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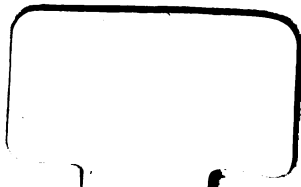


*Life of Rear Admiral John
Randolph Tucker, ...*

James Henry Rochelle

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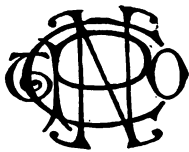


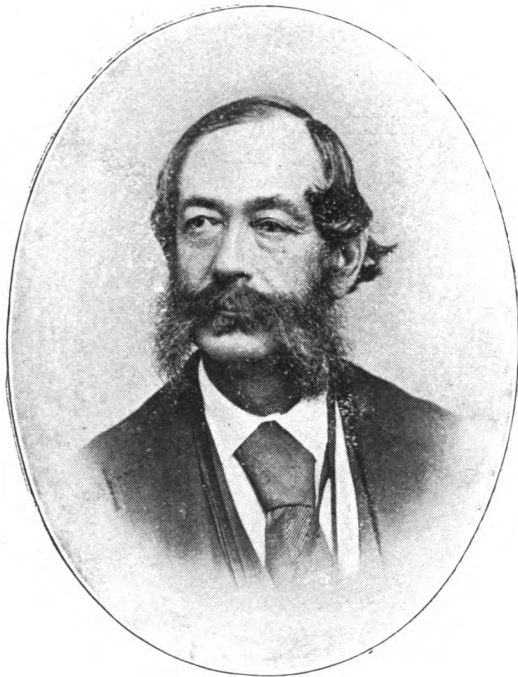
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JOHN RANDOLPH TUCKER

LIFE OF REAR ADMIRAL

JOHN RANDOLPH TUCKER¹⁸¹²⁻¹⁸⁸³

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COMMANDER IN THE NAVY OF THE UNITED STATES, CAP-
TAIN AND FLAG-OFFICER IN THE NAVY OF THE CON-
FEDERATE STATES, REAR ADMIRAL IN THE NAVY
OF THE REPUBLIC OF PERU, AND PRESIDENT
OF THE PERUVIAN HYDROGRAPHICAL
COMMISSION OF THE AMAZON

WITH AN APPENDIX

CONTAINING NOTES ON NAVIGATION OF THE UPPER
AMAZON RIVER AND ITS PRINCIPAL
TRIBUTARIES

By CAPTAIN JAMES HENRY ROCHELLE

AND CONTAINING A BIOGRAPHICAL SKETCH OF THE
AUTHOR, AND PORTRAITS OF ADMIRAL
TUCKER AND CAPTAIN ROCHELLE

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Life of Rear Admiral John Randolph Tucker

A SKETCH OF THE AUTHOR.

JAMES HENRY ROCHELLE, the author of the following pages, and the subject of this sketch, was of French-English and Celtic, or Scotch-Irish, extraction—English through his paternal great-grandmother, who was the daughter of Hinchia Gilliam, and his wife (née) Harrison; Scotch-Irish through his maternal ancestry. The name itself proclaims its French (Huguenot) origin.

It is well known that when Louis XIV revoked the edict of Nantes many French Protestants, called Huguenots, fled from their homes to escape persecutions worse than death. About forty thousand took refuge in England, and in 1690 William III sent a number of them to America. A party of them made their way up the James river and made a settlement, which they called Mannakintown, or "Manacan," because the lands formerly belonged to the Manacan Indians. Feeling that they no longer had to defend themselves against oppression and cruelty, and that in a free country their religion was no stigma, the characteristics of the race came out. With order and work Manacan became a flourishing town. Among those who had made a temporary home there was

John Rochelle, who came with the other Huguenot exiles, and, if Pope be right, he soon enjoyed

“ All the joys of sense—

Health, peace and competence.”

But in a few years the spirit of discord entered among these exiles, who had found peace, liberty and homes. The three Rochelle brothers sought other homes; William settled in North Carolina, James went to South Carolina, and John bought of William and Jonas Longbottom two hundred and twelve acres of land on the south side of the Nottoway river in the then parish of Albemarle. Here he lived, and married Mary Gilliam, daughter of Hinchia Gilliam and his wife (née) Harrison. They had issue four sons—John, Levi, Hinchia and Nathaniel. John, the oldest son, married his cousin, Judith Gilliam, famed for her beauty, and they became the parents of nine children—Benjamin, John, Willis, Clements, Elizabeth (who will live in history as the mother of the famous soldier, George Henry Thomas), James, Lucy, and Mary.

James was born in the year 1786. At an early age he entered the clerk's office of his county as deputy to the then clerk, Samuel Kello. In 1815 he was chosen clerk and held the office until his death.

On the 19th of April, 1817, he married Martha (Hines) Gray, widow of Dr. Henry Mills Gray. Many children were born unto them, but only three lived beyond the early years of infancy—John, Martha and James Henry.

James Henry Rochelle was born at his father's home, near the Courthouse, on the 1st day of November, 1826. His boyhood was passed in the refining influence of a Virginia home, of the period when Virginia was the garden spot of America, when her daughters were the "mothers of Presidents" and her sons were statesmen, "*Sans peur et sans reproche.*"

On the 9th of September, 1841, he was appointed acting midshipman in the United States Navy; served six months at sea, and then received his warrant as midshipman. During the war with Mexico, young Rochelle served on both the *Falmouth* and *Decatur*, in the gulf. He was with Commodore Perry, and participated in all the brilliant exploits of the naval forces, and remained on the Mexican coast until there was added to the United States a territory as large as Germany, France and Spain, all three added together.

In September, 1847, he reported at Annapolis, the Naval School, and was one of the 245 midshipman belonging to the famous "Classe 41," which passed in 1848. He was at once ordered to the frigate *Constitution*, then in Boston harbor, ready to sail to the blue waters of the Mediterranean and the sunny coast of Italy. On this cruise he paid a visit to the beautiful and historical Island of Malta, and here, in the very cradle of Free Masonry, he became a member of that ancient institution. He saw three years' sea service before returning home.

In 1852 the United States Government sent a naval force, under the command of Perry, to open inter-

course with Japan and her then unknown people. Rochelle received orders to report for duty on the ship *Southampton*. Perry sailed from Norfolk on the 24th of November, 1852. With great judgment and ability he rendered his mission a success, and sailed for home from Linada, in Japan, on the 1st of October, 1854, and after an eventful voyage reached New York in the spring of 1855.

After a home leave of some months, Rochelle was promoted on the 14th of September to master, and on the next day was commissioned lieutenant and assigned to duty on the Coast Survey Squadron. He assisted in the survey of New York harbor, Casco bay and the Florida reefs.

His next cruise was in the expedition to Paraguay. Unfortunately, few of his many letters home were preserved. We give one written in 1859:

U. S. STEAMER *Southern Star*,
MONTEVIDEO, REPUBLIC OF URUGUAY,
March 11, 1859.

My Dear Mother:

The steamer *Harriet Lane*, one of the vessels of the Paraguay expedition, will sail for New York on tomorrow morning, and as she is very fast I have determined to write by her, although it will not be long before we follow her to the United States. We are preparing for sea now and expect to sail on the 17th of this month for Norfolk, touching at Pernambuco and Barbadoes for coal. We will be at home, I think, by the 20th of May or 1st of June,

though it is possible that we may be detained longer than I expect on the way.

I sincerely trust that I shall find you all well at home, and that I will have a long leave to spend with you. I wrote you in my letter that we had no difficulty in settling our affairs with Paraguay. Lopez acceded at once to all the demands which were made upon him, and expressed himself gratified at their moderation. The health of the squadron is excellent and the cruise has been a pleasant one. No accident or circumstances have occurred to mar its efficiency or concord. If another vessel should leave in time to get home much before we do, I will write again, but I doubt if such an opportunity will occur. You must not, of course, write to me again. Give my best love to Sister, Jimmy, Letitia and Mattie, and my affectionate regards to Mr. Edwards and Major Shands.

Ever your affectionate son,

J. H. ROCHELLE.

To follow Rochelle through all of his naval life would take more space than we now have and would be to repeat scenes and events already dealt with by him in the following pages. When the war came on he was serving on the sloop-of-war *Cumberland*. Captain Scharf very correctly says: "It required no sacrifice and entailed no inconvenience to remain loyal to the Union, but to resign from that service involved every consideration which might deter a man not actuated by exalted principles." It was "exalted prin-

inciples" which caused Rochelle to resign his commission in the Navy, where he had served with honor and advancement for twenty years, and to offer his sword to his native State. From the columns of the *Richmond Dispatch* we quote:

"All know how hot and furious the war was. The Anglo-Saxon race, the first and foremost people on earth, are wise in counsel and fierce in war. Fighting commenced at once. Captain Rochelle was placed under the command of Captain Tucker, on the James river, on the war steamer *Patrick Henry*, and with the *Merrimac* fought the *Monitor* and wooden fleet of the North in Hampton Roads, the first naval battle in which armored ships were used. That engagement covered the new and little Confederate Navy with glory. When Norfolk was evacuated, and our little wooden fleet fell back to Richmond after the destruction of the *Merrimac*, which could not be carried up the James river on account of its great draught of water, the heavy guns of the *Patrick Henry* were carried by Tucker and Rochelle with great difficulty up on Drewry's Bluff, and aided very much in repulsing the attack of the *Galena* and other Northern gunboats, who hoped to carry Richmond by a *coup de main*. After the evacuation of Norfolk and the peninsula between the York and James rivers, the siege of Charleston, S. C., having commenced, he was sent there and soon after placed in command of one of the largest iron-clad steamers in the Confederate Navy. Here he remained during the remainder of the siege and until the advance of Sherman through South

Carolina and in the rear of Charleston forced the evacuation of that vital point in the Confederacy. His ship, along with others, was destroyed, and he returned to Richmond with a small body of seamen, where the Southerners made their last stand around Richmond and Petersburg *pro ara et pro focis*. On reaching Richmond he, along with Captain Parker, distinguished alike in arms and letters, were placed in command of the Naval Academy and cadets which the Confederates had established there—an arduous, important and distinguished position. He remained in that position until the evacuation of Richmond, when he marched the cadets in a body to Washington, in Georgia, where they were disbanded after the capture of President Davis and the dissolution of the Confederacy.

“The war being ended, he returned to his ancestral home in Southampton. His old comrade-in-arms, Tucker, who had been at one time Admiral in the Peruvian Navy, and was then about to make a survey of the upper Amazon river for the Peruvians, sent for him, and he accepted a position under that Government to make a hydrographic survey of that vast fluvial system in the mountains of Peru east of the Andes. He remained in Iquitos three years and then returned home, where he devoted his time to reading, letters, and the society of his friends. He was a doughty warrior and soldier, and from the beginning loved a career of arms. He sorrowed over the rupture of the Government, but when his State went out he nobly stood by her; went to the

front, and never grounded his arms until there was nothing left to fight for. He knew to win would bring honor and safety, and failure would make him a rebel, and while success on the Northern side gave to many of his old comrades in arms on that side marble and bronze statues in the new Pantheon at Washington, yet with the courage of his convictions, in disaster his only regret was that he did not win. Of such stern stuff are the cavaliers of Virginia made, and such as these are yet to lift her from the dust and crown their old mother again with glory."

"DEATH OF CAPT. JAMES H. ROCHELLE.

"COURTLAND, SOUTHAMPTON COUNTY,

"April 3, 1889.

"On the morning of the 31st of March, after an illness of only one day, this county, and his many friends, met with a heavy loss in the death of Capt. James Henry Rochelle. This distinguished soldier was a veteran of two wars. Euripides, I think it was, said no man should be called fortunate or happy until he had been placed with his good name by death beyond the reach of accident or change. Then, indeed, is this noble soldier happy, for he lived without reproach and died without fear. Another noble son of Virginia has gone down below the horizon of time, but his name will be held in sweet remembrance by his old comrades and his memory cherished and honored by his kinsmen."

Life of Rear Admiral John Randolph Tucker

BY JAMES HENRY ROCHELLE.

PREFATORY NOTE.

IN writing this biographical sketch I have performed not a task, but a labor of love, for I was, during many years, both in times of peace and of war, intimately associated with the distinguished sailor whose career I have attempted to trace.

The appendix was added in consequence of letters I received asking for information in regard to the navigation of the upper Amazon river and its tributaries, a highway for commerce destined to be much better known in the near future than it is at present.

J. H. R.

COURTLAND, VIRGINIA,

July 1, 1888.

PART I.

THE TUCKERS—BIRTH OF JOHN RANDOLPH TUCKER.
BOYHOOD—APPOINTED A MIDSHIPMAN IN THE
UNITED STATES NAVY—FIRST CRUISE—"THE
ROARING LADS OF THE BRANDYWINE"—PASSES
EXAMINATION FOR PROMOTION—APPOINTED A
PAST MIDSHIPMAN—PROMOTED TO THE RANK
OF LIEUTENANT—MARRIAGE—MEXICAN WAR.
CAPTURE OF TOBASCO—COMMANDS UNITED
STATES BOMB-BRIG *Stromboli*—MADE A COM-
MANDER—COMMANDS UNITED STATES RECEIV-
ING SHIP *Pennsylvania*—ORDNANCE OFFICER
AT THE NORFOLK NAVY YARD—RESIGNS ON THE
SECESSION OF VIRGINIA.

During the first years of the present century John Tucker, of the Island of Bermuda, came to Virginia, where resided many of his kinsmen, a branch of the Tucker family having settled in Virginia prior to the War of the Revolution. The family has produced a number of gifted men who have been honorably prominent in the political and social life of the State, but no member of it has been more distinguished or more esteemed than the subject of the present sketch.

John Randolph Tucker was born on the 31st day of January, 1812, at Alexandria, near Washington, on

the Virginia side of the Potomac river, in which city his father had made his home and had there married Miss Susan Douglas, the daughter of Dr. Charles Douglas, an English physician, who emigrated to America soon after the Revolution.

Young Tucker received his early education in the good private schools of his native city, which he continued to attend until he entered the United States Navy as a midshipman on the 1st of June, 1826, being then in the fifteenth year of his age.

The profession upon which he entered was one for which he was by nature peculiarly adapted, and to the end of his days he loved the sea and all that was connected with the life of a sailor. It has been said of a great admiral that he could perform with his own hands the duties of every station on board a ship-of-war, from seaman-gunner to admiral, and the same may be, without exaggeration, said of Tucker.

He was fortunate in beginning his naval career on the Mediterranean Station, where he made his first cruise in the frigate *Brandywine*. Before the establishment of the Naval Academy at Annapolis the best school for training a cadet in the etiquette, spirit and, perhaps, even in the seamanship of the service, was a smart frigate of the Mediterranean Squadron. If we may trust the traditions which have been handed down to us in song and story about "the roaring lads of the *Brandywine*," the training on board the ship in which Tucker first served was well calculated to develop all that was dashing and daring in the young gentlemen of her steerage mess.

After six years' service as a midshipman, Tucker passed the requisite examination for promotion, but he had to wait for his turn to fill a vacancy, and, consequently, was not promoted to the rank of lieutenant until the 20th of December, 1837. As a lieutenant, he made a good deck officer and a very excellent executive or first-lieutenant. In the latter capacity he served on board the bomb-brig *Stromboli*, in the Gulf of Mexico, during the war between Mexico and the United States. The *Stromboli* was actively employed, and Tucker participated in the capture of Tobasco and other naval operations against the enemy. During the latter part of the war Tucker succeeded to the command of the *Stromboli* as Lieutenant-Commanding, retaining the command until the cessation of hostilities.

His last cruise whilst belonging to the United States Navy was made as executive officer of the frigate *Cumberland*, the flag-ship of Flag-Officer Stringham, on the Mediterranean Station, thus ending his active service in the United States Navy where it began, after an interval of thirty years.

Soon after his promotion to a lieutenancy Tucker was married, at Norfolk, Virginia, on the 7th of June, 1838, to Virginia, daughter of Captain Thomas Tarleton Webb, of the United States Navy. This union was, uninterruptedly, most happy and harmonious until it was dissolved by the death of Mrs. Tucker in 1858. She left several children, three of whom—Randolph Tucker, of Richmond, Virginia; Tarleton Webb Tucker, of Memphis, Tennessee; and Virginus

Tucker, of Norfolk, Virginia—are now living and prospering.

On September 14th, 1855, Tucker received his commission as a Commander, and at the same time was ordered to command the *Pennsylvania*, an old three-decker ship-of-the-line which was in commission as receiving-ship at Norfolk. His next duty was as Ordnance Officer of the Norfolk Navy Yard, and it was whilst he was employed on this duty that the secession of Virginia caused him to forward his resignation to the Secretary of the Navy.

There is no intention of discussing in this biographical sketch the questions which were in controversy between the Northern and Southern States until they were finally settled by the arbitrament of arms; it is sufficient to say that nothing but the sincerest conviction that the highest duty required the sacrifice could have induced an officer in Tucker's position to leave an established and an illustrious navy to enter the service of a people who had neither ships nor sailors.

PART II.

APPOINTED A COMMANDER IN THE VIRGINIA NAVY—
IN CHARGE OF THE DEFENSES OF JAMES RIVER—
TRANSFERRED TO THE CONFEDERATE STATES
NAVY—PLACED IN COMMAND OF THE *Patrick
Henry*—FITTING OUT UNDER DIFFICULTIES—
FIRST PARTIALLY ARMORED AMERICAN VESSEL.
LIEUTENANT POWELL'S PLAN FOR ARMORED
GUNBOATS—OFFICERS OF THE *Patrick Henry*—
GUARDING JAMES RIVER—SCALING THE GUNS—
"NAVAL SKIRMISH"—A FLAG WHICH WAS
NOT PRESENTED—BATTLE OF HAMPTON ROADS.
SINKING OF THE *Cumberland*; AN AMERICAN
Vengeur—BURNING OF THE *Congress*—COM-
BAT BETWEEN THE *Virginia* AND THE *Mon-
itor*—FLAG-OFFICER TATNALL TAKES COM-
MAND OF THE CONFEDERATE SQUADRON—SALLY
INTO HAMPTON ROADS—PLAN FOR CARRYING
THE *Monitor* BY BOARDING—EVACUATION OF
NORFOLK—TOWING UNFINISHED GUNBOATS TO
RICHMOND—FEDERAL SQUADRON ENTERS JAMES
RIVER—CREWS OF THE *Patrick Henry*, *James-
town* AND *Virginia* MAN THE NAVAL BATTERIES
AT DREWRY'S BLUFF—ACTION AT DREWRY'S
BLUFF—THE *Galena*; A WELL-FOUGHT VESSEL.
REPULSE OF THE FEDERAL SQUADRON—TUCKER
ORDERED TO COMMAND THE IRON-CLAD STEAMER

Chicora AT CHARLESTON—SUCCESSFUL ATTACK ON THE BLOCKADING SQUADRON — TUCKER POSTED AND APPOINTED FLAG-OFFICER OF THE CHARLESTON SQUADRON — COMMANDING OFFICERS OF THE CHARLESTON SQUADRON—DU-PONT'S ATTACK ON CHARLESTON—CONFEDERATE TORPEDO-BOATS AT CHARLESTON; DAMAGE DONE BY THEM—CHARLESTON NAVAL BATTALION SERVING WITH THE ARMY—EVACUATION OF CHARLESTON — ONE BATTALION OF THE CHARLESTON SQUADRON SERVES WITH THE ARMY AT WILMINGTON—TUCKER, WITH THE CHARLESTON SQUADRON BRIGADE, MARCHES THROUGH NORTH CAROLINA AND ARRIVES AT RICHMOND—TUCKER ORDERED TO COMMAND AT DREWRY'S BLUFF—CONFEDERACY AT ITS LAST GASP—EVACUATION OF RICHMOND—TUCKER NOT INFORMED OF THE INTENTION TO EVACUATE RICHMOND—SUCCEEDS IN JOINING HIS BRIGADE OF SAILORS TO MAJOR-GEN. CUSTIS LEE'S DIVISION—ACTION AT SAYLOR'S CREEK; DIDN'T KNOW THEY WERE WHIPPED, THOUGHT THE FIGHT HAD JUST BEGUN—SURRENDER—PRISONER OF WAR—RELEASED ON PAROLE—EMPLOYED BY THE SOUTHERN EXPRESS COMPANY.

Tucker was appointed a Commander in the Virginia Navy, with rank from the date of the commission in the United States Navy which he had resigned. He was at first assigned by the Governor

to the defense of James river, but in a short time was ordered to assume command of the steamer *Patrick Henry*.

When Virginia became one of the Confederate States, all the officers of the Virginia Navy were transferred to the Confederate States Navy, with the same rank they had held in the United States Navy. The *Patrick Henry* was also transferred by the State of Virginia to the Confederate States. This vessel was a paddle-wheel steamer of about 1,400 tons burthen; she was called the *Yorktown* before the war, and was one of a line of steamers running between Richmond and New York; she was reputed to be a fast boat, and deserved the reputation.

When Virginia seceded this vessel was in James river, and, together with her sister steamer *Jamestown*, of the same line, was seized by the authorities of the State, taken up to the Rockett's wharf, at Richmond, and the command conferred, as has been said, upon Commander Tucker; this assignment of duty being afterwards confirmed by the Secretary of the Confederate States Navy. Naval Constructor Joseph Pearse, with a number of mechanics from the Norfolk Navy Yard, who had been brought to Richmond for the purpose, commenced the necessary alterations, which had previously been determined upon, and in a short time the passenger steamer *Yorktown* was converted into the very creditable man-of-war *Patrick Henry*, of 12 guns and one hundred and fifty officers and men. Lieutenant William Llewellyn Powell, who soon afterwards re-

signed from the Navy, entered the Army as Colonel of Artillery, and died a Brigadier-General at Fort Morgan before its fall, was her executive officer while she was being fitted out, and to him, as well as to Constructor Joseph Pearse, much credit is due for having made her as serviceable as she was for purposes of war. Her spar-deck cabins were removed, and her deck strengthened so as to enable it to bear a battery. Her boilers were slightly protected by iron plates one inch in thickness. V-shaped iron shields on the spar-deck, forward and aft of her engines, afforded some protection to the machinery, but none to the walking beams, which rose far above the hurricane-deck. It is probable that Lieutenant Powell suggested the first American attempt to protect steamers with iron armor, unless the Stevens floating-battery, which was so long building at Hoboken for the United States, was such an attempt. It is known that Powell forwarded, during the summer of 1861, plans to the Confederate Navy Department for converting river craft and canal boats into iron-clad gunboats.

The armament of the *Patrick Henry* consisted of ten medium 32-pounders in broadside, one ten-inch shell gun pivoted forward, and one eight-inch solid-shot gun pivoted aft. The eight-inch solid-shot gun was the most effective gun on board, and did good service both at the battle of Hampton Roads and the repulse of the Federal squadron at Drewry's Bluff. The captain of this gun was an excellent seaman-gunner named Smith, who was afterwards

promoted to be a boatswain in the C. S. Navy. A few weeks before the battle of Hampton Roads two of the medium 32-pounders were exchanged for two six-inch guns, banded and rifled, a gun much used in the Confederate Navy, and effective, though far inferior to the six-inch rifled guns of the present day.

The *Patrick Henry* was rigged as a brigantine, square yards to the foremast and fore-and-aft sails alone to the mainmast. At Norfolk, when she was about to be employed in running by the batteries of Newport News at night, it was thought best to take both of her masts out in order to make her less liable to be discovered by the enemy. Signal poles, carrying no sails, were substituted in their place.

No list of the officers of the *Patrick Henry* at the time she went into commission can now be given, but the following is a list of those on board at the battle of Hampton Roads, so far as can be ascertained:

Commander John Randolph Tucker, commander; Lieutenant James Henry Rochelle, executive officer; Lieutenants William Sharp and Francis Lyell Hoge; Surgeon John T. Mason; Paymaster Thomas Richmond Ware; Passed Assistant Surgeon Frederick Garretson; Acting Master Lewis Parrish; Chief Engineer Hugh Clark; Lieutenant of Marines Richard T. Henderson; Midshipmen John Tyler Walker, Alexander McComb Mason, and M. P. Goodwyn.

The vessel, being properly equipped, so far as the limited resources at hand could be used, proceeded down James river and took a position off Mulberry Island, on which point rested the right of the Army of the Peninsula, under Magruder. The time passed wearily and drearily enough whilst the *Patrick Henry* lay at anchor off Mulberry Island. The officers and crew very rarely went on shore, the steamer being kept always with banked fires, prepared to repel an attack, which might have been made at any moment, the Federal batteries at Newport News and the vessels stationed there, the frigate *Savannah*, sloop *Cumberland*, and steamer *Louisiana*, being about fourteen miles distant.

To relieve the monotony of the irksome duty on which the *Patrick Henry* was employed, Tucker determined to take her down the river, feel of the enemy, and warn him of what might be expected if boat expeditions should attempt to ascend the river. On the afternoon of Friday, September 13th, 1861, the *Patrick Henry* weighed her anchor at Mulberry Island, and steamed down James river towards Newport News. Choosing her distance from that point, she opened fire upon the Federal squadron, which was promptly returned, principally by the *Savannah*, *Louisiana*, and a battery of light artillery, which had been moved up the left bank of the river. After giving the crew a good exercise at their guns, the *Patrick Henry* was steamed back to her anchorage off Mulberry Island.

About the last of November, Tucker received information that one or two of the Federal gunboats came up the river every night and anchored about a mile and a half above their squadron at Newport News. Hoping to be able to surprise and capture these boats, the commander of the *Patrick Henry* got her underway at 4 o'clock A. M. on December 2d, 1861. The morning was dark and suitable for the enterprise, and all lights on board the *Patrick Henry* were either extinguished or carefully concealed. No vessel of the enemy was met with in the river, but at daylight four steamers were discovered, lying at anchor near the batteries of Newport News. As the *Patrick Henry* could not have returned unseen, Tucker took a position about a mile distant from the batteries, and opened on the Federal vessels with his port battery and pivot guns. The fire was promptly returned, many of the shots from the rifled guns passing over the *Patrick Henry*, and one, going through her pilot-house and lodging in the starboard hammock-netting, did some injury to the vessel, besides wounding slightly one of the pilots and a seaman by the splinters it caused. The skirmish, if such a term can be applied to a naval operation, lasted about two hours, during which time the *Patrick Henry* fired twenty-eight shells and thirteen solid shots, but with what effect on the enemy is not known. From this best kind of drill practice, the Confederate steamer returned to her anchorage off Mulberry Island, continued her guard

of the river, and waited for some opportunity for more active employment.

In February, 1862, the ladies of Charles City, a county bordering on James river, desired to present to the *Patrick Henry* a flag which they had made for her as an evidence of their appreciation of her services in keeping boat expeditions and the enemy's small steamers from ascending the river. But the presentation of this flag did not take place; the C. S. steamers *Jamestown*, 2, and *Teaser*, v, had reinforced the *Patrick Henry*, and such incessant preparations were going on that no time could be spared for the ceremony. The occasion of these preparations was the expectation of being soon engaged in the attack which it was understood that the Confederate iron-clad *Virginia* was about to make on the Federal batteries and men-of-war at Newport News. No care or preparation could make the *Patrick Henry* as well fitted for war as a vessel of the same size built especially for the military marine service; but the best that could be done to make her efficient was done, and not without success, as the part the vessel took in the closely following battle of Hampton Roads conclusively demonstrates.

On the 7th of March, 1862, the James river squadron, consisting of the *Patrick Henry*, 12, Commander J. R. Tucker; *Jamestown*, 2, Lieutenant Commanding J. N. Barney, and *Teaser*, 1, Lieutenant Commanding W. A. Webb, proceeded down the river, and anchored at nightfall off Day's Neck Point, some six miles distant from Newport News.

This movement was effected in order to be near at hand when the *Virginia* made her expected attack on the Federal forces.

The 8th of March, 1862, was a bright, placid, beautiful day—more like a May than a March day. About 1 o'clock in the afternoon, the *Virginia* came steaming out from behind Craney Island, attended by the gunboats *Beaufort* and *Raleigh*. As soon as the *Virginia* was seen, the James river squadron got underway under all the steam the boilers would bear, and proceeded to join her in her attack on the enemy. As Tucker's small squadron approached the Newport News batteries he formed it in line ahead, the *Patrick Henry*, 12, leading; next the *Jamestown*, 2, and lastly the *Teaser*, 1; this order being maintained until the batteries were passed. The batteries were run with less loss than was anticipated; the enemy probably expected the Confederate vessels to pass in the usual channel, about eight hundred yards from the guns of the Federal works, but by Tucker's directions the *Patrick Henry* was run by much nearer the batteries, and the *Jamestown* and *Teaser* followed her closely. Probably in consequence of this deviation from the middle of the channel the Federal guns were not well aimed, and most of the shot from the batteries passed over the Confederate vessels. As the James river squadron ranged up abreast of the first battery, the vessels delivered their fire, and the flash from their guns had scarcely vanished when the Federal works were wrapped in smoke, and their

projectiles came hissing through the air. The *Patrick Henry* was struck several times during the passage; one shot passing through the crew of No. 3 gun, wounding two men and killing one, a volunteer from the army, who had come on board to serve only for the fight. His last words as he fell were, "Never mind me, boys!"

Whilst the James river squadron was passing the batteries, the *Virginia* had rammed and sunk the *Cumberland*, a ship which was fought most gallantly to the bitter end, going down with her colors flying and her guns firing, like the celebrated French ship *Vengeur*.

Having run by the batteries with no material damage, the James river squadron joined the *Virginia* and afforded her valuable aid in the battle she was waging. Whilst the forward guns of the *Patrick Henry* were engaging one enemy, the after guns were firing at another, and the situation of the Confederate wooden vessels at this time seemed well nigh desperate. The Newport News batteries were on one side, on the other the frigates *Minnesota*, *St. Lawrence* and *Roanoke* were coming up from Old Point Comfort, and in front the beach was lined with field batteries and sharpshooters. Fortunately for the wooden vessels, both Confederate and Federal, the *Minnesota*, *St. Lawrence* and *Roanoke* grounded, and the smaller vessels which accompanied them returned to Old Point Comfort. The *Minnesota*, though aground, was near enough to take part in the

action, and opened a heavy fire on the Confederate squadron.

The frigate *Congress*, early in the action, had been run aground, with a white flag flying. Tucker, as soon as he saw that the *Congress* had shown a white flag, gave orders that no shot should be fired at her from the *Patrick Henry*, and he steadily refused to let any gun be aimed at her, notwithstanding that the Confederate gunboats *Raleigh*, *Teaser* and *Beaufort* had attempted to take possession of the surrendered vessel, and had been driven off by a heavy artillery and infantry fire from the Federal troops on the beach. After the Confederate gunboats had been forced to retire from the *Congress*, Flag-Officer Buchanan hailed the *Patrick Henry* and directed Commander Tucker to burn that frigate. The pilots of the *Patrick Henry* declared they could not take her alongside of the *Congress* on account of an intervening shoal, which determined Tucker to approach as near as the shoal would permit and then send his boats to burn the Federal frigate. The boats were prepared for the service, and the boats' crews and officers held ready whilst the *Patrick Henry* steamed in towards the *Congress*.

This movement of the *Patrick Henry* placed her in the most imminent peril; she was brought under the continuous and concentrated fire of three points; on her port quarters were the batteries of Newport News, on her port bow the field batteries and sharpshooters on the beach, and on her starboard bow the *Minnesota*. It soon became evident that no wooden

vessel could long float under such a fire; several shots struck the hull, and a piece of the walking-beam was shot away. As the sponge of the after pivot gun was being inserted in the muzzle of the piece, the handle was cut in two by a shot from the enemy; half in prayer and half in despair at being unable to perform his duty, the sponger exclaimed, "Oh, Lord! how is the gun to be sponged?" He was much relieved when the quarter-gunner of his division handed him a spare sponge. This state of things could not last long; a shot from a rifled gun of one of the field batteries on the beach penetrated the steam-chest, the engine-room and fire-room were filled with steam, four of the firemen were scalded to death and several others severely injured; the engineers and firemen were driven up on deck, and the engines stopped working; the vessel was enveloped in a cloud of escaped steam, and the enemy, seeing that some disaster to the boiler had occurred, increased his fire. At the moment, until the chief engineer made his report, no one on the spar-deck knew exactly what had happened, the general impression being that the boilers had exploded. It is an unmistakable evidence of the courage and discipline of the crew that the fire from the *Patrick Henry* did not slacken, but went on as regularly as if nothing unusual had occurred. As the vessel was drifting towards the enemy in her disabled condition, the jib was hoisted to pay her head around, and the *Jamestown*, Lieutenant Commanding Bar-

ney, gallantly and promptly came to her assistance and towed her out of action.

The engineers soon got one boiler in working order. The other was so badly damaged that they were unable to repair it for immediate use, and with steam on one boiler alone the *Patrick Henry* was again taken into action. The closing in of night put an end to the conflict, as in the dark it was impossible to distinguish friend from foe. The victory remained without dispute with the Confederate squadron, and was witnessed, as was the combat between the *Virginia* and the *Monitor* on the day following, by multitudes of spectators from Norfolk and the neighboring camps of the Confederate troops, as well as by many on the Federal side of the Roads.

It has been stated that the total Federal loss in this battle was nearly four hundred. The numerical strength of the Confederate force engaged was about six hundred, of which the total loss was about sixty. The loss on board the *Patrick Henry* being five killed and nine wounded.

The part taken by the *Patrick Henry* in this battle—it was a battle and not a combat—seems to have been lost sight of in consequence of the great power, as a new force in naval warfare, displayed by the *Virginia*, but the Federal commanders bear witness to the efficient service done by the Confederate wooden vessels. Lieutenant Commanding Pendergrast, of the *Congress*, reported that “the *Patrick Henry* and *Thomas Jefferson (Jamestown)*, rebel steamers, approached us from up the James river,

firing with precision and doing us great damage," and Captain Van Brunt, of the *Minnesota*, reported that the *Patrick Henry* and *Jamestown* "took their positions on my port bow and stern and their fire did most damage in killing and wounding men, insomuch as they fired with rifled guns."

The closing in of night having put an end to hostilities until morning, the Confederate squadrons anchored under Sewell's Point, at the mouth of the harbor of Norfolk. The crews were kept busy until a late hour of the night, making such repairs and preparations as were necessary for resuming operations in the morning. Soon after midnight a column of fire ascended in the darkness, followed by a terrific explosion—the Federal frigate *Congress*, which had been on fire all the evening, had blown up, the fire having reached her magazine.

Flag Officer Buchanan, having been wounded in the action, was sent to the Naval Hospital at Norfolk on the morning of the 9th, just prior to the getting under way of the squadron. The command ought, in conformity with military and naval usage, to have been formally transferred to the next senior officer of the squadron, who was Commander J. R. Tucker, of the *Patrick Henry*; but this obviously proper course was not followed, and Flag Officer Buchanan's flag was kept flying on board the *Virginia*, though he himself, in point of fact, was not and could not be in command of that vessel, or the Confederate squadron, since he was not within signal distance of either, being laid up in bed at the

Norfolk Naval Hospital. Tucker did not assume command of the squadron, but simply continued to command the *Patrick Henry*.

At the first peep of dawn, on the morning of the 9th of March, the Confederate squadron was under way, having in view for its first object the destruction of the *Minnesota*, that frigate being still aground near Newport News. As the daylight increased, the *Minnesota* was discovered in her old position, but no longer alone and unsupported. Close alongside of her there lay such a craft as the eyes of a seaman does not delight to look upon; no masts, no smokestack, no guns—at least nothing of the sort could be seen about her. And yet the thing had a grim, pugnacious look, as if there was tremendous power of some sort inherent in her, and ready to be manifested whenever the occasion required it. The *Monitor* (for it was that famous vessel) promptly steamed out to meet the *Virginia*, as the latter vessel bore down on the *Minnesota*, and the celebrated combat between these iron-clads was joined immediately. It was the first action that had ever been fought between armored vessels, and as such will ever be remembered and commented upon. The combat resulted in a drawn fight as far as the *Virginia* and *Monitor* was concerned, but it established the power of iron-clad steamers as engines of war, and completely revolutionized the construction of the navies of the world.

That the combat between the *Virginia* and the *Monitor* was an indecisive action is clear. The *Mon-*

itor received the most damage in the fight, and was the first to retire from it into shoal water, though the fight was afterwards renewed. On the other hand, the *Virginia* did not accomplish her object, which was the destruction of the *Minnesota*, and she did not accomplish it in consequence of the resistance offered by the *Monitor*. The two vessels held each other in check, the *Virginia* protecting Norfolk, and the *Monitor* doing the same for the Federal wooden fleet in Hampton Roads and the Chesapeake waters. The injuries received by the *Virginia* in ramming the *Cumberland*, on the previous day, were probably greater than those inflicted on her by the *Monitor*; in neither case were they severe enough to disable or force her to withdraw from action.

On her return to Norfolk harbor, the *Virginia* was accompanied by the *Patrick Henry* and the other vessels of the Confederate squadron. The Confederate wooden steamers had taken no part in the action between the *Virginia* and the *Monitor*, except to fire an occasional shot at the *Monitor*, as she passed, at very long range; no wooden vessel could have floated a quarter of an hour in an engagement at close quarters with either of the two iron-clads.

Flag Officer Tatnall having relieved Flag Officer Buchanan, who was incapacitated from command on account of severe wounds received in the first day's fight in Hampton Roads, and all the vessels of the squadron having been refitted, on the 13th of April the squadron again sallied out to attack the enemy.

It was expected that the *Monitor* would be eager to renew the combat with the *Virginia*, and it was agreed upon that, in case the *Virginia* failed to capture or destroy the Federal iron-clad, an attempt should be made to carry the latter by boarding. This duty was assigned to the gunboats *Beaufort* and *Raleigh* and two other small steamers. One of these small steamers was the tender of the Norfolk Navy Yard; she was manned for the occasion by officers and men from the *Patrick Henry*, under the command of the executive-officer of that vessel, and was christened by the men *Patrick Henry, Junior*.

The Confederate squadron steamed about in Hampton Roads for two days, but the *Monitor* did not leave her anchorage at Fortress Monroe, her passiveness being due, it seems, to orders from Washington not to engage the *Virginia* unless she attempted to pass Old Point Comfort.

General J. Bankhead Magruder, commanding the Confederate Army of the Peninsula, was urgent in demanding the return of the James river squadron, and consequently the *Patrick Henry* and *Jamestown* were ordered to run by the Newport News batteries at night, and resume their old duty in James river. The *Jamestown* ran up the river on the 19th and the *Patrick Henry* on the 20th of April; the *Beaufort*, *Raleigh* and *Teaser* were also sent up the river; the headquarters of this detached squadron, of which Tucker was the senior officer, was at Mulberry Island, on which point rested the right flank of the Confederate Army of the Peninsula.

Up to this time the *Patrick Henry* was brigantine rigged, but to fit her better for running by batteries without being discovered, both of her masts were now taken out and short signal poles substituted for them.

When the Confederate authorities determined upon the evacuation of Norfolk, the James river squadron was employed to remove what public property could be saved from the Navy Yard to Richmond. The hulls of several uncompleted vessels were towed past the Federal batteries at Newport News. The running past the batteries was always done at night, moonless nights being chosen whenever it was practicable to select the time of making the trip. So far as known, the vessels employed on this service were never detected by the enemy; at least they were never fired upon.

Soon after the evacuation of Norfolk, whilst the Confederate forces were retiring from the Peninsula to the lines around Richmond, a Federal squadron, consisting of the *Monitor*, *Galena*, *Naugatuck*, *Aroostook* and *Port Royal*, entered James river. The *Monitor* alone could with ease and without serious injury to herself have destroyed in fight all the Confederate vessels in James river, and no course was open to Tucker but to take his squadron up the river and make a stand at the place below Richmond best adapted for defense. The place most wisely selected was Drewry's Bluff, where the river had been obstructed by rows of piles, and the piles defended by four army guns mounted in a breast-

work on the crest of the bluff, about two hundred feet above the river. When the Confederate squadron arrived at Drewry's Bluff, the defenses which had been constructed at the place were not in a condition to have prevented the Federal squadron from passing on to Richmond; but in the day which the Federal vessels wasted in silencing the fire of the half-deserted Confederate batteries on the lower river, the works at Drewry's Bluff were materially strengthened. The *Jamestown* and several smaller vessels were sunk in the river channel, the two rifled guns of the *Jamestown* having been previously landed and mounted in pits dug in the brow of the bluff. The eight-inch solid-shot gun of the *Patrick Henry* and her two six-inch rifles were also landed, thus forming a formidable naval battery counter-sunk on the brow of the hill, consisting of one eight-inch solid-shot gun and four six-inch rifles. Besides the naval battery, there were several army guns mounted in a breastwork and served by a battalion of Artillery, under the command of Major A. Drewry, who was the owner of the bluff, and from whom the place took its name.

The naval guns were manned by the crews of the *Patrick Henry*, *Jamestown* and *Virginia*—the crew of the *Virginia* arriving at the bluff soon after she had been destroyed by Flag Officer Tatnall, to prevent her from falling into the hands of the enemy. It is not always possible for a sea captain to preserve the vessel he commands; but it is always possible to act with firmness, skill and judgment under trying and adverse circumstances, and this Flag Officer Tatnall

seems to have done. A court-martial, composed of officers of high professional attainments and acknowledged personal merit, acquitted him of all blame for the loss of the *Virginia*.

The following naval officers may be named as participating in the engagement of Drewry's Bluff, though there were others whose names are not at this time procurable: Of the *Patrick Henry*, Commander John Randolph Tucker, Lieutenant James Henry Rochelle, Lieutenant Francis Lyell Hoge, and others; of the *Jamestown*, Lieutenant Commanding J. Nicholas Barney, Acting Master Samuel Barron, Jr., and others; of the *Virginia*, Lieutenant Catesby Roger Jones, Lieutenant Hunter Davidson, Lieutenant John Taylor Wood, Lieutenant Walter Raleigh Butt, and others. Commander E. Farrand was the ranking and commanding officer present, having been sent down from Richmond to command the station.

It was on the 15th of May, 1862, that the Federal vessels *Galena*, *Monitor*, *Naugatuck*, *Aroostook*, and *Port Royal* made the well-known attack on the Confederate batteries at Drewry's Bluff, which was the only obstacle barring the way to Richmond, the capital of the Confederate States.

The *Galena* and *Monitor* engaged the batteries at short distance, the other three Federal vessels keeping just within long range of the Confederate guns. The *Monitor*, after the action commenced, finding that her position was too near the bluff to allow of her guns being elevated sufficiently to throw their shot to the crest of the cliff, retired to a more favorable position. The Confederates wasted but

few shot on her, knowing they would not pierce her armor.

The *Galena* was managed and fought with great skill and daring. Approaching to within about six hundred yards of the Confederate batteries, she was deliberately moored, her battery sprung and a well-directed fire opened upon the Confederate works. From half past six o'clock in the morning until about eleven, when the action ceased, she kept this position, receiving nearly the whole of the Confederate fire. The most effective gun on the Bluff was the eight-inch solid shot gun of the *Patrick Henry*. Knowing by previous experience the power of the gun, Tucker gave it his personal supervision. At 11 o'clock A.M. a shot from this gun passed into one of the bow posts of the *Galena*, and was followed by an immediate gushing forth of smoke, showing that the vessel was on fire or had sustained some serious damage, a conclusion confirmed by her moving off down the river, accompanied by the other four vessels of the Federal squadron. It was at Drewry's Bluff that Midshipman Carroll, of Maryland, was killed. He was struck by a projectile whilst standing by Tucker's side, whose aide he was.

For some days it was expected that another attack on the Confederate position would be made, but no other effort to capture Richmond with iron-clads was attempted. A half a dozen armored vessels, built expressly for being forced through obstructions and by batteries, could have passed Drewry's Bluff and captured Richmond, but the force with which the attempt was actually made was neither

well adapted for the undertaking nor sufficiently strong for success.

The *Galena's* loss was thirteen killed and eleven wounded, and one officer and two men were wounded on board the other Federal vessels. On the Confederate side the loss, including the battalion of Artillery, as well as the force of sailors, was eleven killed and nine wounded.

After the Federal repulse at Drewry's Bluff, the officers and crew of the *Patrick Henry*, *Virginia* and *Jamestown* were permanently attached to the naval batteries at that place, Tucker continuing to command his men on shore.

In August, 1862, Tucker was ordered to command the iron-clad steamer *Chicora*, which vessel had just been launched at Charleston. She was a casemate iron-clad, with armor four inches in thickness, and carried a battery of two nine-inch smooth-bore shell guns, and two six-inch Brooks rifles, throwing a projectile weighing sixty pounds. Flag Officer Duncan N. Ingraham commanded the Charleston squadron, and flew his flag on board the *Palmetto State*, Lieutenant Commanding John Rutledge. The *Palmetto State* was an iron-clad, similar to the *Chicora* in build and armor, carrying a battery of one seven-inch rifled gun forward, one six-inch rifled gun aft, and one eight-inch shell gun on each broadside.

On the night of January 31st, 1863, the two Confederate iron-clads made a successful attack on the Federal blockading squadron off Charleston. Passing the bar of Charleston harbor at early dawn, the

Confederate iron-clads quickly drove the blockading vessels out to sea, and the blockade was broken, at least for some hours. In his official report of this action Flag Officer Ingraham says, "I cannot speak in too high terms of the conduct of Commander Tucker and Lieutenant Commanding Rutledge; the former handled his vessel in a beautiful manner and did the enemy much damage. I refer you to his official report."

The official report to which Flag Officer Ingraham refers the Confederate Secretary of the Navy is as follows:

"CONFEDERATE STATES STEAMER *Chicora*,

"January 31st, 1863.

"*Sir*—In obedience to your order, I got under way at 11.30 P. M. yesterday, and stood down the harbor in company with the Confederate States steamer *Palmetto State*, bearing your flag. We crossed the bar at 4.40 A. M., and commenced the action at 5.20 A. M. by firing into a schooner-rigged propeller, which we set on fire and have every reason to believe sunk, as she was nowhere to be seen at daylight. We then engaged a large sidewheel steamer, twice our length from us on the port bow, firing three shots into her with telling effect, when she made a run for it. This vessel was supposed to be the *Quaker City*. We then engaged a schooner-rigged propeller and a large sidewheel steamer, partially crippling both, and setting the latter on fire, causing her to strike her flag; at this time the latter vessel, supposed to be the *Keystone State*, was

completely at my mercy, I having taken position astern, distant some two hundred yards. I at once gave the order to cease firing upon her, and directed Lieutenant Bier, First Lieutenant of the *Chicora*, to man a boat and take charge of the prize, if possible to save her; if that was not possible, to rescue her crew. While the boat was in the act of being manned, I discovered that she was endeavoring to make her escape by working her starboard wheel, the other being disabled, her colors being down. I at once started in pursuit and renewed the engagement. Owing to her superior steaming qualities she soon widened the distance to some two hundred yards. She then hoisted her flag and commenced firing her rifled guns; her commander, by this faithless act, placing himself beyond the pale of civilized and honorable warfare.* We next engaged two schooners, one brig, and one bark-rigged propeller, but not having the requisite speed were unable to bring them to close quarters. We pursued them six or seven miles seaward. During the latter part of the combat, I was engaged at long range with a bark-rigged steam sloop-of-war; but in spite of all our efforts, was unable to bring her to close quarters, owing to her superior steaming qualities. At 7.30 A. M., in obedience to your orders, we stood in shore, leaving the partially crippled and fleeing enemy about *seven miles clear of the bar*, standing to the southward and eastward. At 8 A. M., in obedience

*The *Keystone State* did not surrender, rescue or no rescue, and her escape ought probably to be regarded as a rescue.

to signal, we anchored in four fathoms waters off the Beach Channel."

"It gives me pleasure to testify to the good conduct and efficiency of the officers and crew of the *Chicora*. I am particularly indebted to the pilots, Messrs. Payne and Aldert, for the skillful pilotage of the vessel."

"It gives me pleasure to report that I have no injuries or casualties."

"Very respectfully, your obedient servant,

"J. R. TUCKER, *Commander, C. S. N.*

"*Flag Officer D. N. INGRAHAM, C. S. N.,*

"*Commanding Station, Charleston, S. C.*"

The result of this engagement was a complete demonstration of the futility of any attempt on the part of wooden vessels to contend with iron-clads. The Federal squadron consisted of the *Housatonic*, *Meresdita*, *Keystone State*, *Quaker City*, *Augusta*, *Flag*, *Memphis*, *Stettin*, *Ottawa*, and *Unadilla*, ten vessels, all of them unarmored, and three, the *Housatonic*, *Ottawa* and *Unadilla*, built for war service, the other seven being merchant steamers converted into men-of-war. The Confederate squadron consisted of only two vessels, both iron-clads, the *Palmetto State* and *Chicora*, which received no damage whatever during the engagement, either to their hulls, machinery, or crew, whilst several of the ten Federal wooden vessels were seriously injured, though none of them were sunk, their escape from capture or destruction being due to the swiftness of their flight.

Their loss was twenty-five killed and twenty-two wounded.

The blockade of Charleston harbor was soon, indeed immediately, re-established, and kept up by the armored frigate *New Ironsides* and a number of heavy "Monitors." There was, from the end of this battle to the evacuation of Charleston by the Confederates, no time when there would have been the least probability of the success of another dash by the Confederate vessels in the harbor upon the Federal squadron blockading.

In the month of February, 1863, Tucker was promoted to the rank of Captain in the Provisional Navy of the Confederate States, and in March following was appointed Flag Officer of the Confederate Forces Afloat at Charleston, the *Chicora* bearing his flag.

On the 7th of April, 1863, Admiral Dupont made his attack on Charleston, with a squadron consisting of the armored frigate *New Ironsides* and eight "Monitors." Tucker, with his usual good judgment, held the *Chicora* and *Palmetto State*, aided by a number of rowboats armed with torpedoes, ready to make a desperate and final assault upon the Federal squadron if it should succeed in passing the Confederate forts guarding the entrance to the harbor. Admiral Dupont's squadron was repulsed by the forts, and the Confederate squadron was not engaged.

The Confederate naval forces afloat at Charleston did not possess either the strength or swiftness necessary for an attack on the Federal blockading

squadron with any reasonable prospect of success, and Tucker therefore turned his attention to attacks by means of torpedo-boats fitted out from his squadron. On the 5th of October, 1863, Lieutenant W. T. Glassell, with a small double-ender steam torpedo-boat, made an attempt to sink the *New Ironsides*, lying off Morris' Island. The *New Ironsides* was not sunk, but she was seriously damaged and was sent North for repairs. The torpedo-boat was filled with water, and her commander, pilot, and engineer, all that were on board of her, were thrown overboard by the shock of the striking and exploding of the torpedo against the bottom of the iron-clad. The torpedo-boat was finally taken back into Charleston harbor by the pilot and engineer, but Lieutenant Glassell was made prisoner after having been in the water about an hour. A torpedo-boat commanded by Lieutenant Dixon of the Confederate Army, and manned by six volunteers from Tucker's squadron and one from the army, attacked and sunk, on the night of February 17th, 1864, the United States steamer *Housatonic* lying in the North Channel. The torpedo-boat with all on board went to the bottom, but most of the crew of the *Housatonic* were saved by taking refuge in the rigging, which was not submerged when the vessel rested on the bottom.

The boat attack on Fort Sumter, made by the Federals on September 8th, 1863, was easily repulsed, and the Charleston squadron materially aided in the repulse.

A battalion of sailors from the recruits on board the receiving-ship *Indian Chief*, under the command

of Lieutenant Commanding William Galliard Dozier, was detached by Tucker to co-operate with the army on James' Island in August, 1864. This battalion rendered good service, and upon its return to the squadron was kept organized and ready to respond whenever a call for assistance was made upon the Navy by the Army.

Early in 1864 some changes were made in the commanding officers of the squadron; Commander Isaac Newton Brown was ordered to the *Charleston*, Commander Thomas T. Hunter to the *Chicora*, and Lieutenant Commanding James Henry Rochelle to the *Palmetto State*. No other changes were made in the commands of the squadron while it existed.

The three iron-clads under Tucker's command at Charleston were all slow vessels, with imperfect engines, which required frequent repairing; for that day, and considering the paucity of naval resources in the South, they were fairly officered, manned and armed. All of them were clad with armor four inches thick, and they were all of the type of the *Virginia*, or *Merrimac*, as that vessel is frequently but erroneously called. The commander of the vessels were all formerly officers of the United States Navy, who were citizens of the Southern States and had resigned their commissions in the Federal service when their States seceded from the Union. The lieutenants and other officers were appointed from civil life, but they were competent to perform the duties required of them, and conducted themselves well at all times and under all circumstances. The crews of each vessel numbered from one hundred

and twenty to one hundred and sixty men, some of them able-seamen, and most of them efficient and reliable men. Each vessel carried a torpedo, fitted to the end of a spar some fifteen or twenty feet long projecting from the bows in a line with the keel, and so arranged that it could be carried either triced up clear of the water or submerged five or six feet below the surface. The squadron was in a good state of discipline and drill, and, so far as the personnel was concerned, in a very efficient condition.

Every night one or two of the iron-clads anchored in the channel near Fort Sumter for the purpose of resisting a night attack on that place or a dash into the harbor by the Federal squadron.

Not long before the evacuation of Charleston an iron-clad named the *Columbia* was launched there. She had a thickness of six inches of iron on her casemate, and was otherwise superior to the other three iron-clads of the squadron. Unfortunately, she was run aground whilst coming out of dock, and so much injured as not to be able to render any service whatever.

Charleston was evacuated by the Confederate forces on the 18th of February, 1865. Several days previous to the evacuation a detachment from the squadron of about three hundred men, under the command of Lieutenant Commanding James Henry Rochelle, consisting of the officers and crews of the *Palmetto State*, *Columbia*, and the recruits from the receiving-ship *Indian Chief*, were dispatched by rail to Wilmington, which the detachment reached only a few days before it was, in turn, abandoned by the

Confederate Army. The Charleston naval detachment was ordered to co-operate with the Army as a body of infantry, and was assigned to duty with General Hoke's division, of which it formed the extreme right, resting on Cape Fear river. The position was exposed to an annoying fire from the Federal gunboats in the river, to which no reply could be made, but from which some loss was suffered. The evacuation of Wilmington took place on the 22d of February, 1865, and the Charleston squadron's naval battalion marched out with Hoke's division, to which it remained attached until somewhere in the interior of North Carolina it reunited with Tucker's command.

With the officers and crews of the *Charleston* and *Chicora*, Tucker left Charleston on the 18th of February, 1865, the day of the evacuation of the city by the Confederate Army. As far as Florence in South Carolina the Charleston naval brigade traveled by rail, but at that point Tucker received a telegram informing him that the Federal forces were about cutting the railway communication between Florence and Wilmington. This was the last message that came over the wires, and Tucker, knowing that the enemy had succeeded in seizing the railroad, abandoned his intention of making for Wilmington, and marched his command across the country to Fayetteville, where he received orders from the Navy Department to bring his force to Richmond. On the way from Fayetteville to Richmond the detached Charleston naval battalion was reunited to the main

body under Tucker, and the whole brigade proceeded together to Richmond, and from Richmond it was sent to garrison the Confederate batteries at Drewry's Bluff, of which place Tucker was ordered to assume command, the naval forces afloat in James river being under the command of Rear Admiral Raphael Semmes.

When Tucker took command at Drewry's Bluff the Confederate cause was at its last gasp. Richmond was evacuated by the Confederate Army and Government on the night of the 2d of April, 1865. Strange to relate, Tucker received no orders to retire with his command, and he held his post steadily until, early on the morning of the 3d, the Confederate iron-clads in James river were burnt by their own commanders. When he knew the troops were marching out of Richmond and saw the Confederate iron-clads burning in the river, Tucker thought it was not only justifiable but necessary for him to act without orders, and he retired with his command from Drewry's Bluff. General R. E. Lee told Tucker, when they met, that of all the mistakes committed by the Richmond authorities he regretted none more than the neglect to apprise the naval force at Drewry's Bluff of the intended evacuation of the city.

The naval brigade from Drewry's Bluff, under Flag Officer Tucker, joined the rear guard of the Confederate Army, and was attached to General Custis Lee's division of General Ewell's corps, with which it marched until the battle of Saylor's Creek on the 16th of April, 1865. The naval brigade held

the right of the line at that battle, and easily repulsed all the assaults made upon it. A flag of truce was sent by the Federal General commanding at that point to inform Tucker that the Confederate troops on his right and left had surrendered, and that further resistance was useless and could only end in the destruction of the sailors. Tucker, believing that the battle had only commenced, refused to surrender, and held his position until reliable information, which he could not doubt, reached him of the surrender of General Ewell and his army corps. The naval brigade surrendered by Tucker numbered some three hundred sailors, who, the opposing force said, did not know when they were whipped. Tucker's sword, which he rendered to General Keifer, was returned to him some years after the war by that gentleman, then a prominent member of Congress.

Tucker was sent North and confined as a prisoner of war until the entire cessation of hostilities, when he was released on parole. On his return to Virginia he found that both the Confederate and State Governments were things of the past, and that he would have to mend his broken fortunes, if mend them he could, by engaging in the business pursuits of civil life. He succeeded, not without difficulty, in obtaining employment as an agent of the Southern Express Company, and was stationed at Raleigh, North Carolina, to take charge of the business matters of the Company in that city.

PART III.

TUCKER OFFERED THE COMMAND OF THE PERUVIAN FLEET, WITH THE RANK OF REAR ADMIRAL—ARRIVES IN LIMA—NO PRECEDENT FOR THE RETURN OF MONEY—COMMISSIONED A REAR ADMIRAL IN THE NAVY OF PERU—COMMANDS THE ALLIED FLEETS OF PERU AND CHILE—SPANISH WAR—TUCKER'S PLAN FOR A NAVAL CAMPAIGN; PROJECTED EXPEDITION AGAINST MANILA—CESSATION OF HOSTILITIES—TUCKER RETIRES FROM THE COMMAND OF THE FLEET, AND IS APPOINTED PRESIDENT OF THE PERUVIAN HYDROGRAPHICAL COMMISSION OF THE AMAZON—CROSSES THE ANDES AND REACHES THE AMAZON—EXPLORES THE YAVARI RIVER—ORDERED TO THE UNITED STATES TO SUPERINTEND THE BUILDING OF AN EXPLORING STEAMER—RETURNS TO THE AMAZON WITH STEAMER *Tambo*. EXPEDITION UP THE UCAYALI AND EXPLORATION OF THE TAMBO RIVER—ORDERED TO THE UNITED STATES TO PROCURE A STEAMER OF LIGHT DRAUGHT OF WATER—RETURNS TO THE AMAZON WITH STEAMER *Mairo*—SECOND EXPEDITION UP THE UCAYALI—CANOE EXPEDITION UP THE PACHITEA AND EXPLORATION OF THE PICHIS RIVER—EXPEDITION UP THE AMAZON AND HUALLAGA RIVERS—ORDERED TO LIMA. ORDERED TO NEW YORK TO SUPERINTEND THE

CHARTS MADE BY THE HYDROGRAPHICAL COMMISSION—PUBLICATION OF CHARTS ABANDONED ON ACCOUNT OF THE FINANCIAL CONDITION OF PERU—LETTER FROM PRESIDENT PARDO—LETTER FROM MINISTER FREYRE—TUCKER RETIRES TO HIS HOME IN PETERSBURG, VIRGINIA—OCCUPATIONS AND AMUSEMENTS OF OLD AGE—DEATH — CHARACTER AND QUALITIES — CONCLUSION.

While residing in Raleigh, North Carolina, Tucker received a letter from the Peruvian Minister to the United States, requesting an interview on affairs of importance. Going to Washington, Tucker saw the Minister, and the result of the interview was that he accepted a proposition to go to Peru and enter the Navy of that Republic as a rear-admiral, his commission to be dated from the time of his arrival at Lima. He was allowed to take with him two staff officers, one with the rank of captain and the other with that of commander.

When Tucker entered the Navy of Peru, that Republic was engaged in a war with Spain. Spain had never recognized the independence of her former South American colonies, and thinking a favorable opportunity had arisen for asserting her dormant claims, the Spanish Government sent an iron-clad frigate, accompanied by several smaller vessels, to attack the Chilean and Peruvian seaport cities on the Pacific coast. The attack upon Valparaiso, the chief port of Chile, was successful, but the Spanish squad-

ron was beaten off at Callao by the Peruvian batteries. Whilst preparing for the defense of Callao, the Peruvian Government determined to place its naval establishment on such a footing that it would be able to meet any force Spain could send to the Pacific. Tucker had, and most deservedly, the reputation of being a hard fighter, a thorough disciplinarian, and a splendid seaman; hence the Peruvian Government of President Prado directed its Minister at Washington to engage his services if possible. The cause was one which enlisted all Tucker's sympathies, and he agreed to take command of the Peruvian fleet. Tucker became much attached to Peru, and served the Republic zealously and faithfully. He had many warm friends in Lima, and no matter what party held the Government, the trust and confidence reposed in him by the authorities in Lima was always implicit.

Tucker arrived in Lima accompanied by his personal staff, David Porter McCorkle, captain of the fleet, and Walter Raleigh Butt, commander and aide. Just before their leaving New York the Peruvian Minister handed Tucker a bag of gold, with which he was told to pay all the traveling expenses of himself and staff; this was done, but when the party arrived at Lima the bag was still half full. Tucker insisted on returning this surplus to the Government, but there was no precedent for such a thing, and it was not without some difficulty that there could be found an officer of the treasury authorized to receive and receipt for the unexpected money.

The appointment of a foreigner to command their fleet was distasteful to some of the Peruvian officers, and this fact coming to Tucker's knowledge, he informed General Prado, the President of the Republic, that he had no wish that any officer should be forced to serve unwillingly under his command, and preferred resigning if the dissatisfaction at the appointment of a stranger to command the fleet was general or deep-seated. The officers who were dissatisfied were relieved from duty, and others were easily found who were not only willing but anxious to serve under Tucker.

The Peruvian squadron was lying at Valparaiso when Tucker hoisted his flag on board the frigate *Independencia*. The Chilean squadron was also lying at Valparaiso, and Tucker, as senior officer present, was in command of the allied fleets of both Peru and Chile.

An efficient state of drill and discipline was soon established in the fleets. A feeble attempt at mutiny broke out on one occasion during the temporary absence of Tucker, but it was easily quelled without bloodshed, and no similar attempt was ever again made whilst Tucker was in command. Officers of the Peruvian Navy, who were themselves opposed to giving foreigners high rank in their service, admitted that the fleet had never been in so good a condition for effective service as whilst it was under Tucker.

The Spanish squadron had retired from the coast, but was expected to return as soon as it had been refitted and revictualled, but no apprehension was felt

as to the result of another attack by the Spanish, for the allied fleets were believed to be fully equal to the task of protecting the coasts and ports of the Republics.

Tucker's plan of naval operations was to sail with a small squadron, composed of the most efficient vessels under his command, for Manila, a most important dependency of Spain in the East Indies. He expected to take the Spaniards entirely by surprise, to capture all Spanish vessels in port, and to hold Manila and the other ports of the Philippine Islands until peace was established.

In order to provide for the reappearance of the Spanish fleet on the coast during his absence, Tucker advised the allied Governments to enroll as a naval reserve all the Peruvian and Chilean masters, mates and crews of merchant vessels, pilots and mariners engaged in employments on shore. A part of his plan was that all merchant steamers carrying the flags of the Republics, which could be made available for war purposes, should be inspected and held ready for active service in the Navy and manned by the naval reserve whenever the Government should think it necessary to employ them. This force, with the harbor defense iron-clads, and the forts and batteries on shore, Tucker thought would be a sufficient protection for the coast, whilst his squadron of the most efficient sea-going vessels was absent in the East Indies, where the capture of Manila would have dealt a heavy blow to Spain, and rendered an honorable peace, carrying with it an acknowledgment of the in-

dependence of Peru and Chile, a matter of easy attainment.

This plan, which would probably have been entirely successful if carried out with skill, daring and judgment, as it would have been by Tucker, was favorably considered by the Governments of the allied Republics, but it was not carried out, probably on account of the financial embarrassments under which the Republics labored, and which rendered it exceedingly difficult to find the funds required to fit out the expedition.

The Manila expedition having been abandoned, and the Spanish fleet which had been employed on the Pacific coast having returned home, Tucker requested permission to visit Lima, in order that he might lay before General Prado, President of the Republic, a plan for making an exploration and survey of the Peruvian or Upper Amazon River and its tributaries. The President heartily approved of the enterprise, for the Government was at that very time considering the practicability of opening better communications between the west coast and the eastern part of the country, and of finding an outlet by the waters of the Amazon for the rich productions of the interior.

Tucker resigned his commission as rear-admiral in the Navy of the Republic, and was immediately appointed President of the Peruvian Hydrographical Commission of the Amazon. He left Lima with a full corps of assistants, and made his way across the mountains to the head of navigation on the Palcazu river, where the party was received on board a Gov-

ernment steamer that had been dispatched from Iquitos to meet them. The headquarters of the Commission was established at Iquitos, the principal settlement on the Upper Amazon river, and the place where the Government factories and magazines were located.

In the small steamer *Nap^o*, belonging to the Government, Tucker made an exploring expedition of two hundred and fifty miles up Yavari, the river which forms the boundary between Peru and Brazil.

None of the Peruvian steamers on the Amazon being suitable for exploring and surveying purposes, the Government at Lima ordered Tucker to proceed to the United States and procure such a vessel as was required for the duty pertaining to his Commission. In obedience to this order Tucker spent some months in the United States, and had a steamer built by Messrs. Pusey, Jones & Co., of Wilmington, Delaware, expressly adapted to the navigation of the shoals and rapids of the Upper Amazon. This vessel, named the *Tambo*, was delivered to Tucker at Para, the Brazilian city at the mouth of the Lower Amazon. Embarking on board the *Tambo*, Tucker took the steamer up the river to Iquitos, where supplies were taken on board sufficient to last for several months. He then proceeded to make an important expedition up the Upper Amazon, the Ucajali and the Tambo rivers. The Tambo river had never been explored, and it was thought that it presented a feasible route for navigation to San Ramon, a military station in the heart of the interior, only

about thirty miles distant from the large and important city of Tarmo, which is connected by railway with Lima.

Leaving Iquitos, the *Tambo*, with the Commission on board, passed up the Amazon to the mouth of the Ucayali river, up the Ucayali past the rapids of the "Devil's Leap," and entered the Tambo river. The Tambo was found to be a narrow stream, full of rocks and rapids and not practicable for navigation by steamers. When the steamer *Tambo* could ascend no higher, Tucker fitted out a small boat and pulled some twenty miles farther up the river, but everywhere found such obstructions as rendered it an impracticable route to the interior. It is, perhaps, to be regretted that time did not allow of an examination of the other affluents of the Ucayali trending towards San Ramon and Tarmo.

On his return to Iquitos, Tucker was again dispatched to the United States to procure another and smaller exploring steamer. During his absence Captain James Henry Rochelle was directed by the Government at Lima to take charge of the Hydrographical Commission as its acting president.

After an absence of some months, Tucker returned to Iquitos with the new steamer, which was named the *Mayro*, and was little more than a large steam launch, intended for use where a vessel of greater draught of water could not be employed.

The next expedition decided upon was for the exploration of the water route towards Huanaco, by way of the entirely unknown river Pichis. Most of

the tributaries of the Ucayali had been traveled more or less by the Jesuit priests from the College of Ocopa, but none of them had attempted the route of the Pichis, the banks of which were in possession of roving tribes of Indians, who permitted no stranger to pass through their country. It was thought possible, and even probable, from the stories told by the natives, that the head of the Pichis river would be found well suited for being the eastern terminus of the trans-Andean railway.

In February, 1873, the *Mayro*, with a detachment of the Commission on board, was dispatched from Iquitos, with orders to await at the mouth of the Pachitea river the coming of the *Tambo*. Tucker embarked on board the *Tambo* on the 1st of April with the main body of the Commission, and arrived at the confluence of the Pachitea and Ucayali, seven hundred and sixty-five miles from Iquitos, on the 13th of May. The river had commenced to fall, which rendered it prudent not to ascend the Pachitea in steamers, for had one of them got aground whilst the water was falling, it would probably have remained in that situation until the next annual rise of the river.

The water of the Amazon, and the same may be said of all its tributaries, begins to rise about October, and continues to increase its flood until December. In December there is a short period of no rise, or perhaps even a slight fall, after which the river again continues to rise until May, when the permanent fall commences and continues until the follow-

ing October, when the annual flood again sets in. Sand bars are constantly forming and shifting in the channel of the river, and for a steamer to run on one of them whilst the water is falling endangers the detention of the vessel until she is floated off by the annual rise in October.

The annual fall of the river having set in when the *Tambo* reached the mouth of the Pachitea, Tucker determined to continue the expedition in canoes. Six of the largest and best canoes that could be procured from the Indians were fitted out, and the whole Commission embarked in them, accompanied by its escort of a dozen Peruvian soldiers under the command of Major Ramon Herrera.

From the 19th to the 30th of May the Commission prosecuted its survey of the Pachitea without interruption, but on the 30th, at a place called Cherrecles Chingana, fifteen or twenty Cashibo Indians came down to the left or north bank of the river, and by signs and gestures signified a desire for friendly communication. The canoes were paddled in to them, and some few presents of such articles as could be spared were distributed among them, and, apparently, received most thankfully. But the Cashibos did not let the occasion pass without showing the treachery for which they are notorious. When the interview was ended, seemingly in the most amicable manner, and as the canoes of the Commission were paddling off, a flight of arrows was discharged at them by a party of Cashibos who had been lying in ambush during the interview. A few volleys from

the Remington rifles, with which all the members of the Commission were armed, soon dispersed the savages and drove them to the jungle.

Of all the savage tribes that roam about the head waters of the Ucayali, the Cashibos alone are cannibals. They are brave, cunning and treacherous, and are only surpassed by the Campas in their hatred of the white man. The Campas inhabit the spurs and hills at the foot of the eastern Cordilleras, where the Ucayali and Pichis rivers have their origin. They are a fierce, proud and numerous tribe, and are held in great fear by their lowland neighbors. They permit no strangers, especially no whites, to enter their country, and the members of the expedition under Tucker were the first white men who ever ascended the Pichis into the regions of this warlike tribe.

The canoes of the expedition entered the mouth of the Pichis on the 6th of June. Being an unknown river, it became necessary to give names to the prominent points as they were discovered; and these names were used subsequently in making the charts of the surveys of the Commission.

The navigation of the Pichis was found to be clear and unobstructed from its mouth for a distance of fifteen miles up to Rochelle Island, which is in latitude $9^{\circ} 57' 11''$ south, longitude $75^{\circ} 2' 0''$ west of Greenwich, and three thousand one hundred miles from the Atlantic coast, following the course of the Amazon river. Rochelle Island was reached on the 7th of June, and was named after Captain James Henry Rochelle, the senior member of the Commis-

sion. Any steamer which can navigate the Pachitea can ascend the Pichis this far without difficulty, but above Rochelle Island the navigation becomes more difficult, and probably impracticable for any but steamers of very light draught and strong steam power.

On the 15th of June the expedition arrived at the head of canoe navigation on the Pichis. The point was named Port Tucker, after the president of the Commission. Port Tucker is in latitude $10^{\circ} 22' 55''$ south, longitude $74^{\circ} 49' 0''$ west of Greenwich, distant three thousand one hundred and sixty-seven miles from the mouth of the Amazon, following the course of the river, and one hundred and ninety miles in a direct line from the Pacific coast. The lofty mountains so plainly in sight from Port Tucker are the eastern spurs of the Andes, the chosen land of the savage and numerous Campas Indians.

Several days before the expedition reached the shoals which terminate the navigation of the Pichis, the tom-toms or drums of the Campas were heard night and day beating the assembly of the warriors. The purpose for which the braves were to be assembled was not a matter about which there was the least doubt, but probably sufficient numbers were not got together in time to execute their intentions, for no attack was made on the Commission whilst it was in the Campas country.

During this expedition the Palcazu river was also ascended to Port Prado, or Puerto del Mairo, the head of navigation for steamers of light draught.

Port Prado is in latitude $9^{\circ} 55' 22''$ south, longitude $75^{\circ} 17' 45''$ west of Greenwich, distant three thousand one hundred and nineteen miles from the mouth of the Amazon, following the river, and only about forty miles from the important interior city of Huanaco, to which place it is in contemplation to extend the trans-Andean railway. If the road were continued from Huanaco to Port Prado there would be a complete trans-continental line of communication by railway and steamboats from Lima in Peru to the mouth of the Amazon.

Two new rivers were discovered by the Commission flowing into the Pichis. One of them was named the Trinidad, from having been discovered on Trinity Sunday, and the other was called Herrera-yacu, after Major Ramon Herrera, of the Peruvian Army, who commanded the escort of the Commission. The supplies of the expedition were running too short to allow of any but a cursory examination of these two rivers. The Trinidad, trending to the westward, can only be of value as affording a water route to the plains lying between the Pichis and the Ucayali, but it is possible that the Herrera-yacu may furnish a nearer water route to Cerro de Pasco than any yet known.

Whilst the canoes of the Commission were descending the Pachitea, they were attacked by the Cashibos, who assembled on the banks of the river, and, waiting until the leading canoes had passed, let fly flights of arrows at the canoe which brought up the rear. The Cashibos were dispersed by a few rounds from the

Remington rifles of the Commission, and the explorers met with no further forcible opposition on the way to the steamers awaiting them at the mouth of the Pachitea, where they arrived after a canoe voyage of forty-one days, during which many difficulties and some dangers were encountered and overcome. Not a single person under Tucker's command was killed, or died from sickness, during this expedition, and, singular to relate, after all the hardships and exposure endured the explorers were in much better health when they returned to their steamers than when they left them at the beginning of the expedition.

On the 15th of July, 1873, the steamers *Tambo* and *Mayro*, comprising the exploring squadron, reached Iquitos after an absence of three months and ten days. From the 15th of July to the 18th of September the Hydrographical Commission was on shore at Iquitos, employed making charts of the surveys of the late expedition, whilst the steamers were being refitted for further service.

On the 18th of September the Commission again embarked and proceeded to the mouth of the Yavari river, which forms the boundary between Peru and Brazil. The greatest pains were taken to properly establish this point. On a small island in the middle of the river, and very near its confluence with the Amazon, many astronomical observations were taken, resulting in giving the latitude $4^{\circ} 18' 45''$ south, longitude $69^{\circ} 53' 10''$ west of Greenwich, the distance from the Atlantic coast by the courses of the

Amazon being one thousand eight hundred and eleven miles. From the Brazilian frontier the main stream of the Amazon was surveyed and its tributaries examined by the Commission up to Borja, where the river rushes from a narrow gorge of the mountains and leaps into the lowlands. Borja is in latitude $4^{\circ} 31' 37''$ south, longitude $77^{\circ} 29' 43''$ west of Greenwich. From the Atlantic coast to Borja, a distance of two thousand six hundred and sixty miles, the Amazon is navigable, without serious obstruction or difficulty, for either river or sea-going steamers of several hundred tons burthen.

It would take many long years to make a thorough survey of the waters of the Amazon, which is, in fact, more of an inland sea than a river, with hundreds of branches forming a network of communicating channels extending for sixty or seventy miles on each side of the main stream. At the height of the annual floods the whole country, with the exception of the highest land, on which the towns are invariably built, is covered with water, forming a vast swamp and jungle, traversed in every direction by navigable channels, which at the season of low waters become rivers or natural canals.

The principal object for which the Commission presided over by Tucker had been instituted was accomplished when the main channels of the river and of its affluents was traced from the Peruvian and Brazilian frontiers to the head of navigation of the main river and of its tributaries, so as to show the

nearest approach by water communication to the eastern terminus of the trans-Andean railway. This duty having been executed, Tucker was ordered to proceed to Lima for conference with the Government as to the results of the explorations and surveys he had made.

After consultation with Tucker, Señor Pardo, the President of the Republic, directed that charts of the surveys made by the Hydrographical Commission should be published in New York, and that Tucker and two members of the Commission should be detailed to prepare the work for the press and superintend the engraving of the plates. The other members of the Commission returned to their homes, having completed the duty for which they were engaged.

There were some changes from time to time in the Peruvian Hydrographical Commission of the Amazon, but the following list of its members may be taken as correct:

President—John Randolph Tucker. Members—James Henry Rochelle, David Porter McCorkle, Walter Raleigh Butt. Secretaries—Timotéo Smith, Maurice Mesnier. Surgeon—Francis Land Galt. Civil Engineers—Manuel Charron, Manuel Rosas, Thomas Wing Sparrow, Nelson Berkeley Noland. Steam Engineers—John W. Durfey, David W. Bains.

On arriving in the United States, Tucker established an office in New York, and, assisted by Captain Rochelle and Mr. Sparrow, soon had the charts and plans, with explanatory notes, ready for the

hands of the printers and engravers; but in consequence of the financial difficulties into which Peru had fallen, the publication was delayed from time to time and finally abandoned altogether, as is shown by the following letter from Señor Pardo, President of the Republic:

LIMA, Marzo 13, 1877.

"Sr. J. R. Tucker.

"39 Broadway, New York City.

"Estimado amigo:—He recibido su apreciable carta de 10 del pasado, que me es grato contestar manifestándole que las graves dificultades económicas por que hoy atraviesa la República, obligan al Gobierno á dar por terminada la comision de que fué encargado para la publicacion de los Mapas y Cartas topográficas de las regiones Amazonicas. q g g a

"En esta virtud, se servirá Ud. entregar al señor Freyre, Ministro del Perú en Washington, las repetidas Cartas, Mapas, y todas las demas útiles pertenecientes al Gobierno del Perú, que hoy existen en poder de la Comision que Ud. preside; todo bajo de inventario y con las formalidades necesarias. r e a r v

"En cuanto al pagar de sus sueltos y los de los Señores que forman parte de esa Comision, he ordenado al Ministro de Hacienda disponga lo conveniente para su pronto abono, y juzgo que asi-luego les servan completamente satisfechos. e

"Deseándole a Ud. la mejor conservacion, me es grato reiterarle las expresiones de mi amistad y particular estima." r e

"Su afrino S. S.

"PARDO."

[TRANSLATION.]

" LIMA, March 13, 1877.

" *J. R. Tucker, Esq.*" *39 Broadway, New York City.*

" *Esteemed Friend*.—I have received and answer with pleasure your appreciated letter of the 10th ultimo, apprising you that the grave economical difficulties which at present afflict the Republic, obliges the Government to order the termination of the commission with which you are charged for the publication of the maps and charts of the Amazonian regions.

" For this reason, you will be pleased to deliver to Mr. Freyre, Minister of Peru in Washington, the referred to charts, maps and all other articles belonging to the Government of Peru, which now remain in charge of the Commission over which you preside; all to be delivered under inventories and with the necessary forms.

" In regard to the payment of the salaries of yourself and the other gentlemen who form part of the Commission, I have ordered the Minister of the Treasury to take measures for the prompt disbursement of what may be due, and I judge that in a short time these claims will be completely satisfied.

" With my best wishes, it gives me pleasure to repeat the expression of my friendship and particular esteem.

" Truly your faithful Servt.,

" PARDO."

In compliance with the directions of President Pardo, the charts made by the Commission were delivered to the Peruvian Legation at Washington. These charts were all ready for publication, and had they been published would have afforded much valuable information in regard to the Upper Amazon and its tributaries, water courses which are daily becoming more and more important to commerce, and which are destined in the not distant future to be navigated by lines of ocean as well as by lines of river steamers.

The following letter from Colonel Manuel Freyre, Peruvian Minister at Washington, describes the charts and plans which Tucker delivered to the Legation, and which it is to be hoped are still preserved :

“ Legacion del Peru.

“ WASHINGTON, Marzo 22 de 1877.

“ Senor Don Juan R. Tucker, Ex-Presidente de la Comision Hidrografica del Amazonas.

“ La caja que dió le. depositada en poder del Cónsul Tracy, ha sido recibida en esta Legacion, y contiene los siguientes planos ; à saber :

“ 1st. Un plano del Rio Amazonas Peruano, desde lo boca del rio Yavari hasta Borja, termino de la navegacion á vapor, dibujado sobre diez pliegos y en una escala de una pulgada por cada diez millas. Los rios Ytaya y Pastaza están incluidos en esta Plano, que cuenta 848 millas del rio Peruano Amazonas, 45 millas del rio Ytaya, y 7 millas del rio Pastaza.”

“ 2d. Un plano del rio Yavari desde su boca hasta la confluencia de los rios Yacarana y Yavarasina,

dibujado, sobre dos pliegos y en una escala de una pulgada por cada dos millas. Este plano cuenta 220 millas del rio Yavari.

“ 3d. Un plano del rio Nanay desde su boca hasta el término de la navegacion para vapores de poco calado dibujado sobre dos pliegos. Este plano contiene 160 millas del rio Nanay.

“ 4th. Un plano del rio Tigre-Yacu desde su boca hasta un punto 111 millas arriba de la boca, dibujado sobre dos pliegos y en una escala de una pulgada por cada dos millas.”

“ 5th. Un plano del rio Huallaga desde la boca hasta Rumi-Callirina, el término de la navegacion para vapores, dibujado sobre dos pliegos y en una escala de una pulgada por cada dos millas. Este plano cuenta 169 millas del rio Huallaga.

“ 6th. Un plano del rio Morona desde su boca hasta un punto 37 millas arriba de dicha boca, dibujado sobre un pliego y en una escala de una pulgada por cada dos millas.”

“ 7th. Un plano del rio Potro desde la boca hasta el término de la navegacion para vapores de poco calada, dibujada sobre un pliego y en una escala de una pulgada por cada dos millas. Este plano contiene 64 millas del rio Potro.

“ 8th. Un plano del rio Ucayali desde la boca hasta la confluencia de los rios Urubamba y Tambo, dibujado sobre nueve pliegos y en una escala de una pulgada por cada dos millas. Los rios Urubamba y Tambo, desde sus bocas hasta el mas alto punto donde es practicable la navegacion á vapor, están incluidos en este plano, que contiene 885 millas del

rio Ucayali, 24 millas del rio Urubamba, y 53 millas del rio Tambo.”

“9th. Un plano del rio Pachitea desde su boca hasta la confluencia de los rios Palcazu y Pichis, dibujado sobre dos pliegos y en una escala de una pulgada por cada dos millas. Este plano contiene 191 millas del rio Pachitea.”

“10th. Un plano del rio Palcazu desde la boca hasta el puerto del Mairo, dibujado sobre un pliego y en una escala de una pulgada por cada dos millas. Este plano contiene 37 millas del rio Palcazu.

“11th. Un plano del rio Pichis desde la boca hasta el término de navegacion en canoas, dibujado sobre un pliego y en una escala de una pulgada por cada dos millas. Una parte del rio Herrera-yacu y otro parte del rio Trinidad se hallan en este plano, que contiene 85 millas del rio Pichis, 4 millas del rio Trinidad, y 5 millas del rio Herrera-yacu.

“12th. Un plano del rio Amazonas Peruano y sus afluentes, dibujados sobre un pliego y en una escala de una pulgada por cada quince millas. Este plana contiene 1661 millas del rio Amazonas Peruano y sus afluentes.

“13th. Todas las mencionadas planos están dibujados sobre treinta y cinco pliegos, siendo cada pliego treinta pulgados de largo por quince pulgada de ancho.

“14th. Un plano del rio Amazonas Peruano y sus afluentes, dibujado sobre un pliego y en una escala de 0 una pulgada por cada diez millas, siendo el pliego e cinco piés de largo por cinco piés de ancho. Este plano contiene en un solo pliego todos los reconoci-

mientos verificados por la Comision Hidrografica del Amazonas, que son por todo 2945 millas.

S “ Los demas planos dán los mismos reconocimientos mas detalladamente.

“15th. Un plano del pueblo de Yquitos, dibujado sobre un pliego.

“ Dios que á le.

“ MANL. FREYRE.”

[TRANSLATION.]

“ *Legation of Peru.*

“ WASHINGTON, March 22d, 1877.

“ *John R. Tucker, Esq., Ex-President of the Hydrographical Commission of the Amazon.*

“ The box deposited by you with Consul Tracy has been received at this Legation, and contains the following charts, to wit :

“ 1st. A chart of the Peruvian Amazon river, from the mouth of the River Yavari to Borja, the termination of steam navigation, drawn upon ten sheets, and on a scale of one inch to each two miles. The Rivers Itaya and Pastaza are included in this chart, which contains 848 miles of the Peruvian Amazon river, 45 miles of the Itaya river, and 7 miles of the Pastaza river.

“ 2d. A chart of the Yavari river from its mouth to the confluence of the Rivers Yacarana and Yavarasino, drawn upon two sheets and on a scale of one inch for each two miles, This chart comprises 220 miles of the Yavari river.

“ 3d. A chart of the River Nanay from its mouth to the termination of navigation for steamers of light

draught, drawn upon two sheets and on a scale of one inch for each two miles. This chart contains 160 miles of the River Nanay.

" 4th. A chart of the River Tigre-yacu, from its mouth to a point 111 miles above its mouth, drawn upon two sheets and on a scale of one inch for each two miles.

" 5th. A chart of the River Huallaga, from its mouth to Rumi-Callirina, the termination of steamer navigation, drawn upon two sheets and on a scale of one inch for each two miles. This chart comprises 169 miles of the Huallaga river.

" 6th. A chart of the River Morona, from its mouth to a point 37 miles above its mouth, drawn upon one sheet and on a scale of one inch for each two miles.

" 7th. A chart of the River Patro, from its mouth to the termination of navigation for steamers of small draught, drawn upon one sheet and on a scale of one inch for each two miles. This chart contains 64 miles of the Patro river.

" 8th. A chart of the River Ucayali, from its mouth to the confluence of the Rivers Urubamba and Tambo, drawn upon nine sheets and on a scale of one inch for each two miles. The Rivers Urubamba and Tambo, from their mouths to the highest point to which steamer navigation is practicable, are included in this chart, which contains 885 miles of the River Ucayali, 24 miles of the River Urubamba, and 53 miles of the River Tambo.

" 9th. A chart of the River Pachitea, from its mouth to the confluence of the Rivers Palcazu and Pichis, drawn upon two sheets and on a scale of one

inch for each two miles. This chart contains 191 miles of the River Pachitea.

“10th. A chart of the River Palcazu, from its mouth to Port Mairo, drawn upon one sheet and on a scale of one inch each for two miles. This chart contains 37 miles of the River Palcazu.

“11th. A chart of the Pechis river, from its mouth to the termination of canoe navigation, drawn upon one sheet and on a scale of one inch for each two miles. A part of the River Herrera-yacu, and also a part of the River Trinidad, are included in this chart, which contains 85 miles of the River Pichis, 4 miles of the River Trinidad, and 5 miles of the River Herrera-yacu.

“12th. A chart of the Peruvian Amazon river and its affluents, drawn upon one sheet and on a scale of one inch for each 15 miles. This chart contains 1661 miles of the Peruvian Amazon river and its affluents.

“13th. A chart of the River Ucayali and its affluents, drawn upon one sheet and on a scale of one inch for each 15 miles. This chart contains 1284 miles of the River Ucayali and its affluents.

“All the above mentioned charts are drawn upon 35 sheets, each sheet being 30 inches long and 15 inches broad.

“14th. A chart of the Peruvian Amazon river and its affluents, drawn upon one sheet and on a scale of one inch for each ten miles, the sheet being 5 feet long by 5 feet broad. This chart contains, on one single sheet, all the surveys made by the Hydrographical Commission of the Amazon. The other charts give the same surveys more in detail.

" 15th. A plan of the town of Iquitos, drawn upon one sheet.

" May God guard you.

" MANL. FREYRE."

Tucker was in the sixty-seventh year of his age when he retired to his home in the City of Petersburg, Virginia, where he had purchased a comfortable house with a lawn and garden attached. Here he passed the evening of an active life in the enjoyment of a private fortune, which, though not large, was sufficient to supply all his moderate wants and simple tastes. Relatives and friends frequently visited him; he read much, and books, especially the older English classics, were a source of much pleasure to him; the improvement of his lawn and garden was a pursuit which afforded him unfailing interest and occupation.

On the 12th of June, 1883, he was apparently in his usual good health. In the course of the morning a friend called on him, and they conversed together for some time, seated in the shade of a tree on the lawn. His friend having taken his departure, Tucker reseated himself for a few minutes in his chair, suddenly arose, straightened up his tall form to its full height, and fell forward—dead. Physicians were immediately summoned, but all the efforts to revive him were ineffectual. He had died from disease of the heart; passing away from this world without a struggle or a sigh, and going where souls as pure as his have nothing to fear.

His remains were taken to Norfolk, Virginia, where they were received by old friends and comrades, who knew and loved him well, and interred

by the side of his wife's grave, in a beautiful private cemetery near the city.

Admiral Tucker possessed many of the qualities of a great commander. His judgment was excellent, and it was very rarely the case that he was mistaken as to what it was possible for the force at his disposal to accomplish. He always commanded the respect and confidence, as well as the good will, of his men. A strict disciplinarian, the prompt and unhesitating obedience to orders he exacted was cheerfully rendered by his subordinates. His plans were coolly and deliberately formed, and, having been once determined upon, were carried out with energy and resolution. In the ordinary intercourse of private life he was so gentle, generous and genial that his friends and associates felt for him a regard approaching affection. In youth he was an eminently handsome man and in maturer years his presence was imposing. Sailors and Indians are fond of giving personally descriptive names to those with whom they are thrown in contact; when Tucker was a lieutenant he was called "Handsome Jack" by the men-before-the-mast, and the warriors of the savage tribes that wander about the head waters of the Amazon knew him as the "Apo," the meaning of the word being "High Chief."

In concluding this sketch of the eventful life of John Randolph Tucker, it is but doing justice to his memory to say that the sea-service never produced a more thorough and accomplished sailor, and that there never was bred to the profession of arms a more honorable and gallant gentleman.



JAMES HENRY ROCHELLE

NOTES

ON THE

Navigation of the Upper Amazon

AND ITS

PRINCIPAL TRIBUTARIES

BY

CAPTAIN JAMES HENRY ROCHELLE

**Member of the late Peruvian Hydrographical Commission of
the Amazon.**

NOTES.

THE AMAZON.

Springing from Lake Laracocha, in the heart of the Andes, the Amazon winds its way through the eastern Cordillera of Peru, a rapid and turbulent stream, until, passing through a narrow gorge in the mountains at the pongo de Manseriche, it leaps into the lowlands and flows for two thousand six hundred and sixty miles in a direction nearly east through the vast plains of Peru and Brazil, fed on its way by tributaries which are themselves great rivers, and finally pouring its immense volume of water into the Atlantic ocean. From the Atlantic up to the Peruvian frontier the river is known as the Lower or Brazilian Amazon, and sometimes as the Solimoens; above the Brazilian frontier the river lies wholly in Peruvian territory and takes the name of the Peruvian Amazon or Marañon, but is commonly spoken of as the Upper Amazon. It is of the navigation of the Upper Amazon that these notes will treat.

RISE AND FALL OF THE RIVER.

The waters of the Upper Amazon and its tributaries begins to rise annually in October, remains stationary for a short time in December, then continues to rise until May, when it commences to fall. November, December, January, February, March and

April are considered the months of high water, and June, July, August and September comprise the low-water season. October and May are sometimes months of high and sometimes of low water.

DEPTH OF WATER.

During the season of low water a minimum depth of twenty-four feet is found in the channel of the Upper Amazon, from the Brazilian frontier to the mouth of the Ucayali river at Nanta, eighteen feet from the mouth of the Ucayali to the mouth of the Huallaga river, and twelve feet from the mouth of the Huallaga to Borja, where further navigation is rendered impracticable by the rapids and falls of the pongo de Manseriche.

CURRENT.

From the Brazilian frontier to the mouth of the Ucayali river the current of the Amazon is three miles per hour; from the mouth of the Ucayali to the mouth of the Potro river three and one-fourth miles per hour; from the mouth of the Potro to the mouth of the Morona river three and a-half miles per hour; and from the mouth of the Morona to Borja, at the head of steamer navigation, the current is three and three-fourths miles per hour. This is the usual and average current to be met with, but it increases or diminishes with the rise and fall of the river and, also, with the narrowing or broadening of the channel.

PILOTS.

In order to prevent running upon sand-bars, which are constantly forming and shifting and frequently changing the bed of the channel, the services of experienced pilots are indispensable to the safe navigation of the Upper Amazon and its tributaries. It is not difficult to obtain such pilots, and they are frequently expert hunters and fishermen as well as pilots.

BEST TIME FOR NAVIGATING THE RIVER.

When a steamer on the Upper Amazon runs aground, it is almost always in consequence either of the ignorance of the pilot or of the unskillful handling of the vessel. To get aground when the water is falling endangers the detention of the vessel until she is floated off by the next rise of the river, which may not occur for months; getting aground when the water is rising usually necessitates a delay of only a few hours, as the rising water soon floats the vessel off. Hence it is, of course, that the navigation of the Amazon is attended with much less difficulty when the waters of the river are rising than when they are falling.

FUEL.

Coal is not to be found on the Upper Amazon; the steamers burn wood, which is abundant, cheap and makes good fuel. Wood should be ordered in advance at certain points, but in case a steamer gives out of fuel all that has to be done is to haul in to the

bank, send the crew on shore with axes, and cut as much wood as is required.

DISCHARGING AND RECEIVING CARGO.

In the absence of wharves on the Upper Amazon and its tributaries, vessels lay alongside of the banks whilst discharging or receiving cargo. The banks at the usual stopping places afford good landings; wharves are not needed and it would be difficult to construct them so that they could be used at all stages of the water.

IMPORTS.

It may be well to say a word about the trade of the Upper Amazon. There are no import or export duties for this part of Peru, nor are any duties paid on goods passing up the Brazilian Amazon to Peru. Coarse cotton cloth is worn by nine-tenths of the inhabitants who are civilized enough to wear clothes at all. The demand for this cloth is large and will grow from year to year, and of all coarse cotton cloth in the market the American is preferred. The plantain is the native substitute for bread, but wheat flour is used by the mercantile and official classes; there is a steady demand for Baltimore and Richmond flour, which brands are supposed, probably with reason, to stand the climate better than flour manufactured elsewhere. Bacon hams sell for one dollar per pound, but the demand for them is small and the article is soon spoiled by the climate. Axes, hoes, spades and machetes are much in demand, and there

is a limited demand for improved firearms; ready made clothing, and articles of household furniture for the houses of the richer persons of the community, are usually imported from Europe.

EXPORTS.

The exports of the region of the Upper Amazon are not as valuable as they are destined to become when the productions of the rich valleys of eastern Peru find an outlet to market by way of the river. Among the principal articles of export may be enumerated, hats, from ~~May~~^{My}bamba (Panama hats); rum, made from the sugar cane (cachaça); dried fish (pay~~hi~~hi); and Indian rubber (jebe). The Indian-rubber tree abounds in the forests of the Upper Amazon, and the gathering of the gum is a profitable industry. Specimens of gold have been obtained from the natives about the pongo de Manseriche, and rich deposits of the precious metal will without doubt be discovered at some future time, but no search even can be made for it until the fierce and cruel savages, who have undisputed possession of the country beyond Borja, shall have been subdued.

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MOUTH OF THE YAVARI RIVER.

Commencing at the Yavari river, which forms the boundary between Peru and Brazil on the south side of the Amazon river, and following the Upper Amazon and its principal tributaries up to the head of navigation, the first place to be noted is the mouth of

the Yavari river:* Latitude $4^{\circ} 18' 45''$ south; longitude, $69^{\circ} 53' 10''$ west of Greenwich; magnetic variation, $5^{\circ} 38' 54''$ east; thermometer (Fahrenheit), 76° ; elevation above sea-level, 266 feet; distance from the Atlantic ocean, following the course of the river, 1811 miles; current, in the Amazon, $4\frac{1}{2}$ miles per hour; width of the Yavari river at its mouth, 500 yards; width of the Amazon, 1200 yards; depth of water in the channel of the Amazon, 36 feet. As the Yavari river marks the boundary between Peru and Brazil on the south side of the Amazon, special pains were taken to ascertain correctly the latitude and longitude of its mouth; the observations for the latitude and longitude were taken on a small islet, probably overflowed at high water, in the middle of the lower mouth of the river.

It was said in Iquitos that, in 1874, Captain Guillermo Black, President of the Peruvian Boundary Commission, ascended the Yavari in a small steamer a distance of 500 miles from its mouth, and 300 miles farther in canoes to a point where there was barely two feet of water in the channel, at which point the latitude was determined to be $7^{\circ} 1' 22''$ south, and the longitude $74^{\circ} 8' 25''$ west of Greenwich; elevation above the sea-level, 800 feet.

*The latitudes, longitudes and other data given in these notes are taken from the journal of the Peruvian Hydrographical Commission of the Amazon. Some of them have been published, by permission, in the third edition of Professor Orton's "Andes and the Amazon."

TABATINGA (BRAZIL).

Distance from the Atlantic, 1825 miles; current, $4\frac{1}{2}$ miles per hour; depth of water, 36 feet; width of river, 800 yards.

Tabatinga is the Brazilian frontier post on the north side of the Amazon. Captain Azevedo, of the Brazilian Navy, gives the latitude of this place as $4^{\circ} 14' 30''$ south; longitude, $70^{\circ} 2' 24''$ west of Greenwich; magnetic variation, $6^{\circ} 35' 10''$ east.

LETITIA.

Latitude, $4^{\circ} 10' 57''$ south; longitude, $69^{\circ} 59' 21''$ west of Greenwich; magnetic variation, $5^{\circ} 57' 40''$ east; elevation above sea-level, 274 feet; distance from the Atlantic, 1828 miles.

Letitia is the Peruvian frontier post on the north bank of the Amazon. A fort, intended to command the passage of the river, was projected but not erected at this point. It is probable that the passage of steamers up the Amazon cannot be stopped by forts and batteries at any point on the river below Tams-hiyacu.

LORETO.

Latitude, $3^{\circ} 54' 20''$ south; longitude, $70^{\circ} 7' 45''$ west of Greenwich; magnetic variation, $5^{\circ} 11' 24''$ east; thermometer, 78° ; elevation above sea-level, 286 feet; distance from the Atlantic, 1865 miles; current, 3 miles per hour; width of river, 1300 yards.

Loreto is the most eastern Peruvian town of any importance on the Amazon. It is situated on the

north or left bank of the river. Near it resides a tribe of Indians, partly civilized, called the Ticunas.

CAMACHEROS.

Situated on the right or south bank of the river ; current $2\frac{1}{4}$ miles per hour ; width of river, 1800 yards.

MAUCALLACTA.

Situated on the right or south bank of the river ; width of river, 2500 yards.

PEBAS.

One mile from the Amazon, on the left or north bank, and one mile up the River Ambiyacu. The current of the Amazon at Pebas is $2\frac{1}{2}$ miles per hour ; distance from the Atlantic, 2009 miles.

ORAM.

On south or right bank of the river ; current, $2\frac{1}{2}$ miles per hour ; width of river, 1000 yards ; depth of water, 36 feet.

IQUITOS.

Latitude, $3^{\circ} 44' 15''$ south ; longitude, $73^{\circ} 7' 30''$ west of Greenwich ; magnetic variation, $5^{\circ} 55'$ east ; thermometer, 78° ; elevation above sea-level, 295 feet ; distance from the Atlantic, 2126 miles ; current, 3 miles per hour ; depth of water, 36 feet.

Iquitos is on the north bank of the Amazon, at a point where the river is divided by an island into two channels ; from the town to the island the river is 1800 yards wide, and the channel on the other side of the

island has about the same width. The Government buildings and works are situated at this place, and it is the largest and most important town on the Upper Amazon. It is a place of considerable trade, and in it are established several mercantile houses which import their goods directly from Europe and the United States by way of Para. The anchorage is good at all times, and vessels, whilst discharging or receiving cargo, can lay in security alongside the high bank that lines the whole front of the town. This is an advantage not to be underrated when it is remembered that there are no wharves on the Upper Amazon.

TAMSHIYACU.

Situated on a high bank on the south side of the river, distant 2146 miles from the Atlantic; thermometer, 76° . At this place the river is narrow, has only one channel, and the current is strong. It is probably the only position on the Amazon, below the mouth of the Ucayali, where vessels could be prevented from passing, up or down, by heavy guns mounted in forts or batteries.

MOUTH OF THE UCAYALI RIVER.

Latitude, $4^{\circ} 28' 30''$ south; longitude, $73^{\circ} 21' 30''$ west of Greenwich; magnetic variation, $7^{\circ} 2'$ east; thermometer, 80° ; elevation above sea-level, 318 feet; distance from the Atlantic, 2189 miles; current in the Amazon, 3 miles per hour; depth of water in the channel of the Amazon, 30 feet; width of the Amazon, 1300 yards. Unfortunately, immediately at the mouth of the Ucayali neither the banks of that river

nor those of the Amazon afford a place suitable for the location of a town. Nauta, on the north bank of the Amazon, seven miles above the mouth of the Ucayali, is the nearest place at which it is practicable to build houses not liable to be swept away by the annual floods.

NAUTA.

Latitude, $4^{\circ} 31' 30''$ south; longitude, $73^{\circ} 27'$ west of Greenwich; magnetic variation, $7^{\circ} 2'$ east; thermometer, 78° ; elevation above sea-level, 320 feet; distance from the Atlantic, 2195 miles; current $3\frac{1}{4}$ miles per hour; depth of water, 30 feet; width of river, 1200 yards. Situated on the north bank of the Amazon, near the confluence of that river and the Ucayali, Nauta is well located for grasping the trade of both rivers, and ought to become a place of importance. Of course, the six or seven miles that vessels have to ascend the Amazon to reach the place after leaving the Ucayali constitutes a drawback, especially in the case of vessels not propelled by steam; but no desirable place can be found below and near the mouth of the Ucayali where buildings could be erected and vessels could load and unload with facility at the season of high water. Below and adjoining Nauta the banks are high and present a better site for a town than the one on which it stands.

SAN REGIS.

Distant from the Atlantic 2230 miles; current, $3\frac{1}{3}$ miles per hour; average current between Nauta and San Regis, $3\frac{1}{4}$ miles per hour.

MOUTH OF THE TIGREYACU RIVER.

Distance from the Atlantic, 2245 miles; current, $3\frac{1}{2}$ miles per hour; average current between San Regis and the mouth of the Tigreyacu, $3\frac{1}{4}$ miles per hour. The Tigreyacu can be navigated by steamers of considerable size for some distance; its waters are dark and clear, and those tributaries of the Amazon having dark and clear waters are usually unhealthy, whilst those having muddy and discolored waters have always been found to be healthy.

SANTA CRUZ DE PARINARI.

Latitude, $4^{\circ} 36' 30''$ south; longitude $74^{\circ} 6' 30''$ west of Greenwich; magnetic variation, $7^{\circ} 27' 20''$ east; thermometer, 78° ; elevation above sea-level, 351 feet; distance from the Atlantic, 2273 miles; current, $3\frac{1}{4}$ miles per hour.

PARANARI.

Distance from the Atlantic, 2293 miles; current, $3\frac{1}{4}$ miles per hour.

VACA MARINA.

Distance from the Atlantic, 2334 miles; current, $3\frac{1}{4}$ miles per hour.

ELVIRA.

Distance from the Atlantic, 2352 miles; current, $3\frac{1}{4}$ miles per hour.

SAN PEDRO.

Distance from the Atlantic, 2393 miles; current, $3\frac{1}{4}$ miles per hour.

FONTEVERA.

Distance from the Atlantic, 2408 miles; current, $3\frac{1}{4}$ miles per hour.

MOUTH OF THE HUALLAGA RIVER.

Distance from the Atlantic, 2430 miles; current in Amazon, $3\frac{1}{4}$ miles per hour. One hundred and twenty-three miles up the Huallaga is the town of Yurimaguas, a centre of trade, to which steamers from Para frequently ascend.

CEDRO ISLA.

Distant from the Atlantic 2445 miles; current, $3\frac{1}{4}$ miles per hour.

MOUTH OF THE PASTAGA RIVER.

Distance from the Atlantic, 2514 miles; current in the Amazon, $3\frac{1}{4}$ miles per hour. The Pastaga has a rapid current and is full of obstructions to navigation; it is with much difficulty that canoes even can be forced up the river for any distance. On its head waters the Indians wash a considerable quantity of gold from the sand of the bed of the channel.

BARRANCA.

Latitude, $4^{\circ} 59' 53''$ south; longitude, $76^{\circ} 38' 38''$ west of Greenwich; magnetic variation, $7^{\circ} 46' 26''$ east; thermometer, 78° ; elevation above sea-level, 453 feet; distance from the Atlantic, 2545 miles; current, $3\frac{1}{4}$ miles per hour. Barranca is situated on a red clay bluff, about seventy feet high, on the north or left bank of the river, which is here narrow. Communi-

cation is kept up between Barranca and Moyabamba by way of the Aypena river to its head and thence by land. Barranca has been used as, but is not well adapted to be, a military post; gunboats could lay out of sight below, around a bend of the river, and shell it without being themselves exposed to its fire.

MOUTH OF THE POTRO RIVER.

Distance from the Atlantic, 2564 miles; current, $3\frac{1}{4}$ miles per hour. The Potro is navigable for small steamers a distance of sixty miles from its mouth, and is of importance as a link in the projected route from Chachapoyas to Limon on the Amazon.

MOUTH OF THE MORONA RIVER.

Distance from the Atlantic, 2576 miles; current, $3\frac{1}{2}$ miles per hour. Steamers ascend the Morona 300 miles, and at some stages of the water a greater distance.

LIMON.

Distance from the Atlantic, 2588 miles; current, $3\frac{3}{4}$ miles per hour. Limon is the terminus of a projected route from Chachapoyas to the Amazon; it is a place of no importance whatever in any other respect.

PUNTA ACHUAL.

Latitude, $4^{\circ} 15' 27''$ south; longitude $77^{\circ} 1' 28''$ west of Greenwich; magnetic variation, $8^{\circ} 18' 18''$ east; thermometer, 80° ; elevation above sea-level, 509 feet; distance from the Atlantic, 2612 miles; current, $3\frac{3}{4}$ miles per hour. Two miles above Punta Achual, at the Vuelta Calentura, or Calentura pas-

sage, the first serious difficulty is encountered in navigating the Upper Amazon; the difficulty there encountered is a strong current combined with a whirlpool in the channel of the river, but, with full heads of steam on, steamers are able to pass the vuelta and proceed on to Borja. At Vuelta Calentura the course of the river is from N. N. W. to S. S. E.

BORJA.

Latitude, $4^{\circ} 31' 37''$ south; longitude, $77^{\circ} 29' 43''$ west of Greenwich; thermometer, 76° ; elevation above sea-level, 516 feet; distance from the Atlantic, 2660 miles; current, $3\frac{3}{4}$ miles per hour. At Borja the navigation of the Upper Amazon ends; the river in its whole course from Laracochoa to Borja, a distance of 500 miles, is a mountain torrent, impracticable for navigation even by canoes. The length of the Amazon, from its source at Laracochoa to the Atlantic ocean, is 3160 miles, but the distance from the Atlantic to the source of the Ucayali is still greater. It usually takes a steamer 69 steaming hours to ascend the river from Iquitos to Borja, and 35 steaming hours to descend from Borja to Iquitos.

DISTANCES.

In the following list of distances between places on the Amazon, from its mouth to its source in Lake Laracochoa, the distances for the Lower Amazon are taken from the best Brazilian authorities that could be consulted; the distances for the Upper Amazon, from the Brazilian frontier to the head of steamer navigation at Borja, were measured by the Peruvian

Hydrographical Commission of the Amazon; and the distance from Borja, the head of navigation, to the source of the river in Lake Laracocha, is given as estimated by the best Peruvian authorities.

LIST OF DISTANCES ON THE AMAZON.

	Lower Amazon. Miles.
Atlantic ocean to Para	75
Para to Breves	146
Breves to Garupa	123
Garupa to Porto de Moz	48
Porto de Moz to Prainha	96
Brainha to Monte Alegre	44
Monte Alegre to Santarem	60
Santarem to Obidos	68
Obidos to Villa Bella	95
Villa Bella to Serpa	137
Serpa to Manaus	110
From the Atlantic to Manaus, 1002 miles.	
Manaos to Cudajos	155
Cudajos to Coary	84
Coary to Tefé (Ega)	107
Tefé (Ega) to Fonte Boa	133
Fonte Boa to Tonantius	140
Tonantius to San Paulo	95
San Paulo, mouth of the Yavari river	90
The mouth of the Yavari marks the boundary line between Peru and Brazil on the south side of the Amazon.	
Mouth of the Yavari to Tabatinga	14
Brazilian frontier port on the north side of the Amazon. From the Atlantic to Tabatinga, 1825 miles.	
Tabatinga to Letitia	3
Peruvian frontier post.	

	Upper Amazon. Miles.
Letitia to Loreto.....	37
Lóreto to Pebas.....	144
Pebas to Iquitos.....	117
Iquitos to Tamshiyacu.....	20
Tamshiyacu to mouth of the Ucayali river.....	43
Mouth of the Ucayali river to Nauta.....	6
Nauta to San Regis.....	50
San Regis to Santa Cruz de Parinasi.....	28
Santa Cruz de Parinari to Parinari.....	20
Parinari to Vaca Marina.....	41
Vaca Marina to Elvira.....	18
Elvira to San Pedro.....	41
San Pedro to Fontevera.....	15
Fontevera to mouth of the Huallaga river.....	22
Mouth of the Hullaga river to Cedro Isla.....	15
Cedro Isla to mouth of the Pastaza river.....	69
Mouth of the Pastaza river to Barranca.....	31
Barranca to Mouth of the Potro river.....	19
Mouth of the Potro river to mouth of the Mo- rona river.....	12
Mouth of the Morona river to Limon.....	12
Limon to Punta Achnal.....	24
Punta Achnal to Borja.....	48
From the Atlantic to Borja, the head of navigation, 2660 miles.	
Borja to Lake Laracochoa.....	500
Source of the Amazon.	
Length of the Amazon river from its source to its mouth, 3160 miles.	

HUALLAGA RIVER.

The Huallaga has its source in Lake Chiquicoba, flows by the important central city of Huanaco, and thence in a direction nearly north, for 450 miles, until its confluence with the Amazon. The mouth of the Huallaga is 2430 miles distant from the Atlantic, and its current is about 3 miles per hour. Eighteen feet of water can usually be carried up to Yurimaguas, and steamers ascend 40 miles higher to a place called Rumicallarina; above Rumicallarina the river is navigable for a great distance by canoes. About 8 miles below Yurimaguas the river is divided by an island, on each side of which there are sand-bars that steamers drawing more than 11 feet of water are sometimes unable to pass during the months of June, July and August.

LAGUNA.

Distance from the Atlantic, 2447 miles; current, 3 miles per hour.

SANTA LUCIA.

Distance from the Atlantic, 2473 miles; current, 3 miles per hour.

SANTA MARIA.

Distance from the Atlantic, 2528 miles; current, 3 miles per hour.

YURIMAGUAS.

Latitude, $5^{\circ} 5' 55''$ south; longitude, $75^{\circ} 59' 58''$ west of Greenwich; magnetic variation, $7^{\circ} 47'$ east;



thermometer, 77° ; elevation above sea-level, 440 feet; distance from the Atlantic, 2554 miles; current, $3\frac{1}{2}$ miles per hour.

The advantage which Yurimaguas possesses over all the other river ports on the Upper Amazon is that of its being the point where travelers from Lima and articles of export from Moyubamba, a city of 10,000 inhabitants, meet the steamers from Para. Canoes ascend the Huallaga from Yurimaguas to Chasuta in eight days and make the return trip in three; from Chasuta there is a mule road to Moyubamba, Chachapoyas and Cajamarca, and from the latter place a railway runs to Lima. This is the best route from the Amazon to the Pacific coast, and the only one which does not involve long marches on foot. Steamers drawing five or six feet of water could make regular trips to Chasuta at any season of the year, even at lowest water, and meeting larger steamers at Yurimaguas would establish better communication with the rich country of the interior. On the Huallaga, above Yurimaguas and a little back from the river, are to be found the best locations for colonies. Thirty miles above Yurimaguas, on the right bank of the river, is situated Shucushiyacu, a place well known as commanding a fine view of mountain and river scenery.

CAINARACHI.

Distance from the Atlantic, 2592 miles; current, $3\frac{1}{2}$ miles per hour.



RUMICALLARINA.

Latitude, $5^{\circ} 58' 32''$ south; longitude, $75^{\circ} 47' 32''$ west of Greenwich; magnetic variation, $8^{\circ} 8' 10''$ east; thermometer, 77° ; elevation above sea-level, 486 feet; distance from the Atlantic, 2600 miles; current, $3\frac{1}{2}$ miles per hour; depth of water, 36 feet; width of river, 200 yards.

Rumicallarina is at the head of navigation for steamers on the Huallagu. Any steamer which can ascend the river to Yurimaguas can continue on to Rumicallarina, beyond which place only five or six feet, at the season of low water, can be carried to Chasuta.

LIST OF DISTANCES ON THE HUALLAGA.

Atlantic ocean to mouth of the Huallaga, 2430 miles
By the Amazon river.

	Huallaga River. Miles.
Mouth of the Huallaga to Laguna.....	17
Laguna to Santa Lucia.....	26
Santa Lucia to Santa Maria.....	55
Santa Maria to Yurimaguas.....	26
Yurimaguas to Cainarachi.....	38
Cainarachi to Rumicallarina.....	8
Rumicallarina to Chasuta.....	50
Chasuta to Lake Chiquicoba.....	300
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Length of the Huallaga river.....	520
Distance from the source of the Huallaga to the mouth of the Amazon.....	2950



UCAYALI RIVER.

The Ucayali river has its origin in the Andean region, about Lake Titicaca, and flows, under various names, in a direction nearly north until it mingles its waters with those of the Amazon, to which river it bears the same relation that the Missouri does to the Mississippi; that is to say, like the Missouri, its length and volume of water entitles it to be considered a continuation and not a tributary of the main river. During the season of low water 24 feet can be carried from Nauta, at the mouth of the river, to Sarayacu; 18 feet from Sarayacu to the mouth of the Pachitea river; and 12 feet from the mouth of the Pachitea to the confluence of the Tambo and Urubamba. The average current from the mouth of the river to Pucacura is 2 miles per hour, and from Pucacura to the confluence of the Tambo and Urubamba 3 miles per hour. The Tambo is probably navigable for steamers drawing eight or ten feet of water to the confluence of the Ene and Perene, and thence the Perene would afford communication, at least by canoes, to San Ramon, a Peruvian military post; from San Ramon to Tarma, and from Tarma to Lima, would, of course, be the continuation of the route to the Pacific slope. The first step towards the opening of this most desirable of all the routes between the Pacific coast and the Amazon would be the establishment of a battalion post at the confluence of the Ene and Perene, communicating at regular and stated intervals with San Ramon. The distance between the

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two posts would be about 60 miles of canoe navigation, and would soon become a traveled route forming the connecting link between eastern and western Peru.

MOUTH OF THE UCAYALI.

Latitude, $4^{\circ} 28' 30''$ south; longitude, $73^{\circ} 21' 30''$ west of Greenwich; magnetic variation, $7^{\circ} 2'$ east; thermometer, 80° ; elevation above sea-level, 318 feet; distance from the Atlantic, 2180 miles; current, 2 miles per hour; the width of the Ucayali at its mouth is half a mile.

PUCACURA.

Latitude, $6^{\circ} 4' 45''$ south; longitude, $75^{\circ} 1'$ west of Greenwich; magnetic variation, $7^{\circ} 22' 10''$ east; thermometer, 79° ; elevation above sea-level, 377 feet; distance from the Atlantic, 2482 miles; current, 3 miles per hour.

SARAYACU.

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Latitude, $6^{\circ} 35' 15''$ south; longitude, $74^{\circ} 58' 30''$ west of Greenwich; magnetic variation, $7^{\circ} 52' 8''$ east; thermometer, 79° ; elevation above sea-level, 410 feet; distance from the Atlantic, 2578 miles; current, 3 miles per hour; depth of water, 20 feet.

The town of Sarayacu is situated on a small creek, about three miles from the place on the river which is called the Puerto del Sarayacu. Between Pucacura and Sarayacu is Esquina, a small settlement built on high land, which extends along the river for a mile or more. This place (Esquina) and Pucacura are

about the only places on the banks of the Ucayali, below Sarayacu, that are not overflowed at high water. The floods of the Ucayali, which regularly recur every year at certain seasons, render the banks of the river an undesirable, perhaps even an impracticable, location for an agricultural population. It is possible that a crop might be raised and gathered during the dry season, but the farms would have to be abandoned whenever the river rose to its maximum height. At Paca, about twelve miles above Sarayacu, the banks on both sides of the river are high; such places are much more frequently met with above than below Sarayacu, but still they are the exception to the general character of the country near the river, which continues to be low and subject to overflow until the highlands are reached near the confluence of the Tambo and Urubamba.

PACAMASHI.

Latitude, $7^{\circ} 53' 15''$ south; longitude, $74^{\circ} 40' 45''$ west of Greenwich; magnetic variation, $7^{\circ} 51' 38''$ east; thermometer, 77° ; elevation above sea-level, 435 feet; distance from the Atlantic, 2733 miles; current, 3 miles per hour; width of the river, 600 yards.

YARINACocha.

Latitude, $8^{\circ} 15'$ south; longitude, $74^{\circ} 31' 30''$ west of Greenwich; magnetic variation, $7^{\circ} 38' 30''$ east; thermometer, 79° ; elevation above sea-level, 447 feet; distance from the Atlantic, 2800 miles; current, 3 miles per hour; width of river, 1200 yards.

MOUTH OF THE PACHITEA RIVER.

Latitude, $8^{\circ} 43' 30''$ south; longitude, $74^{\circ} 32' 30''$ west of Greenwich; magnetic variation, $8^{\circ} 45' 40''$ east; thermometer, 75° ; elevation above sea-level, 508 feet; distance from the Atlantic, 2891 miles; current, 3 miles per hour; width of the river, 600 yards.

VUELTA DEL DIABLO.

Distance from the Atlantic, 3091 miles. This strait is the first serious difficulty encountered in ascending the Ucayali; the current dashes with much violence against the trunks of large trees which lodge in, and almost block up, the passage.

CONFLUENCE OF THE TAMBO AND URABAMBA RIVERS.

Latitude, $10^{\circ} 41'$ south; longitude, $73^{\circ} 41'$ west of Greenwich; elevation above sea-level, 661 feet; distance from the Atlantic, 3142 miles; depth of water, 12 feet.

ESPERANZA.

Esperanza is situated on the Perene river about 11 miles above the junction of the Ene and Perene, which form the Tambo. The navigation for steamers drawing 10 feet of water terminates at the junction of the Perene and Ene. From thence to Fort San Ramon, a distance of sixty miles, canoes could navigate, but with some difficulty, owing to the swiftness of the current, which at San Ramon runs at the rate of 6 miles per hour. Small stern-wheel, flat-bottomed steamers, such as are in use on the swift, narrow and shallow rivers west of the Mississippi, could probably

be employed with success in establishing communication between Fort San Ramon and the Ucayali.

LIST OF DISTANCES ON THE UCAYALI RIVER.

	Ucayali River. Miles.
Atlantic ocean to mouth of the Ucayali.	2189
(Amazon River.)	
Mouth of the Ucayali to Pucacura.	293
Pucacura to Sarayacu.	96
Sarayacu to Pacamashi.	155
Pacamashi to Yarinacocha.	67
Yarinacocha to mouth of the Pachitea river. . . .	91
Mouth of the Pachitea to Vuelta del Diablo. . . .	200
Vuelta del Diablo to confluence of the Tambo and Urubamba.	51
Confluence of the Tambo and Urubamba to the Ucayali, source of the Urubamba river, a continuation of the Ucayali.	375
Ucayali river, from its source to the Atlantic. . .	3517
Distance from the Atlantic to the head of steamer navigation on the Ucayali.	3142

PACHITEA RIVER.

The banks of the Ucayali and Pachitea, at their confluence, are low, subject to overflow and unsuitable for settlement. About nine miles above its mouth we come to the first Indian village on the Pachitea, a male Conebo hamlet, with nothing to recommend it except that it is situated on ground a little higher than the flats which surround it. On the left bank of the

Ucayali a few miles below the mouth of the Pachitea, there is a place called Hoje, which is not subject to overflow at high water, but in other respects it is not an eligible position for a town or post. The Pachitea is navigable at low water for steamers drawing nine feet of water to the confluence of the Palcazu and Pichis rivers.

MOUTH OF THE PACHITEA.

Latitude, $8^{\circ} 43' 30''$ south; longitude, $74^{\circ} 32' 30''$ west of Greenwich; magnetic variation, $8^{\circ} 45' 40''$ east; thermometer, 75° ; elevation above sea-level, 508 feet; distance from the Atlantic, 2891 miles; current, 3 miles per hour; width of the Pachitea at its mouth, 400 yards.

CUÑUYACU.

Latitude, $9^{\circ} 5' 52''$ south; longitude, $74^{\circ} 48' 15''$ west of Greenwich; magnetic variation, $8^{\circ} 59' 26''$ east; elevation above sea-level, 557 feet; distance from the Atlantic, 2951 miles; current, $2\frac{1}{2}$ miles per hour; width of the river, 400 yards.

Cuñuyacu means hot water, and is descriptive of the place, for there are here several thermal springs welling up from the sand beach. At Chunta Isla, between the mouth of the Pachitea and Cuñuyacu, the Cashibo Indians frequently attack from ambush strangers who are ascending the river.

INCA ROCA.

Latitude, $9^{\circ} 9' 4''$ south; longitude, $74^{\circ} 55' 45''$ west of Greenwich; magnetic variation, $8^{\circ} 6' 26''$ east; dis-

tance from the Atlantic, 2963 miles; current, $2\frac{1}{2}$ miles per hour.

Inca Roca is a rocky beach overhung by sandstone cliffs sixty-five feet high; on the face of the cliffs are carved numerous figures, amongst them the figure of the sun and of the Llama are conspicuous, hence the place was named Inco Roca.

CONFLUENCE OF THE PALCAZU AND PICHIS RIVERS.

Latitude, $9^{\circ} 54' 9''$ south; longitude, $74^{\circ} 58' 45''$ west of Greenwich; magnetic variation, $7^{\circ} 34' 4''$ east; elevation above sea-level, 518 feet; distance from the Atlantic, 3082 miles; current, $2\frac{3}{4}$ miles per hour.

At the junction of the Palcazu and Pichis, the two rivers forming the Pachitea, there is high land suitable for a town or post.

LIST OF DISTANCES ON THE PACHITEA RIVER.

	Miles.
Mouth of the Pachitea to Cuñuyacu	60
Cuñuyacu to Inca Roca	12
Inca Roca to confluence of the Pichis and Palacazu	119
From the confluence of the Pichis and Palacazu, forming the Pachitea river, to the Atlantic . .	3082

PALACAZU RIVER.

The Palacazu is a somewhat narrow stream, with a current of $3\frac{1}{4}$ miles per hour and a depth which at low water will permit a steamer drawing seven feet of water to ascend to Puerto del Mauro.

PUERTO DEL MAIRO.

Latitude, $9^{\circ} 55' 22''$ south; longitude, $75^{\circ} 17' 45''$ west of Greenwich; thermometer, 75° ; elevation above sea-level, 795 feet; distance from the Atlantic, 3119 miles; current, $3\frac{1}{2}$ miles per hour.

Puerto del Mairo is 45 miles distant from the large city of Huanaco, which has constant communication and trade with Lima. At present the route between Huanaco and Puerto del Mairo is only a footpath through the forest, but it is probable that a good road for pack-mules could be constructed at little expense, and that a railway is not impracticable.

PICHIS RIVER.

The Pichis is a branch of the Pachitea river. The Cashibos and Campas Indians inhabiting its banks are warlike tribes and fiercely oppose all attempts to examine their country. Nothing was known of the river, above its mouth, until it was explored and surveyed, in 1873, by the Peruvian Hydrographical Commission of the Amazon, accompanied by a military escort. It was necessary for the Commission to bestow names on notable places as they proceeded to discover them, and these names were afterwards used in making the chart of the river.

MOUTH OF THE PICHIS.

Latitude, $9^{\circ} 54' 9''$ south; longitude, $74^{\circ} 58' 45''$ west of Greenwich; magnetic variation, $7^{\circ} 34' 4''$ east; elevation above sea-level, 618 feet; distance from the Atlantic, 3082 miles; current, $2\frac{1}{2}$ miles per hour.

ROCHELLE ISLA.

Latitude, $9^{\circ} 57' 11''$ south; longitude, $75^{\circ} 2'$ west of Greenwich; magnetic variation, $8^{\circ} 35' 36''$ east; elevation above the sea-level, 630 feet; distance from the Atlantic, 3100 miles; current, $2\frac{1}{2}$ miles per hour.

Up to Rochelle Isla, named after the senior member of the Peruvian Hydrographical Commission, navigation is clear and unobstructed for any steamer that can ascend the Pachitea; that is, for any steamer not drawing more than nine feet of water. Beyond this island the navigation of the river becomes much more difficult, though not altogether impracticable. The River Trinidad, so named on account of its having been discovered on Trinity Sunday, empties itself into the Pichis ten miles above Rochelle Isla; it is a fine, large river, flowing from the eastward, with deep water and a current of 3 miles per hour at its mouth.

TEMPESTAD PLAYA.

Latitude, $10^{\circ} 5' 6''$ south; longitude, $74^{\circ} 55' 45''$ west of Greenwich; magnetic variation, $7^{\circ} 46'$ east; distance from the Atlantic, 3123 miles. Tempestad Playa received its name in consequence of a violent tempest which was there encountered by the namers.

MOUTH OF THE HERRERAYACU RIVER.

Latitude, $10^{\circ} 20' 3''$ south; longitude, $74^{\circ} 54'$ west of Greenwich; magnetic variation, $7^{\circ} 59' 26''$ east; distance from the Atlantic, 3156 miles.

The Herrerayacu river was named after the major who commanded the escort of soldiers accompanying

the Hydrographical Commission; it has a current of $3\frac{1}{2}$ miles per hour, and is navigable for canoes a distance of four or five miles, up to Terminacion Playa in latitude $10^{\circ} 22' 33''$ south; longitude, $74^{\circ} 54'$ west of Greenwich. Mountain ranges are plainly in sight from Terminacion Playa, which is 3160 miles distant from the Atlantic.

PUERTO TUCKER.

Latitude, $10^{\circ} 22' 55''$ south; longitude, $74^{\circ} 49'$ west of Greenwich; magnetic variation, $9^{\circ} 7' 30''$ east; elevation above sea-level, 700 feet; distance from the Atlantic, 3167 miles; current, $3\frac{1}{2}$ miles per hour.

Puerto Tucker was named after the President of the Hydrographical Commission. It is at the head of canoe navigation, not far from the source, of the Pichis river; from it a range of lofty mountains, distant some twenty or thirty miles, bears from S. to S. W. This range must be the eastern Cordillera of Peru.

LIST OF DISTANCES ON THE PICHIS RIVER.

	Miles.
Mouth of the Pichis to the Atlantic ocean.....	3082
Mouth of the Pichis to Rochelle Isla.....	18
Rochelle Isla to mouth of Trinidad river.....	10
Mouth of Trinidad river to Tempestad Playa..	13
Tempestad Playa to mouth of the Herrerayacu.	33
Mouth of the Herrerayacu to Puerto Tucker..	11
Puerto Tucker to Atlantic ocean.....	3167

CONCLUSION.

The Upper Amazon river is destined to become much better known than it is at present; it cannot be long before commerce takes possession of such an inviting field. Ocean steamers run regularly to Mañaos, a thousand miles from the mouth of the river, and they might extend their voyage, certainly during nine months in the year, to Nauta at the mouth of the Ucayali; from Nauta smaller steamers could ascend the Amazon to Borja, the Huallaga to Yurimaguas, and the Ucayali to the confluence of the Tambo and Urubamba. A road is projected from Limon, near Borja, to Chachapoyas, where it would connect with the route to Lima. From Yurimaguas to O Mayubamba, and thence on to Lima, there is already established a much traveled route. From Esperanza, near the confluence of the Tambo and Urubamba; it is probable that flat-bottomed, stern-wheel steamers, such as are used on the Nicaragua route across Central America, could ascend the Tambo to Fort San Ramon, a place which it is to be hoped will be connected by railway with Tarma and Lima. When this latter route is opened, as it is destined to be sooner or later, it will become the great artery of communication between the Pacific and Atlantic coasts of South America.

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