

Continental Shelf



Landing a Giant Tuna in Nova Scotia.

Prepared by National Geographic Society, Washington, D. C.—WNU Service.

AS ONE stands on the seashore at the full of the tide and looks out over the swelling floods surging in from the distant horizon, his feet are on the threshold of an enormous empire, so vast in extent and population that the achievements of the haughtiest rulers of mankind are dwarfed by comparison.

Though fleets sail over its depth, they make no significant impression upon this immense realm.

The subjects of this empire swarm through the waters in myriads totaling far greater numbers than all the life of the continental world. In fact, scientific investigations indicate that the oceans were the original abode of life on the globe, and that the continents were peopled from that inexhaustible reservoir.

Geologists believe that the depressions now occupied by the oceans have been located in approximately their present positions during the entire history of the earth, and that the foundations of the land masses likewise have been situated nearly as they are at the present time.

But during the great geological periods, the ocean has repeatedly invaded their edges and even their interior basins, sometimes to an enormous extent, forming shallow epicontinental seas.

Thus, all the continents of the world are bordered by a strip of shallow sea, the continental shelf, which slopes gradually from the coast to depths varying from 100 to 1,000 fathoms at its outer edge. Beyond this limit there is usually a more rapid gradient to the main floor of the ocean—the continental slope.

This world-wide shallow strip is of major importance to the life of the seas.

North Atlantic Shelf.

This article deals especially with the mollusks and other small creatures inhabiting the continental shelf which borders the Atlantic coast of North America from Nova Scotia to New York, and includes the extensive New England fisheries.

A most remarkable stretch of shore this is. Its southern half is of comparatively even contour, but, beginning with the region of Cape Hatteras, the coast to the northward has subsided and is indented with deep bays and irregularities, finally terminating in the long curving and tapering indentation of the Gulf of Maine.

The latter is the most noteworthy feature of the coast, its wide mouth being guarded on either hand by Cape Cod and Cape Sable, and its inner reaches narrowing to a double apex in the Bay of Fundy.

All this northern half of the Atlantic seaboard is a succession of drowned valleys, and its topography and geological history indicate that it has subsided beneath the waves of the sea during relatively recent times. On the other hand, the even outline of the coast from Hatteras south to Florida shows no evidence of such sinking.

The oceanic shelf to the 100-fathom line widens rapidly to the northward, reaching its greatest extent off the Gulf of Maine, where it is approximately 400 miles wide.

The central floor of the Gulf of Maine is an ancient river valley to which the river systems, represented by those now existent, contributed their drainage, to be emptied into the prehistoric sea by a single channel and mouth still traceable on the sea floor at the edge of the continental shelf.

Throughout this extensive and comparatively shallow oceanic margin, well illuminated by the sun's rays, conditions are favorable for an enormous development of the marine plants on which sea animals feed: namely, the microscopic diatoms, one-celled algae, and the larger seaweeds.

Nursery for Food Fishes.

Here numerous streams empty their loads of silt, rich in nitrates, phosphates, and other chemicals needed for plant food. The strong tides rushing into the narrowing channel from the open sea keep the water stirred with upwelling currents plentifully supplied with oxygen.

Hordes of small crustaceans, the copepods, feed upon this plant life. At certain seasons they swarm in these waters in numbers so vast that they give the sea a reddish color for miles.

These tiny creatures are rich in oils and are greedily devoured by large schools of mackerel, herring, alewives, and shad. Bluefish, cod, hake, and haddock pursue and devour the smaller fishes, and even the huge snapper and humpback

whales do not disdain to feed upon the herring.

Thus the shallow banks off New England, especially Georges and Browns Banks, at the entrance to the Gulf of Maine, as well as the Grand Banks of Newfoundland, farther away, form a veritable nursery for the important food fishes of our coasts, and thus connect mankind by an interlocking food chain with the microscopic plant life of these shallow waters.

The evolution of the animal world, as we know it, would have been impossible had these primitive plants not come into existence. From such forms, also, all the higher land plants of the world originate.

The Intertidal Zone.

As the open seas were peopled from the oceanic shelf, so the freshwater streams and swamps received parts of the overflow. Countless species found food and a measure of safety from enemies by creeping into the area between the tides, where they acquired resistance to exposure to the open air at the intervals of low water. Here a rapid evolution took place, so that the intertidal zone became densely populated with life.

Finally, from fresh-water swamps on the one hand and from the upper parts of the marine tidal zone on the other, first plants and then animals invaded the land itself and produced the highly specialized types that now reign over it.

North of Cape Cod, the coast of New England is predominantly high and rocky. Beginning with the headlands of Nahant, Marblehead, and Cape Ann, north of Boston, the cliffs are at first isolated to local regions, with intervening stretches of sandy beaches and flats. But from Portland, in Casco Bay, northward, the coast is an almost unbroken succession of granite cliffs, sloping rock-ribbed promontories, and reentrant bays and harbors, with occasional beaches.

The tidal waters flowing from the open sea are gradually confined by the narrowing outline of the Gulf of Maine, which forces them to a progressively increasing height, and reach a climax in the Bay of Fundy. From Massachusetts Bay north to Portland, the tide rises nine feet. It continues to increase northward, until it becomes 18 feet at Eastport and 37 to 48 feet at the ends of the two tapering horns which terminate the Bay of Fundy.

Here, too, there are interpolated stretches of beaches, flat points, and swampy meadows, and these are entirely covered at high tide. Naturally the width of the tidal zone on the side of a vertical cliff is measured exactly by the vertical rise and fall of the water. For example, the cliffs that surround Bliss Island, at the entrance of Passamaquoddy bay, are exposed for 22 feet from the top of the barnacle frieze that marks the high-tide limit to the water level at low tide.

Crowded With Life.

This region between the tides is teeming with life, both plant and animal, in crowded array. On the vertical granite walls of Bliss Island, the various species are arranged in overlapping zones, with the conspicuous white band of rock barnacles.

Below this, the rockweeds hang in thick, gracefully festooned clusters down to the low-water mark.

Concealed beneath the rockweed, and succeeding the base of the barnacle zone, the rocks are covered with a dense layer of young black mussels.

Among them are closely crowded groups of the common dog whelk, feeding upon the mussels, and laying their graceful vase-shaped egg cases, tinted rose and yellow, in mosaiclike patches in the crevices.

The latter mollusks secrete a purple dye, formerly used by the Indians for coloring their deer-skin garments. They are related to the murex of the Phoenicians, from which that people derived the famous royal purple, later arrogated by the Roman emperors for their personal use.

The dog whelk has a thick shell with a characteristic spindle-shaped opening. It is extremely variable in color, size, and sculpture along the New England shore.

The common periwinkle creeps everywhere over the rockweed from the low-water mark to the highest part of the barnacle zone and even upon the bare rocks far above it. This remarkable sea snail can stand exposure to the open air longer than any other marine creature of the northern coast.

It is in a transitional state of evolution toward terrestrial life, for its gill seems to be on the point of being replaced by a lung. It has a very wide range, being found on both sides of the Atlantic. In England it is the common "winkle" sold in markets.

TWENTY YEARS AGO THEY CARRIED THE STARS AND STRIPES TO FRANCE

By ELMO SCOTT WATSON

ONE June day 20 years ago a force of khaki-clad men marched along the docks at Hoboken, N. J., and walked up the gangplank of a ship that was all ready to start on a trip across the Atlantic. The day was June 14, 1917—a singularly appropriate day for their departure. For June 14 is Flag day and these soldiers were taking the Stars and Stripes across the sea into the greatest war in the history of the world. They were the first combat troops of the American Expeditionary Forces, the vanguard of a mighty host of more than 2,000,000 men, the greatest army ever transported across an ocean.

Considering the day and the importance of the occasion it would have seemed appropri-



Gen. Pershing Disembarking in France.

ate, also, if their departure had been the occasion for a great patriotic celebration. But it wasn't. Modern wars aren't conducted like that—with the blare of bugles and the roll of drums to advertise to your enemy that you are launching an attack against him. Besides, the keynote for this departure had been sounded less than three weeks earlier and that keynote had been—silence!

On the morning of May 28 a little group of grave-faced men in civilian clothing had gathered on these docks and very quietly, in groups of twos and threes, had walked up the gangplank on to the steamship Baltic. Ship news reporters, watching the gathering of the Baltic's slim passenger list, asked no questions. Some of these news-gatherers had been down in the baggage room of the ship. There they had seen certain trunks, bags and bedding rolls stenciled so plainly that anyone who could read could see that this was the baggage of officers of the regular army bound overseas. But, at the request of the army, they said nothing and not a line appeared in the newspapers telling who these officers were.

Pershing Goes Ahead.

If they had printed a roster these are the names which would have appeared on it: Maj. Gen. John J. Pershing, commander-in-chief of the A. E. F.; Maj. Gen. James G. Harbord, first Chief of staff of the A. E. F.; Maj. Gen. John L. Hines, chief of staff of the army; Maj. Gen. Clarence C. Williams, retired, chief of ordnance of the A. E. F.; Maj. Gen. Merritt W. Ireland, surgeon general of the A. E. F.; Maj. Gen. Walter A. Bethel, retired, judge advocate general of the A. E. F.; Brig. Gen. Logan Feland, commander of the Marine Corps; Maj. Gen. Hugh A. Drum, chief of staff of the First army, A. E. F.; Brig. Gen. Samuel D. Rockenbach, chief of tank corps, A. E. F.; Col. Parker Hitt, retired; Col. Hugh H. Young, Col. William F. Repp, Lieut. Col. Raymond W. Briggs, chief of remount service, A. E. F., and Lieut. Col. Roger C. Alexander, chief of map section, A. E. F.

Within a short time after they had gone aboard, the Baltic was steaming out of New York harbor and, so far as the public knew, she was just another big ship starting out to dodge and zigzag her way through the danger zone, infested by the dreaded German U-boats. But she made the trip in safety and now on this Flag day 20 years ago, when the First division of the regular army took



Gen. Charles P. Summerall, Chief of Staff of the United States Army, Speaking at the Reunion of First Division Veterans at the First Division Monument in Washington, D. C.

ship at Hoboken, Pershing and his officers were awaiting them "over there."

Awaiting them also—and even more impatiently—were the people of France. There had been mutinies among certain French troops in the Aisne. French regiments had been cut down to half their strength. Old men and little boys were joining the reserves. The casualty lists were mounting higher every day. There was not a home in all France which had not felt the cruel hand of war and her war weary people were discontented, discouraged, almost despairing. Unless "les Americains" arrived quickly it would be too late.

Out of the Fog.

And then one June morning their dream of help from America came true. That morning the harbor of St. Nazaire was shrouded in mist. Its citizens knew that out there somewhere the blue-gray transports and their cruiser convoys were approaching the port. Suddenly, about 7 o'clock, a motor tender came put-putting through the fog. In its prow stood an American bluejacket. He shouted something to a French sentry who was pacing the dock.

Astonished at this sudden appearance and embarrassed at his inability to understand what was shouted at him, the poilu stopped

eight and the Sixteenth Infantry regiments landed. Field Hospital No. 13 and Ambulance Company No. 13 came ashore June 28. But it was two days later, due to inadequate landing facilities, before the Eighteenth Infantry regiment and the Second Field Signal battalion were able to leave the ships. Twenty days had elapsed since they had left Hoboken.

Considering the historic importance of this occasion, it would be most gratifying to the patriotic sentiments inspired by Flag day if there could be recorded at this point the great enthusiasm with which this vanguard of Uncle Sam's millions were received at St. Nazaire and the admiration which they excited among the French who welcomed them. But as regard historical truth prevents painting any such word picture as that. In fact, just the contrary was true—and for this statement we have the testimony of an American eye-witness to the landing. He was Wilbur Forrest, war correspondent for the New York Herald Tribune, who tells how French officers of the general staff came to St. Nazaire to see the arrival of this "crack First division of the highly-trained American army. . . a historical event for both France and America." He continues:

"There is probably not today an



"THE YANKS ARE COMING!"—American Troops Arrive in France.

and saluted. Then he raised his shoulders in an eloquent gesture as much as to say "I can't understand a word you're saying, but it's all right—I'm glad to see you anyway." Whereupon the blue-jacket grinned broadly at him and the little craft on which he was standing turned her nose back into the fog.

As soon as the sailor reported back to his ship that the docks were clear, tugs began to ease the transports in toward the docks where French soldiers warned back a group of idle spectators who soon gathered as the news of the coming of the Americans spread. Soon a big ship loomed out of the fog, broadside to, and was slowly warped in. Landing stages came down with a bang and in another moment soldiers of Company K of the Twenty-eighth infantry were streaming down them.

Within an hour the sleepy old town of St. Nazaire was seeing more and a stranger activity than it had ever known before. Its streets were filled with men in the khaki of the American army and the blue of the navy, glad to be stretching their legs on land after more than two weeks aboard ship. So they proceeded to "take" the town. They flirited with every French girl who came along; they squatted in the street to stage impromptu crap games while groups of puzzled Frenchmen gathered around to watch them at this strange sport; they swarmed into shops and cafes—especially the latter. Altogether, they gave St. Nazaire such a stirring up as it had not known for centuries.

All Quiet in St. Nazaire.

Later in the day a semblance of order was restored and the soldiers were marched to a tented military town on the outskirts of the city. The next day the remainder of the Twenty-

the khaki-clad columns came on, the enthusiasm of the crowds rose to a high pitch. At last, they were to see for themselves these fighting men from across the sea who would turn the tide of war in their favor. But again the realization was something less than the anticipation. For, to quote Mr. Forrest again:

"It must be confessed that those of us who watched this uniformed soldiery land at St. Nazaire and were watching them on the Paris boulevards were unable to compare them at all favorably with the spick and span and rather grim troops of England and France. Many of us had seen the latter both in action and on parade. Something was lacking with our own compatriots. 'Hundreds of French officers mingling in the crowds and who had perhaps entertained the same enthusiasm the day before were getting a psychological shock. The writer, in civilian clothing, was able to hear sad and frank comment passed.

"Is it that this is the American regular army?" one queried. 'Mon Dieu!'

"Surely these men are not soldiers," remarked another. "If this is what we are to expect from America the war is lost," said a third.

"They were, perhaps, right about it then. But they also lived to change their minds."

"Fighting First" Makes Good.

They changed their minds a year later when they heard how the First division captured Cantigny on May 18, 1918 and held it against all counter-attacks by the Germans and when they heard of the part played by the First in Marshal Foch's great drive of July 1918, in the Chateau Thierry-Rheims-Soissons triangle to cut off the Crown Prince's army. In the wheat fields beyond the Forest of Villa Cotterets two of its regiments suffered appalling losses, leaving as high as 75 and 85 per cent of their strength on the ground either dead or wounded. But they gained their objectives and had it not been for the failure of French, Scottish and Italian divisions on the other side—fighting across from Rheims to close "the sack"—the Crown prince's army would have been destroyed.

For the "Fighting First" earned the unstinted praise not only of American and Allied generals but even the enemy paid it high tribute. In fact, throughout its career in France this division lived up to its designation as "First." It was not only the



Maj. Gen. Robert Lee Bullard, Who Took Command of the "Fighting First" in December, 1917.

first to reach France, but it was the first to go into the trenches, the first to suffer battle losses (its total casualty list was 22,668), the first to capture prisoners, and the first to enter Germany after the Armistice was signed. Only once was the First division last—in returning for demobilization to the United States from which it had sailed on Flag day 20 years ago.

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UNCOMMON AMERICANS

By Elmo Scott Watson Western Newspaper Union

Earliest Rebel

IN FRONT of the statehouse in Boston stands the statue of a woman, with a Bible in her hand and a child snuggled against her. The inscription on the monument tells you that this woman was a "Courageous Exponent of Civil Liberty and Religious Tolerance." But 300 years ago Massachusetts wasn't calling her by any such complimentary names. In the year 1637 she was "that proud dame, that Athaliah," a "notorious Imposter," a "daynagerous Instrument of the Devell raised up by Satan" and a "Breeder of Heresies." For she was Anne Hutchinson, the earliest rebel in this country.

She became a leader of a group of people who fell under the displeasure of the stern Puritans of Massachusetts Bay colony. Because these people held meetings in her house to discuss and criticize the sermons of the Puritan ministers, they finally placed her on trial for heresy, a trial that has been compared to that of Joan of Arc at Rouen.

Under their questioning, she proved herself more than a match for her prosecutors. But just at the moment when it seemed that she had defeated her accusers, she burst forth into a long speech describing God's revelations to her. Thus she convicted herself and her penalty was banishment from the colony.

But Anne Hutchinson was more than the first defender of religious freedom in America. She was our earliest feminist. The meetings held in her house, although primarily for religious discussion, were the forerunners of thousands of meetings since her day, wherever women gather together to improve themselves or the rest of the world. So her house became the "birthplace of the women's clubs of America"

After her banishment from Massachusetts Bay colony she went to that haven of religious freedom, the colony of Rhode Island, founded by Roger Williams. There she lived until 1642 when, left a widow, she took her brood of children (she had borne 14) to the Dutch colony of New York where later she and all of her children were killed. But she had not lived in vain for "civil liberty and religious toleration, the principles for which she suffered exile and death are written into the Constitution of the United States."

The Nation's Jester

HE WAS baptized as Charles Farrar Browne but the whole nation once loved him and laughed with him under the name of Artemus Ward. Born in Maine in 1834, Browne served an apprenticeship in a print shop and then became a journeyman printer. Finally he wandered to Cleveland, Ohio, where he became a local reporter for the Cleveland Plain Dealer and invented the character of "Artemus Ward," supposed to be a traveling showman, writing to the paper to give information and to ask for it. Readers of that paper roared over "Artemus Ward's" bad spelling and humorous descriptions of his adventures and it was not long until Browne got a call from New York to become editor of Vanity Fair, a comic paper.

But this editorship did not last long for the wandering foot of the former journeyman printer soon began to assert itself. He published "Artemus Ward, His Book" which had a phenomenal sale. Then he took to the lecture platform and "Artemus Ward," until now a fictitious character, became a living reality to thousands of Americans.

One of Ward's devoted readers was President Lincoln and his book played a role in an historic scene at the White House during the Civil war. In September, 1862, Lincoln called a meeting of his cabinet members whom he astonished by reading excerpts from Ward's book. When they failed to join in his laughter, Lincoln threw down the book and said: "Gentlemen, why don't you laugh? With the fearful strain that is upon me night and day, if I didn't laugh, I should die and you need the medicine as much as I do."

He then told them the real purpose of the meeting which was to read to them a paper he had prepared and which he proposed to issue when the time was ripe. That paper was the Emancipation Proclamation. When he had finished reading it, Secretary Stanton exclaimed: "Mr. President, if reading chapters of Artemus Ward is a prelude to such a deed as this, the book should be filed among the archives of the nation, and the author canonized."

The author was never canonized but before he died in 1887, Artemus Ward had not only become America's favorite jester but he had won fame as a humorist in England such as no other American before him had ever known.