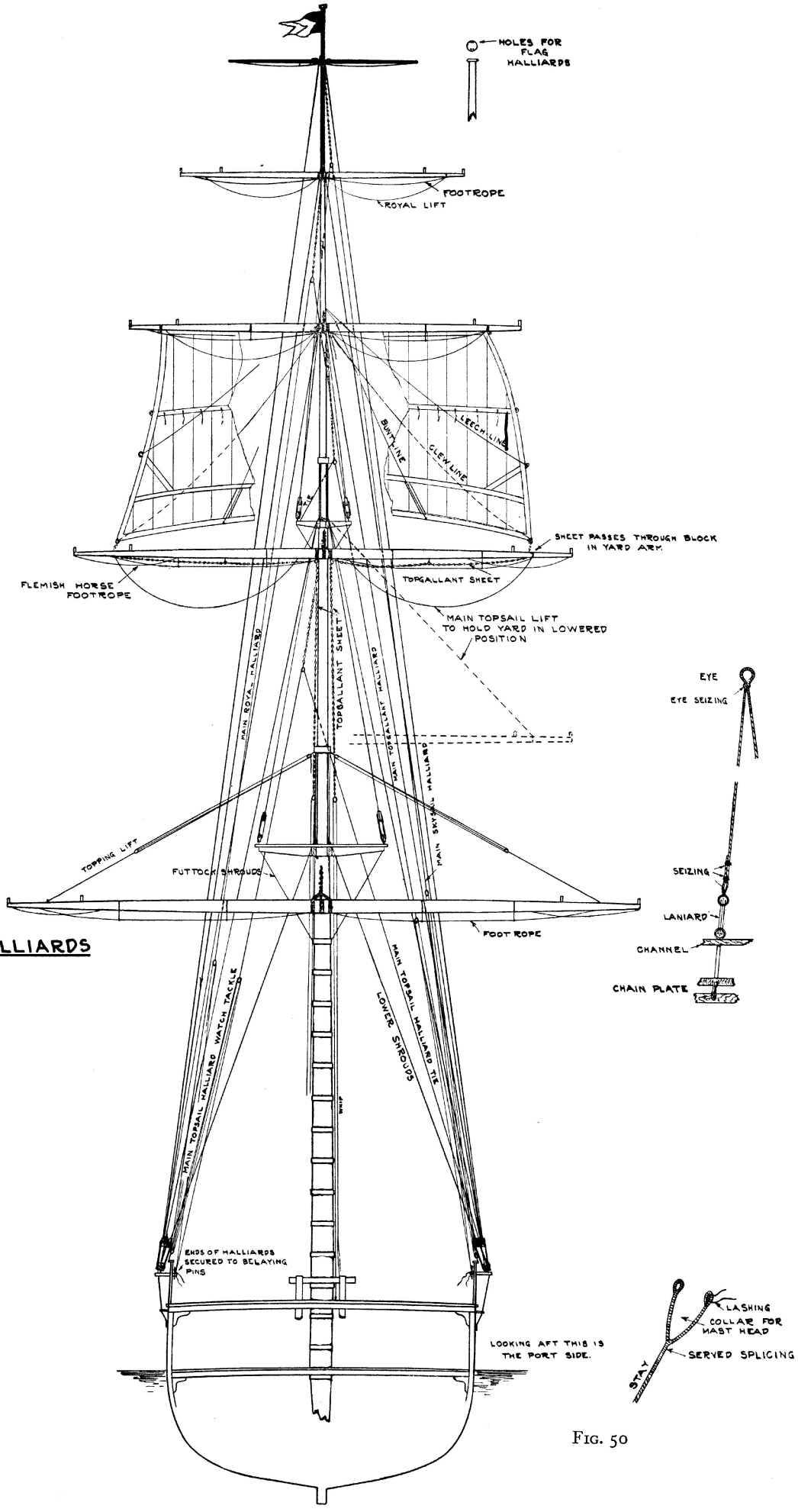


FIG. 50

SECTION AT MAIN MAST

LOOKING AFT

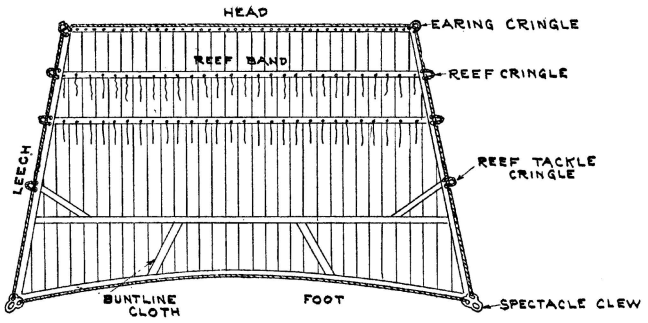


FIG. 51. SQUARE SAIL

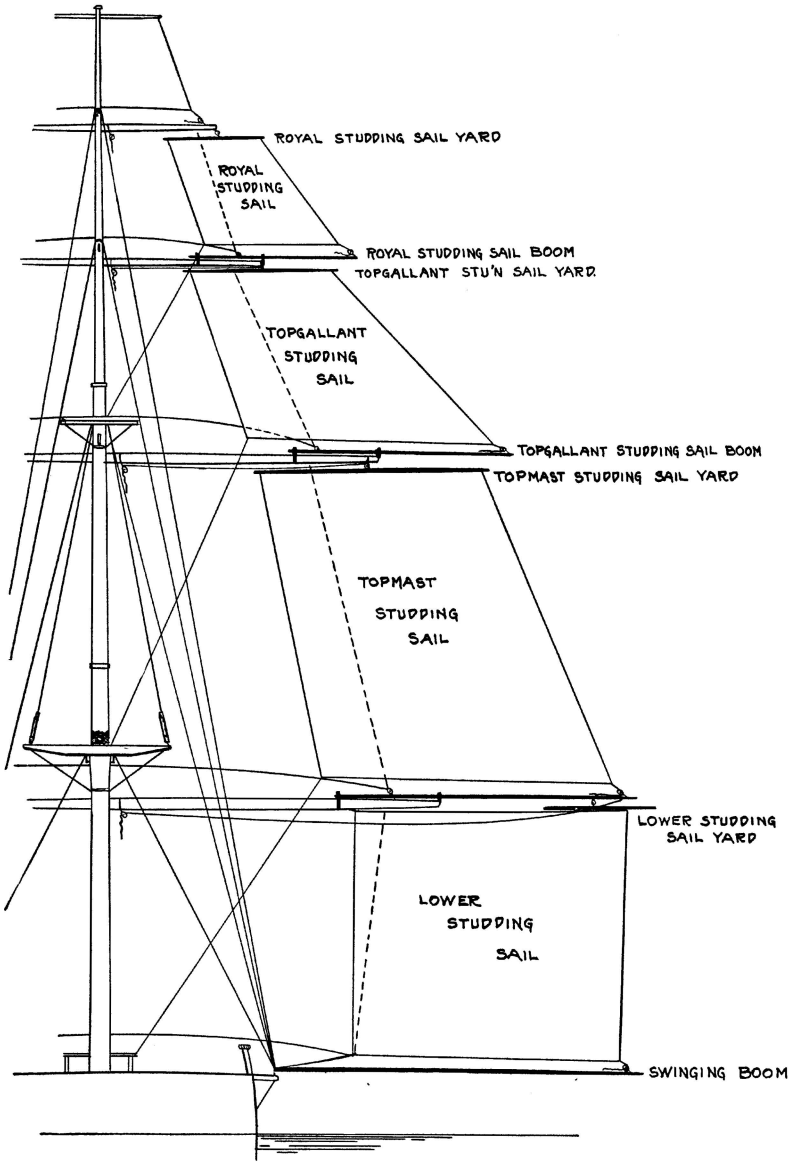


FIG. 52. FORE STUDDING SAILS ON THE *Flying Cloud*

EQUIPMENT

Sails

The construction of the square sail naturally reached its highest development with the clippers. Through the eyelets in the head the sails were lashed to the iron jackstays on the spars. Tackles from the yards to the reef cringles hauled the sail up when it had to be shortened. The sheets and the clew-lines made fast to the spectacle clews at the lower corners. Extra cloths reinforced the canvas wherever necessary.

Besides the sails shown on Plate XII, the *Flying Cloud* was equipped with main topgallant, main royal, mizen topmast, and mizen topgallant staysails. She carried royal, topgallant, and topmast studding sails at the fore and main, with square lower studdingsails and swinging booms at the fore.

The "stun' s'ls," as the sailors called them, greatly increased the sail area, and were used in light weather. Because it was both difficult and dangerous to handle these sails, seamen disliked them heartily. The knowing ones began to refuse to ship on vessels on which they could see the stun' sail booms. Mates, who were clever, consequently stowed their stun' sail booms out of sight, below decks, when signing on a new crew, ordering the booms rigged only after the vessel was at sea. When the sailors had been fooled once by such a ruse, they examined the yards for stun' sail boom irons before deciding whether to join or not.

The topsails were provided with four reef bands — an unusual number. The topgallants had single reefs. Bowlines, found as far back as the *Santa Maria*, still appeared in the topsails and the topgallants of the *Flying Cloud*.

Extra Spars

As seen from the extract of her log quoted on page 110, it was no unusual thing to have to replace a mast or a spar. An extra topmast was carried over the starboard waterway, and a round half-dozen of lighter spars on the forward deck house flanking the upturned small boats.

Anchor

The evolution of the anchor has been extraordinarily slow. Previous to the stockless anchors of the present day there was very little change from even before the Middle Ages. To be sure, the anchor of 1850 had a shorter stock than that of 1492, but in general principle it remained unchanged.

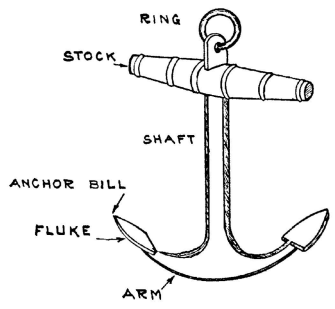


FIG. 53. ANCHOR

The rule for the proportioning of anchors had even less scientific basis than that used today, although both rules are brave in high-sounding deductions.

"For the sheet and bower anchors take two-thirds the number of feet which the ship draws with all her stores, etc., on board, and add to it the breadth of beam, allowing one hundred weight for every foot. The stream anchor is to be one-third of the sheet or bower. In stocking an anchor add together the length of the shank and half the round of the ring for the length of the stock. The stock is as many inches in thickness in the middle as the shank is long in feet, and is tapered to one-half the size at the end."*

* William Brady: *The Kedge Anchor*, 1854.

This anchor is for hemp cables. If for chain cables, the length of shank could be reduced one-quarter, but no reduction in weight was allowed.

Application of the rule would give a 6,400 pound anchor for the *Flying Cloud*. The sheet and the bower chains were of 2½ inch wrought iron, 120 fathoms long.

Windlass

The so-called pump-brake windlass was a great improvement over its predecessors, though much inferior to those of a few years later. On each side of the central samson post an iron-toothed rim served as a ratchet. Between these a pawl operated over another iron-toothed surface and prevented the windlass from overhauling, that is, from slipping back. Links from the crosshead, which on the *Flying Cloud* appeared

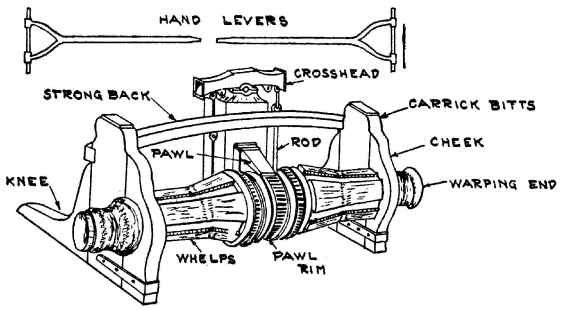


FIG. 54. PUMP-BRAKE WINDLASS

above the forecastle deck, operated on the ratchets and forced the windlass to turn as the hand levers were worked up and down. These levers fitted into sockets in the crosshead and could be removed in order to clear the forecastle.

The great difficulty of this design lay in the impossibility of letting the anchor chain run free. There were several turns around the whelps on the barrel of the windlass which had to be overhauled by hand until sufficient chain had run out to reach bottom. This process was called "ranging" the cable.

Capstans

Of these there were four in all: two single-acting capstans on the poop-deck, one double-acting capstan on the forecastle, and one just abaft the mainmast. A series of

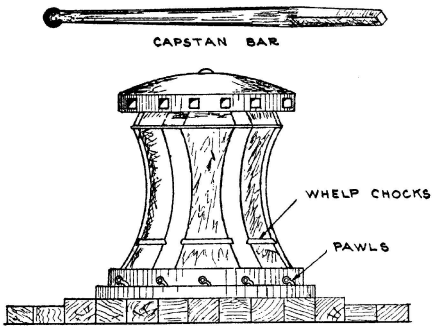


FIG. 55. CAPSTAN

little pawls at the bottom kept the capstan from overhauling and made the rapid click, click, click which accompanied the red-shirted sailors as they pushed the bars around. Without these pawls a sudden force on the hawser would have felled the sailors as the drum spun around and catapaulted the bars out of their holes with fearful and de-

structive effect. Capstan bars were removable; those belonging to the poop-deck stowed on the after side of the deck house beneath the fire buckets; those for the forecastle and waist, on a rack along the bulwarks.

Pump

The fire and bilge pump was no longer below, but now occupied a strategic position between the fife-rails of the mainmast. The old hand levers had been replaced by rotating fly wheels. Removable handles belonged on each end of the shaft, either handle being sufficiently long for two men to operate it at a time.

"Man the pumps" is an order that has in it a hint of romance and catastrophe. Actually it was back-breaking labor which had to be periodically performed as a matter of routine because even the tightest ship leaks a bit.

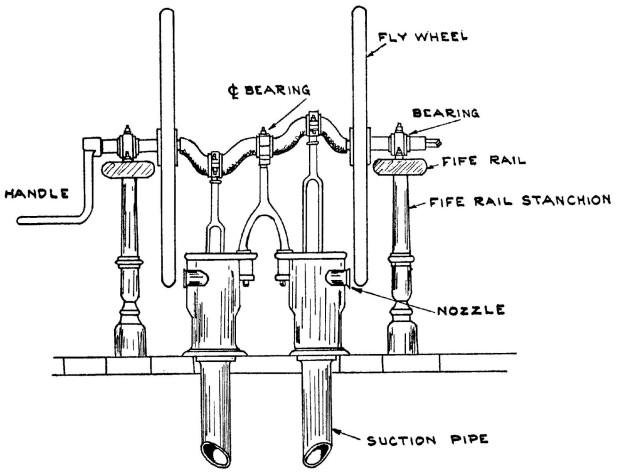


FIG. 56. FLY-WHEEL PUMP

Sometimes it was deadly serious business. On one of her voyages, a few days out of Whampoa, the *Flying Cloud* ran on a coral reef. The crew succeeded in getting her off but not, however, until she was so badly strained that the water leaked into her hold at the rate of eleven inches every hour. Over a hundred days later she arrived in New York with a cargo valued at a million dollars — safe, because the crew had continuously manned the pump in shifts from the time she ran aground.

Flags

From the mainmast every clipper flew the house flag of the firm to which she belonged. That of Grinnell, Minturn & Co. was a white, red, and blue swallowtail.*

From the mizen was flown her private signal — a red pennant.

At the peak the national ensign fluttered in the breeze, proclaiming to all that the ship was American. The British were our only rivals. The flags of these two nations, and these two only, flew from the peak halliards of clipper ships.

* Clark: *Clipper Ship Era*, page 303, gives it as red, white and blue. A lithograph published in 1852 by N. Currier, New York, gives it as white, blue and red. As this book goes to press, a letter from Grinnell Martin of New York, a grandson of one of the owners of the *Flying Cloud*, brings the information that from the fly to the pole the flag was white, red and blue. Thus there is authority for various arrangements, though material left by Capt. Alexander Winsor, commanding officer of the *Flying Cloud*, 1859-1862, more than substantiates the correctness of Mr. Martin's statement. There was no star, as is sometimes erroneously supposed.

Small Boats

Lest they be carried away by the sea, the small boats were not stowed outboard on davits, the one exception being a cutter swung just forward of the starboard mizen shrouds for immediate use in case of a man overboard. The other three boats were turned upside down and lashed on top of the forward deck house where they offered shelter to the poultry during a voyage.

The wisdom of carrying one boat on davits was proven on April 2, 1856, when the *Flying Cloud* was making twelve knots in the vicinity of Madagascar. From her cabin window the captain's wife, Mrs. Creesy, saw a sailor go overboard. She rushed on deck to throw over a life buoy and give the alarm. Immediately the ship was hove to and the boat launched. A long search followed. When the boat came back without the sailor, Creesy ordered a second boat put over and the hunt was vigorously pursued as long as daylight lasted. Four hours later, almost dead, the man was picked up two miles from the ship. Under Mrs. Creesy's motherly nursing he soon regained his strength.

Quarters

A description of the provisions for both crew and passengers has already been given. See page 116.

Food

As a rule the food was excellent and there was plenty of it. British crews were allowed so much a day. American crews could help themselves to beef, pork and bread as long as it lasted.

Water was a different matter. Its consumption had to be carefully regulated, the carpenter usually being charged with the responsibility of pumping a gallon for each person on board, from the great iron tank in the hold, and pouring it into a scuttle-butt on deck. Each day the amount remaining in the tank was meticulously entered in the log-book. From the scuttle-butt, the cook, the stewards and the sailors obtained their water, and woe indeed to the man who wasted it.

Grog formed a part of the rations on the British ships. Not so aboard the American clippers. It is true that the crew often spent their wages for drink when ashore, but no alcohol was allowed at sea. Total abstinence was much encouraged by our ship-owners, both because the ships were then better managed, and because this superiority reaped its monetary reward in lower insurance rates.

A captain would sooner have thought of putting to sea without his medicine chest than without a cow or a nanny goat. The latter possesses excellent sea legs, a bequest from rock-jumping ancestors. She is also blessed with a stomach of such courage that nothing in the shape of vegetable fiber dares to disagree with it. Nevertheless, Captain Cressy preferred a gentle bovine, who chewed her cud within the narrow confines of a pen erected on the forward hatch.

Hogs thrived well at sea, enjoying the scraps from the mess table until one day they appeared upon the menu. Ducks, geese and hens were always found in the forward end of the deck, persisting sometimes unto the third and fourth generation of sea-going poultry. They furnished fresh eggs for the captain's omelette, and like their dryland cousins, they had a noisy way of their own when there was excitement near them. Sometimes, no doubt, even the cow bemoaned her lot.

The solution of the problem of taking care of all these animals has already been hinted at. Beneath the upturned boats the poultry found security and shelter. Across the forward hatch was lashed the cowhouse within whose narrow confines the Jersey

might dream of shade trees and friendly hills, but from which she could see only the rolling endless ocean.

A negro cook of enviable genius always presided over the galley, which, on the *Flying Cloud*, was in the center instead of at the after end of the forward deck house (See Plate XXIX).

Cargo

During the California gold rush the cargo consisted of sundry items on the outward voyage, principally furniture, tools, and food supplies. From San Francisco, ships crossed to China in order to return to New York with tea. Under the British flag the *Flying Cloud* carried wool from Australia and later, lumber from New Brunswick.

Operation

The clippers were much easier in a seaway than the older types of vessel; they rolled and heaved less, and consequently offered greater comfort to the passengers besides delivering their cargoes in better condition. The long, narrow bow would cut through a heavy sea which the tremendous buoyancy of a *Mayflower's* bow would rise upon. This drenched a clipper's deck in a swirl of foaming spray, but what cared the crew for wind or weather?

Their ships could sail to windward under conditions impossible for the navigation of any previous type. They could be operated to advantage by a breath of air, or by a gale. But compared to the simplicity with which the throttle of a turbine may be closed in answer to a ring of the engine-room telegraph, the procedure following the order "All hands shorten and furl sails," was extremely complex. Following this first order the crew would man the clew-ropes, buntlines, leech-lines, down-hauls, and brails, having the bunt ropes and jiggers overhauled, and ready for hooking to the gluts, and hands by the halliards, out-hauls and bowlines, to let them go.

"Aloft, topmen!" was the second command after which time was allowed to reach the futtock-rigging.

"Aloft, lower-yardmen!"

"Haul taut, clew up, haul down, lie out and furl."

Gather up the slack of the sails smartly, and pass the leeches, points, and bowlines, bridles in taut along the yard towards the bunt, slack down the buntlines, hook the bunt-jiggers, toss up, and skin the sail taut and smoothly in the headband, keeping the bunt square in the slings, and heaving the clews forward in the wake of the quarter-blocks, slew the head-earing cringles up fair, and pass the gaskets at right-angles with the yard, parallel with each other, and without turns.

"Lie in, down booms, and down from aloft" — square the heel of the booms, keeping them at equal distances apart on each side of the bunt, and parallel with the yard, secure the glut to the tye by a temporary racking, unhook the bunt-jiggers, stop the bowlines to the jackstays, on each side of the bunt, and haul them taut, together with the jig and staysail halliards, and see that the clew-lines are close up. Then square yards: after which, haul taut reef-tackles, sheets and all slack ropes.

In trimming the sails the yards on a given mast were not all at the same angle. Instead the sails were "checked in" as it was called, the light upper sails being closer to the wind than the larger lower courses. By this system, the helmsman could keep half an eye on the royals, which warned him when he steered too close to the wind by backing before the lower sails came aback.