

Joseph Longstreth's son, Joshua, found a neighbor by the name of John Fitch, busy on the bank of a stream. . . .

JOSHUA LONGSTRETH: Friend John! . . . John!  
JOHN FITCH: Yes, Joshua? What is it?

JOSHUA LONGSTRETH: I have been looking everywhere for thee! Father wants to know can thee help him with the plowing?

JOHN FITCH: Tell him I'm busy with other matters.

JOSHUA LONGSTRETH: Very well, but . . . Why, John, what has thee got there?

JOHN FITCH: A boat.

JOSHUA LONGSTRETH: It's a very strange looking boat. It's only two feet long.

JOHN FITCH: It's a model.

JOSHUA LONGSTRETH: I don't think I ever saw anything quite like it before.

JOHN FITCH: Nor I, Joshua. Nor anyone else.

JOSHUA LONGSTRETH: It looks something like an Indian war canoe.

JOHN FITCH: Yes. I got the idea from that. Two rows of paddles, six on each side.

JOSHUA LONGSTRETH: Aw, they won't work! No man could move all those 12 paddles.

JOHN FITCH: No man is supposed to move them.

JOSHUA LONGSTRETH: Then what makes them paddle?



## STEAMBOAT BUILDERS

**F**AR FORWARD IN THE ONWARD MARCH of America were the inventive pioneers who looked into the future and conceived the vision of man going down to the sea in steam ships. First on a little pond in Pennsylvania, then on the broad waters of great rivers and finally to the sea, the marine cavalcade sailed on from a vision in the mind of an American adventurer, to the final fulfillment of his idea in the magnificent luxury liners of today. It began on the Quaker farm of Joseph Longstreth in Bucks County, Pennsylvania. There, in the spring of 1785,

JOHN FITCH: This bar here, fastened to the paddles and connected with this driving rod.

JOSHUA LONGSTRETH: And that disappears into a box. . . . What is in the little box, John? Magic?

JOHN FITCH: No, Joshua, steam. When there's plenty of steam it will blow this little whistle. . . . That's called a safety valve.

JOSHUA LONGSTRETH: Then what happens?

JOHN FITCH: Then I let some of the steam into the box and—see? Hear the whistle?

JOSHUA LONGSTRETH: Oh, John . . . run!

JOHN FITCH: Don't be frightened. It's perfectly safe. Stay and see its trial trip. And help me put it in the water.

JOSHUA LONGSTRETH: Yes, John. . . . Oh, it's heavy.

JOHN FITCH: Yes, it's heavy laden. Months of work and all my hopes are in it. There we are. Into the water she goes. And it floats, Joshua, it floats!

JOSHUA LONGSTRETH: Yes, it floats all right. Too bad there are no sails or anything to make it go.

JOHN FITCH: It shouldn't need sails . . . nor even a wind . . . just the steam. When I throw this lever, it should start to work. There—see? The paddles begin to move!

JOSHUA LONGSTRETH: So does the boat . . . Oh, John, John! Look! See it go! John, what does thee call this wonder?

JOHN FITCH: Why—I haven't thought of any special name for it—it's just a steamboat.

John Fitch patented his invention and secured from the States of Pennsylvania, New Jersey, New York, Delaware, and Virginia, the exclusive privilege to build and operate steamboats on all their waterways for 14 years. With these franchises and his model, he raised enough money in Philadelphia to build a steamboat 45 feet long. As there were only three steam engines in all America at this time, John Fitch had to make his own with the assistance of Henry Voight, a watch maker. At last, on August 22, 1787, the boat was ready to be launched into the Delaware River. Great crowds stood on the bank to see the wonder. John Morris, one of the syndicate that raised money for the experiment, stood anxiously with John Fitch near the ways. . . .

JOHN MORRIS: Are you quite sure, Mr. Fitch, that when your boat hits the water she'll not break in two?

JOHN FITCH: Mr. Morris, nothing on earth is certain. . . . On the water, it's even more uncertain.

JOHN MORRIS: Well, your invention has cost a lot of money already. If your toy should fail to work . . .

JOHN FITCH: It is not a toy, Mr. Morris. Even though it's only the fourth steam engine in America,

so many distinguished persons do not gather to watch toys.

JOHN MORRIS: Perhaps not, but they will gather to see freaks . . . and truly there is nothing in science to recommend this strange boat of yours. Dr. Franklin will not endorse it.

JOHN FITCH: I know. And have you lost faith in me already?

JOHN MORRIS: As one of your financial backers, it's only natural for me to be anxious. This steam engine you and Voight concocted. . . .

JOHN FITCH: We had to do the best we could. There is no place we could get one. So I share your anxiety about the engine, for our money is all spent.

JOSHUA LONGSTRETH: (*approaching*) Oh, friend John, friend John . . .

JOHN FITCH: Why, Joshua, what are you doing in town?

JOSHUA LONGSTRETH: Father drove me in to see thy real boat on the Delaware.

JOHN FITCH: I hope you won't see it go to the bottom of it.

JOSHUA LONGSTRETH: How can thee say such a thing?

JOHN FITCH: Most of this crowd here think it's more than likely.

JOSHUA LONGSTRETH: But they didn't see thee launch thy model. This big boat looks the very image of it.

JOHN FITCH: It is exactly.

JOSHUA LONGSTRETH: Then *it* must float too.

JOHN FITCH: But it's heavier.

JOSHUA LONGSTRETH: And it's bigger, so it'll float even better.

JOHN FITCH: You give me courage, Joshua.

JOSHUA LONGSTRETH: Who are all those men over there? And why has a special place been set aside for them? Are they builders of boats too?

JOHN FITCH: Well, in a way they are. But they're building a ship much greater than mine.

JOSHUA LONGSTRETH: Another steamboat?

JOHN FITCH: No. It has mightier power than steam. They're building our Ship of State. Those men are members of the new Constitutional Convention.

VOICE: Everything's ready, John. The tide is right.

JOHN FITCH: Hey, Voight, is steam up?

HENRY VOIGHT: (*off*) I've got full pressure ready!

JOHN FITCH: Then let's launch her.

HENRY VOIGHT: Climb aboard.

JOSHUA LONGSTRETH: I'll go back to my father.

JOHN FITCH: All right, Joshua. Wish me well . . . Give me a hand, Voight. Thanks. Hey, you men back there! Cut away the falls! When she's afloat, Voight, I'll give you a signal. Then give her the steam.

HENRY VOIGHT: Very good, John.

JOSHUA LONGSTRETH: (*off*) A good voyage, John!

JOHN FITCH: Thanks, Joshua!

HENRY VOIGHT: She's moving, John!

VOICE: (*off*) Hey! Stand clear of the ways there!

JOHN FITCH: Cast off the tow line!

HENRY VOIGHT: But we may need the tow line to get ashore.

JOHN FITCH: Cast it off, this is no canal boat! We'll sink or swim—but we won't be towed.

HENRY VOIGHT: We're nearly at the water!

JOHN FITCH: The Lord be with us, Voight.

John Fitch's steamboat gathered speed as it slid down the ways and just as the ship plunged her way into the water, a murmur of awed voices came up from the crowd. . . .

HENRY VOIGHT: She floats!

JOHN FITCH: She surely does.

HENRY VOIGHT: And how well she rides!

JOHN FITCH: Give her steam . . . I'll take the helm.

HENRY VOIGHT: All right. The throttle's open wide. The paddles are turning. Is everything all right?

JOHN FITCH: Yes! Look! She's making headway against the tide!

HENRY VOIGHT: Listen to the people cheer! We've made a good start.

JOHN FITCH: I wonder where we'll end?

HENRY VOIGHT: Why, we'll finish at Burlington, 20 miles up stream.

JOHN FITCH: No, Voight, I think the steamboat has started a voyage that won't be finished for centuries.

So successful was his 45 foot steamboat that in 1788, Fitch built a 60 footer that carried 30 passengers and two years later, a larger boat with a stern paddle wheel, ran the 20 miles up stream to Burlington in 3 hours and 10 minutes in regular service. But the cost of operating the lines was very high. The mechanics of steam engines were not well known then. Besides, competition from stage coaches was greater along the Delaware than any other river. The outlook was unprofitable. Within a few years, the steamboat of John Fitch was but a memory, and a new name loomed on the horizon—Robert Fulton! Although Fulton did not launch his first boat until after Fitch had died, he had been interested in canals and inland navigation. His work took him to Paris where, in 1802, Robert Livingston, the American Minister to France, heard of Fulton's accomplishments and sent for him.

ROBERT FULTON: You sent for me, Mr. Livingston?

ROBERT LIVINGSTON: Yes, Mr. Fulton. Since you built your diving boat for Napoleon, I've been thinking about your work.

ROBERT FULTON: You heard of the "Nautilus"? I'm afraid it was more curious than useful.

ROBERT LIVINGSTON: Still, I am told that it stayed submerged for four hours.

ROBERT FULTON: Four and a half hours to be exact. . . . Not that it mattered. The British fleet refused to come our way. And we had to bring my fine torpedoes back unused.

ROBERT LIVINGSTON: Would you like to use your inventive powers for purposes of daily use?

ROBERT FULTON: I'd greatly prefer it! When I was a boy of ten, I made my own pencils out of sheet lead so I could draw.

ROBERT LIVINGSTON: I've heard you are a good draftsman.

ROBERT FULTON: But my interest in mechanics has a less praiseworthy origin.

ROBERT LIVINGSTON: Which is?

ROBERT FULTON: Laziness. When I lived near Lancaster—I'm a Pennsylvanian—I used to like to go fishing on the Conestoga Creek. But I hated to row a boat. So I fashioned a pair of paddle wheels connected with an offset bar which I could turn by hand with a gentle swaying of the body. Very pleasant.

ROBERT LIVINGSTON: Have you never thought of

turning those paddle wheels with anything but muscle?

ROBERT FULTON: What else? . . . Oh, I see. You mean steam.

ROBERT LIVINGSTON: Exactly.

ROBERT FULTON: I have no funds. And such toys cost money.

ROBERT LIVINGSTON: I have the money . . . and something more. I am interested in developing the steamboat in America. You see, I have the franchise for steamboat navigation in the State of New York.

ROBERT FULTON: There are plenty of bad roads and good water there to make steamboat transportation desirable.

ROBERT LIVINGSTON: And you're practical enough to make it profitable.

ROBERT FULTON: Thank you. Unfortunately, New York is a long way off.

ROBERT LIVINGSTON: Do you object to going back?

ROBERT FULTON: My prospects at present seem quite excellent with Napoleon. I'm not sure I want to return to America at this time.

*(door opens)*

HARRIET LIVINGSTON: *(coming in)* Uncle Robert! . . . Uncle Robert! . . . Oh! I'm sorry. Am I interrupting?

ROBERT LIVINGSTON: Come in, my dear! This is Mr. Fulton. My niece, Miss Harriet Livingston.

HARRIET LIVINGSTON: Mr. Robert Fulton, who invented the diving boat?

ROBERT FULTON: Your servant, M'am.

ROBERT LIVINGSTON: I've just been trying to persuade Mr. Fulton to go back to America and build a steamboat for me.

HARRIET LIVINGSTON: And you refused, Mr. Fulton?

ROBERT FULTON: I hesitated, Miss Livingston—I appreciate your uncle's offer—

ROBERT LIVINGSTON: I want you to think it over before you make a final decision, Mr. Fulton. I am sailing in a week's time, and I'd be very happy to know that you were going to be on the same packet with my niece and myself.

HARRIET LIVINGSTON: May I add a word to my uncle's plea, Mr. Fulton. It doesn't seem right that America's talented men should give their inventions to any but their own country. Can't I appeal to your patriotism?

ROBERT FULTON: I only hesitated, Miss Livingston, because France has so far offered more opportunities for my work.

ROBERT LIVINGSTON: I'm offering you a chance not only to make a name for yourself but to be of some service to your country.

Robert Fulton returned to America and worked on his steamboat plans, taking great care to keep

costs low and efficiency high. In 1807, the engines and boilers were installed and on the 11th of August, Robert Livingston and the lovely Miss Harriet arrived at Brown's shipyards in Greenwich Village to meet Fulton for the trial trip. A crowd was waiting to see the first run of Fulton's Folly.

ROBERT FULTON: There she is, Harriet, ready and waiting.

HARRIET LIVINGSTON: It's wonderful, Robert, to think that you made it all yourself.

ROBERT FULTON: Hardly myself, my dear. The engine was designed by Joel Barlow; it was built in England by Boulton and Watt; and the boat itself was built by Charles Brown.

HARRIET LIVINGSTON: But it was your idea, Robert.

ROBERT FULTON: It was your uncle's idea, really. And if it hadn't been for your persuasive powers, I'd probably still be in France trying to build diving boats.

HARRIET LIVINGSTON: It's certainly a lovely ship, Robert. How long is it?

ROBERT FULTON: One hundred and thirty-three feet long and seven feet deep.

HARRIET LIVINGSTON: Oh, I didn't notice at first—the name painted on the side—you've named her after Uncle Robert's place on the Hudson, "*Clermont*."

ROBERT FULTON: "*Clermont*" is your home too, you know.

HARRIET LIVINGSTON: And who is supposed to be complimented the most—Uncle Robert or me?

ROBERT FULTON: I resisted the temptation to name her "Harriet," because if she had turned out to be a failure—

HARRIET LIVINGSTON: The success of this venture means a lot to you, doesn't it, Robert?

ROBERT FULTON: More than I can say. If I succeed, I'll no longer be a penniless inventor. I'll be able to ask your father for permission to announce our engagement.

HARRIET LIVINGSTON: I gave you that permission long ago.

ROBERT FULTON: I know, dear, but—here's your uncle now.

ROBERT LIVINGSTON: Well, Robert—everything in readiness for the trial?

ROBERT FULTON: Yes, Mr. Livingston. The steam has been up for some time. Shall we walk over to the dock and go aboard?

HARRIET LIVINGSTON: Are you sure it won't explode?

ROBERT LIVINGSTON: Don't be frightened. Mr. Fulton can swim.

ROBERT FULTON: I'm sure it's safe.

ROBERT LIVINGSTON: What provision have you made against fire?

ROBERT FULTON: Well, I hope to keep it entirely confined to the boilers. Aft there under that housing is a 20 foot boiler set in brick. The engine is forward.

HARRIET LIVINGSTON: Will steam really turn those paddle wheels? They look enormous.

ROBERT FULTON: They're over 15 feet across.

HARRIET LIVINGSTON: How fast will it go?

ROBERT FULTON: I don't know. But we'll soon see.

ROBERT LIVINGSTON: The crowd on the dock seems interested.

ROBERT FULTON: Hoping to see a catastrophe undoubtedly.

ROBERT LIVINGSTON: Well, let's get aboard, Robert.

VOICE I: Go ahead. I'm sure I wouldn't take a chance.

VOICE II: So Fulton's Folly is about to start!

ROBERT FULTON: I hope so, my friend.

VOICE I: Better take sails along with you, mister.

VOICE II: I'll bet she blows up before she gets out in the river.

HARRIET LIVINGSTON: Well, I'm not afraid. I'm going aboard.

ROBERT LIVINGSTON: Come, Robert. Come, Harriet.

VOICE I: Look at them. Crazy fools. Anyone knows you can't drive a boat by steam.

VOICE II: Those notables aboard don't look any too happy.

VOICE I: I'm waiting to see them all get a wetting in the river.

(laughter)

ROBERT FULTON: (off) Cast off!

SAILOR: (off) Aye, aye, sir!

VOICE I: Well, we'll soon know. They're casting off.

VOICE II: Where's he planning to go?

VOICE I: Albany, he says.

VOICE II: Tide's against her. Wind's against her. She'll never make it.

ROBERT FULTON: (off) Open the throttle!

SAILOR: (off) Throttle's open, sir!

VOICE I: Watch her—she'll blow up in a minute!

ROBERT FULTON: Full steam ahead!

There was a strange mixture of sounds as the hiss of the steam in the boilers, the churning noises from the paddle wheels, and the jeers from the crowd intermingled. Suddenly, the crowd noticed that Fulton's steamboat was moving. . . .

VOICE I: Well, will you look at that!

VOICE II: She's moving!

VOICE I: Durned if she ain't. Against the wind and tide! I never would have believed it. Hooray!

VOICE II: You were the one who said it wouldn't work.

VOICE I: Well, I can change my mind, can't I? Three cheers for Mr. Fulton!

The *Clermont* made her first trip to Albany and return in sixty-two hours running time, averaging nearly five miles per hour. The only other ways of travel up the Hudson at that time were by very bad roads or by sail boat, often against wind and tide, so the comfortable reliable *Clermont* was a commercial success.

More steamboats were built, but all of them depended on wood for fuel under their boilers. One of them was operated by Captain Daniel Peck. One day, Peck had as his passenger a delightful old gentleman, the Reverend Doctor Eliphalet Nott, President of Union College, who cheerfully came to the wharf at Albany. . . .

DOCTOR NOTT: Well, Captain, it's a nice day. I'm looking forward to a delightful trip down the Hudson.

CAPTAIN PECK: Yes. Barring accidents.

DOCTOR NOTT: That, Captain, is, as always, in the hands of Providence. Shall I go aboard?

CAPTAIN PECK: If you don't mind a piece of advice, doctor . . . take a seat in the barge we're towing.

DOCTOR NOTT: Why the barge? Why not here on the steamboat?



CAPTAIN PECK: Well, sir . . . you'll find the barge more comfortable.

DOCTOR NOTT: And cheaper too?

CAPTAIN PECK: No sir. To be honest with you, sir, places in the barge cost more.

DOCTOR NOTT: Then I have two good reasons for riding on the steamboat. First, it is cheaper, and second, I want to see how the engine works.

CAPTAIN PECK: Well, suit yourself, sir. But don't say I didn't advise you different.

DOCTOR NOTT: But I can't understand why it's cheaper to ride on the boat instead of the barge.

CAPTAIN PECK: You don't have to understand it. All you have to do is believe it.

DOCTOR NOTT: Anyway, I'll look more closely at the engine.

CAPTAIN PECK: It's a strange thing to see a clergyman and a teacher so interested in engines.

DOCTOR NOTT: The fact is, I'm more interested in the boiler.

CAPTAIN PECK: Aye, the boilers could stand more attention than they get.

*(calls)*

On board there! Throw another armful of wood on the fire.

VOICE: Aye, aye, sir.

DOCTOR NOTT: What kind of wood is it?

CAPTAIN PECK: Seasoned wood, sir. It'll burn fast and hot.

DOCTOR NOTT: I should think it would make a lot of difference what kind of wood it is, if you want to control the fire.

CAPTAIN PECK: Lord, sir, nobody can control fire under a boiler. It gives you too much steam or no steam, or some steam, there's no telling what.

DOCTOR NOTT: Has no one invented a way to control it?

CAPTAIN PECK: It's like making soup . . . every man to his own taste.

DOCTOR NOTT: Well, now, maybe, I could give that problem some thought.

CAPTAIN PECK: Are you an inventor too?

DOCTOR NOTT: I have experimented with the properties of heat—and made some improvements in stoves and so forth.

CAPTAIN PECK: Wood stoves?

DOCTOR NOTT: No, coal stoves.

CAPTAIN PECK: Coal would be no good for steamboats. How would we get it to burn right?

DOCTOR NOTT: I couldn't tell you at the moment . . . but it's something to think about.

CAPTAIN PECK: Yes. Wood is so very unsatisfactory . . . so unreliable. . . .

VOICE: *(off)* Steam's up, Captain!

CAPTAIN PECK: All right. If you'll step aboard, Doctor Nott, I'll give orders to start.

DOCTOR NOTT: Thank you.

But Doctor Nott had no more than stepped aboard when there was a sudden hiss of steam, followed by a great boiler explosion which shook the ship from bow to stern! Voices cried out in fright and terror, debris flew into the air and fell splashing into the water. Miraculously, no one was hurt. But when Doctor Nott left that day, he well understood why the seats in the barge were more expensive than those on the steamboat itself. He decided to find some way to prevent similar accidents, and in 1829 filed six patents covering the application of heat to steam boilers. These patents brought into existence the first base-burning stove to use the hard anthracite coal. In order to test the practical use of his new boiler, Doctor Nott designed a boat 150 feet long and had it built in New York. Captain Peck was given command and on the evening of May 18, 1831, Doctor Nott's boat, as it was called, docked at Albany where it was greeted by an interested crowd. . . .

CAPTAIN PECK: Make fast! Lower the gang plank! Well, Doctor Nott. Your boilers are a success.

DOCTOR NOTT: I don't think *they'll* blow up, Captain.

CAPTAIN PECK: Right you are, sir.

REPORTER: *(off)* Doctor Nott. Doctor Nott. May I speak with you a moment?

CAPTAIN PECK: Just a moment, young man, Doctor Nott is going ashore.

REPORTER: *(nearer)* Doctor Nott, I represent the Albany "Argus" and I'd appreciate a word or two about your new boat.

DOCTOR NOTT: Gladly, sir.

REPORTER: She's a fine looking boat, Doctor. Most unusual, in fact.

DOCTOR NOTT: She's full of new improvements. That's why I call her the "Novelty."

REPORTER: She has the longest promenade deck I ever saw.

DOCTOR NOTT: One hundred and twenty feet . . . all but thirty feet of her. And notice the round stern.

REPORTER: Yes sir.

CAPTAIN PECK: She's finished throughout most elegant.

DOCTOR NOTT: Captain Peck will be glad to show you around, I'm sure.

REPORTER: Did you make the engines, Doctor Nott?

DOCTOR NOTT: No, the engines and machinery were made in Pittsburgh.

REPORTER: I understand the boilers are your invention. How many are there?

DOCTOR NOTT: There are eight of them. Four on each side. They're arranged so they won't interfere with the cabin.

REPORTER: And you burn anthracite coal?

DOCTOR NOTT: Yes, it gives the greatest heat for the smallest fuel space.

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REPORTER: How far will the coal take you?

DOCTOR NOTT: Many times farther than the same space filled with wood.

REPORTER: That's very interesting.

DOCTOR NOTT: I think I am safe to predict that, within twelve months, ships equipped with anthracite boilers like those will be crossing the Atlantic.

REPORTER: May I quote you on that?

DOCTOR NOTT: Certainly, sir.

REPORTER: Thank you very much, Dr. Nott. You've done something big for navigation. One more question. How long did it take you to make this trip?

DOCTOR NOTT: We left New York at nine this morning.

REPORTER: Thirteen hours! That's a record. Just think, all that power coming from anthracite coal.

DOCTOR NOTT: Give some credit, my friend, to man's inventive mind and the guidance of Divine Providence.

These early steamboats are just memories now—phantom ships of the past, but to these three men of vision, each endowed with a spirit of experiment, imagination, and service to mankind, we owe the modern floating palaces of today.