

## WORLD'S GREATEST OCEAN CURRENT

Hour's Flow at Straits of  
Florida is Ninety Billion  
Tons.

Special interest in the effects of the Gulf Stream on the climate of the east coast of North America having been aroused by stories connecting the mild weather of the past season with the excellent temperature of this great ocean current noted of late by seamen, the National Geographic Society has issued the following bulletin, based on a report from Rear Admiral John E. Pillsbury, U. S. N.:

"The Gulf Stream is probably the grandest and most mighty of any terrestrial phenomena. Its waters are characterized by a deep indigo blue color of great clearness and high temperature. It can be penetrated by the eye to considerable depth, and generally its meeting with the less saline polar waters can be at once distinguished.

"It is difficult for the mind to grasp the immensity of this great ocean river. The Straits of Florida at its narrowest point is about forty miles wide. A calculation of the average volume of water passing in one hour gives the enormous sum of ninety billion tons. If this one single hour's flow of water could be evaporated the remaining salts would require many times more than all the ships in the world to carry it.

"The theories as to the cause of ocean currents have been many.

"Franklin's theory, which has many advocates at the present day, was that the winds produce the current by the air moving over the surface of the water, and he illustrated this theory by the fol-

lowing: 'It is known that a large piece of water, ten miles broad and generally only three feet deep, has by a strong wind had its water driven to one side, and sustained so as to become six feet deep, while the windward side was laid dry.' As will be seen later, this is a well-taken example of the force of the wind in causing the Gulf Stream, but it does not quite show the whole of the truth.

"In the tropical regions there is a steady movement of the air from east to west, known as the trade winds. South of a certain line situated near the equator these winds flow from a south-westerly direction, while north of the equator they come from a more northeasterly direction, but they do not vary much, and then only for brief periods.

"Winds blowing over the surface of the water induce a current in the latter due to friction. At first it is only the merest skim that moves, but gradually the motion is communicated from layer to layer until at last, if the wind is long continued, as in the trade wind region, the movement extends to lower depths, 300 or 400 feet, or perhaps more.

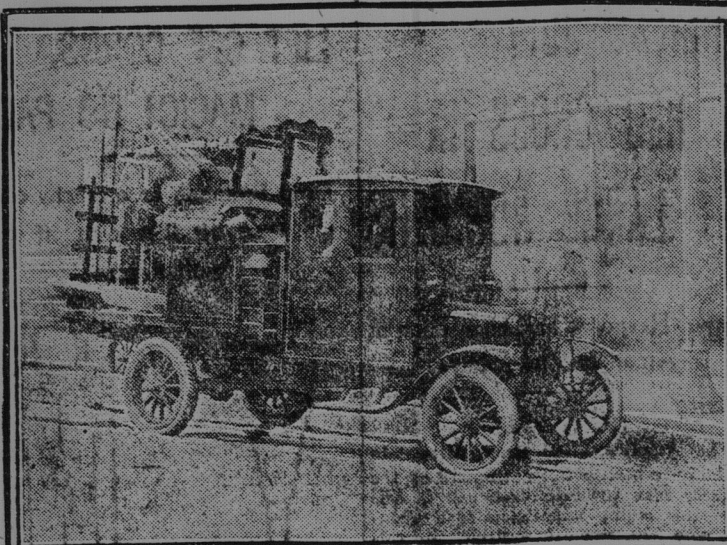
"These trade wind currents meet finally the partial barrier of the islands forming the eastern part of the Caribbean, and a portion of the flow escapes through the passages between them. From here it continues its course across that sea until it reaches the obstruction of the Honduras and Yucatan coasts, from which it escapes by the easiest route, which is into the Gulf of Mexico. "It has been found, however, that the water entering the Caribbean by this means is not more than one-half of the amount which flows through the Straits of Florida from the Gulf of Mexico, and the other half is supplied from a source which does not come under the head of a measurable current. The other source is the wave caused by the wind. Every ripple carries a certain amount of water in the direction toward which it is flowing, irrespective of the current caused by its friction, and when the waves become large, tons of water are hurled from the crest into the trough every time the wave breaks.

"When one is on board a vessel, floating upon its waters, one is not as much impressed at the power and grandeur of this wonder of nature as he is when he stands before a towering mountain, an immense iceberg, or a fall of water such as Niagara, but when one remembers that the mighty torrent, speeding on hour by hour and day by day, in a volume equal to all the largest rivers in the world combined, carrying its beneficent heat to temper the climate of continents, one begins to realize that of all the forces of the physical world none can equal this one river of the ocean.

"Ponce de Leon, while on his famous search for the Fountain of Youth, made the discovery of this great stream. After his failure to find, on the coast of upper Florida, the means of cheating death, he turned to the southward and skirted the shore for hundreds of miles, thus stemming the current.

"The name of 'Gulf Stream' was first suggested by Benjamin Franklin because it issues from the Gulf of Mexico. While it is only a part of the grand scheme of ocean circulation, and the Gulf of Mexico is in reality only a stopping place, as it were, for its waters, this name is generally applied to the current now as it was given by Franklin—that is, the current coming from the Gulf of Mexico and spreading abroad over the North Atlantic.

In a large area like the Caribbean, having a comparatively constant wind blowing over its whole surface, this ac-



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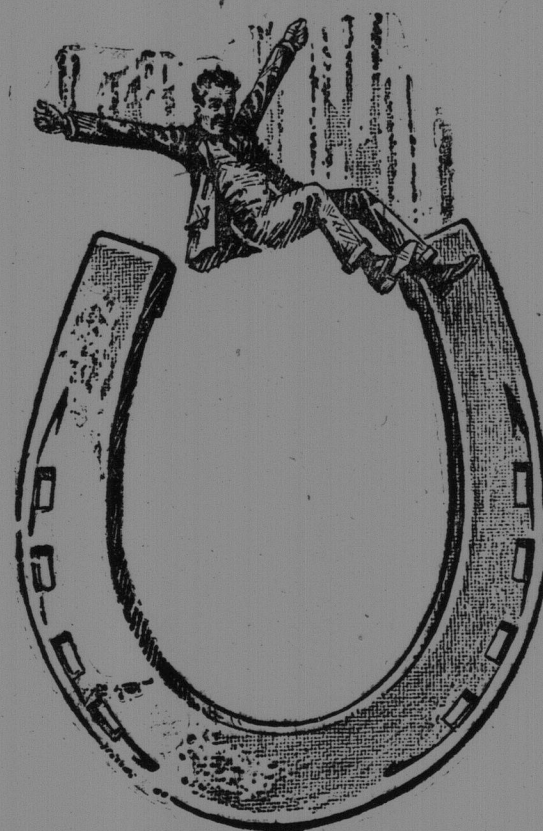
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respect to quantity, quality, and accessibility for mining purposes, Canada possesses coal deposits which compare favorably with those of the greatest mining countries of the world. He estimated that we have reserves of nearly 1,000,000,000 tons of semi-anthracite, 15,000,000,000 tons of bituminous, and 10,000,000,000 tons of sub-bituminous coal and lignite, and urged that these should be developed in order to provide against the annually recurring shortage of fuel. Hitherto our coal in the extreme East and extreme West has not been able to compete in central Canada with coal from the United States, but should the present strike of American miners continue there might be no competition, and yet we are not prepared to supply our own people with fuel from our own reserves. It would be necessary not only to develop our reserves, but to make arrangements for transportation and for storage at strategic points. Transportation could be provided for easily, because the government owns or will own half of the railway mileage of the country, and storage facilities are necessary for economical distribution.

The present system of distribution of coal, and especially of anthracite, from the United States works to the advantage of the well-to-do consumer, who can afford to pay for all of his year's fuel at one time and is able to lay in his supply during the summer when the price is comparatively low. But it is all to the disadvantage of the workingmen, clerks, and others of moderate incomes, who are obliged to buy in small lots at increasing prices during the winter, and who may find themselves this winter unable to buy fuel at any price. There is already a great deal of unrest in the country, and it will not be lessened if there is any trouble over fuel. But even if, as Sir George Foster thinks, we may be able to obtain our usual supply from the United States this year it is necessary to look to the future. The foreign demands upon the supply in the United States are likely to increase heavily, and our annual shortage is likely to become greater. The problem of utilizing our own vast reserves is a big one, but it ought to receive the immediate attention of the government.



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tion is practically a simultaneous movement of its surface waters to the westward and a continual escape of the water heaped up at the obstruction offered by the land into the Gulf of Mexico, through the Straits of Florida, and into the Atlantic.

"The Gulf Stream would be little felt on the coast of Europe did it not receive a great addition to its volume of heat when en route. This is by means of a gentle flow from the northeast trade wind current that passes outside the Caribbean Islands and the Bahamas. The surface temperature of this outside current is about the same in its passage along the West Indies Islands as the Gulf Stream in the Straits of Florida, but it is less violent in its movements, and there is less intermingling of its upper and lower waters, so that it arrives off Cape Hatteras, with a much higher temperature than that of the more turbulent Gulf Stream."

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Use Our Own Coal.

(Toronto Globe.)

The statement of Sir George Foster, acting premier, that the United States will supply Canada with coal as in other years, and that there will be no discrimination against us while there is any coal available there, is satisfactory as far as it goes, and is a testimony to the friendliness of that country. But if the strike of the bituminous coal miners continues for even a short period the U. S. may not have enough coal for its own purposes. Moreover arrangements have been made already to supply coal to European countries which have little or none of their own available because of the war, while Canada has enormous deposits which have never been worked. The whole situation of dependence upon the United States for so large a portion of our fuel is not complimentary to Canada as a nation.

In an address before the Canadian Gas Association Mr. Arthur V. White, Consulting Engineer of the Commission of Conservation, pointed out that, in



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