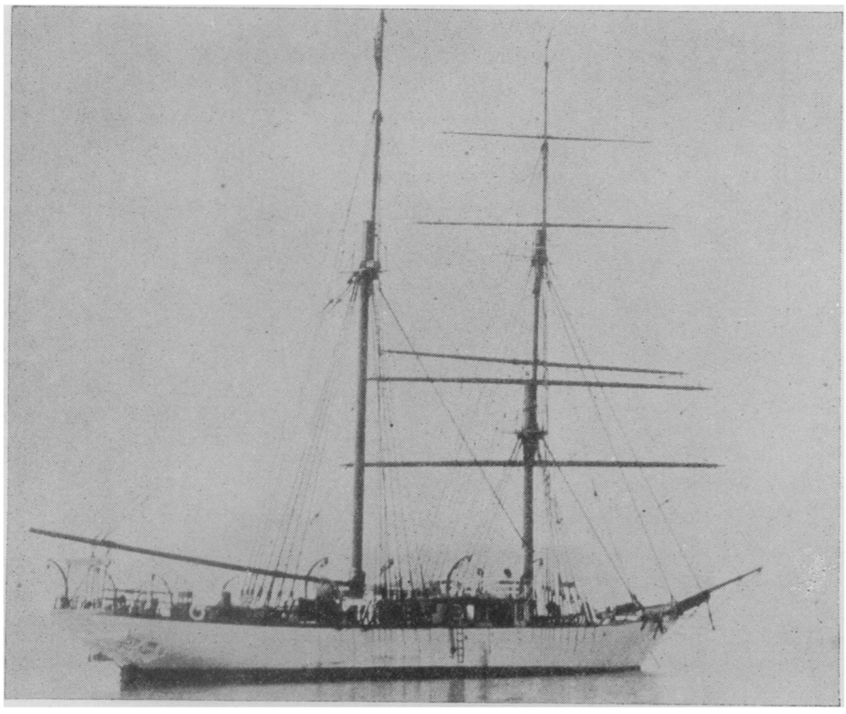
Laboratory Yacht Sails on Science Quest

Oceanography



THE "CARNEGIE"—non-magnetic yacht of the Carnegie Institution's Department of Terrestrial Magnetism, now crossing the Atlantic Ocean on the first lap of a three-year cruise to all the seven seas

By James P. Ault

Last Tuesday morning, May 1. the Carnegie Institution's non-magnetic ship "Carnegie" sailed down the Potomac River from Washington for a three-year cruise through all of the seven seas. In the following article, prepared especially for Science Service just before its departure, Captain James P. Ault, the ship's commander, tells what they expect to accomplish before they return.

How would you like to spend the next three years making a trip around the world on a sailing ship? This is to be the experience of eight men selected by the Carnegie Institution of Washington, and they are to sail about May 1 on the non-magnetic yacht Carnegie. This vessel has already made six voyages, covering about 290,000 miles, in making a magnetic and electrical survey of the oceans. She was especially constructed and equipped for making these investigations, brass and copper being used instead of iron and steel in her construction, since the latter metals cause uncertain errors in the delicate instruments used in making the observations.

After an interval of over six years, the Carnegie is once more to wander down the latitudes in quest of general scientific information. We shall sail first for England and Germany, and then to Iceland. As the sun goes southward next fall, so we shall sail south for the West Indies and Panama, spending next winter in the south Pacific, visiting the Society Islands, Easter Island and Peru and coming north again to Japan and California next summer. And so on around the world, following the sun in order to avoid storms and delays due to wintry weather and to improve the conditions for making our investigations. Among the places to be visited after leaving California are Honolulu, Samoa, New Zealand, Cape Horn, South Georgia, South Africa, Ceylon, India, Western Australia; across the South Pacific again and around the Horn to Buenos Aires, Argentina, St. Helena, Azores, Madeira, and back to Washington in September, 1931.

But you must not be too envious of us, because this is not to be a pleasure jaunt, but is an expedition to be devoted entirely to scientific research work at sea.

The first reason for our going is to find out what changes have taken place in the magnetic conditions over the various ocean areas since the previous cruises of the Carnegie. This information is of interest to the student of the earth's magnetism in his study of the many unsolved problems in this science, and it will supply the values needed to keep the navigation charts up to date. These charts are used by the air pilot as well as by the sea pilot.

Among the unsolved problems are, what is the origin of the earth's magnetic field, what are the causes of the daily and seasonal changes in this field, the close relation between magnetic storms and the occurrence of polar lights and changes in the condition of the sun, and why we have eleven-year periods in magnetic changes and disturbances coincident with the well-known eleven-year periods in sunspot activity.

The second important investigation to be made will be to continue the study of the earth's electric field. The importance of these investigations has increased in recent years because of the close relation between variations in atmospheric electricity and variations in magnetic conditions, also recent theories regarding the nature of electricity and the constitution of matter and the rapid advances made in radio transmission have given added stimulus to these studies.

Recent investigations of variations in radio transmission with changing magnetic and electric conditions have led us to install a very complete radio equipment on the Carnegie for the first time. Short wave broadcasts will be received during the entire cruise and a definite program of transmission and reception is being arranged with the Naval Research Laboratory here in Washington. Thus we shall carry out experiments and investigations on the important problem of skip-distances and of variations in signal-intensity. Time signals will be received daily, thus adding to the accuracy of our time-keeping and consequently to the reliability of our geographical positions at sea.

The third general scientific problem to be investigated is known as oceanography.

In spite of the considerable amount of information which has been accumulated by the various expeditions since the time of the Challenger voyage in 1872 to 1876, we have only a general idea of the contours of the ocean bed, and only a meager knowledge of the bottom sedimentary deposits which are of peculiar interest in the study of the age and formation of the earth and (*Turn to next page*)

"Carnegie"—*Continued*

the changes which time has witnessed. The mapping of the configuration of these great basins covering over two-thirds of the earth's surface should be as important as the mapping of the land masses which occupy less than one-third.

So we have installed one of the recently perfected sonic depth-finders, loaned by the U. S. Navy Department, and we can determine in a few moments the depth of the ocean as the vessel is proceeding on her course. The method consists of measuring very accurately the time it requires for sound sent out from the ship to travel to the bottom of the ocean and the echo to return to the ship again. Sound travels in water at the rate of about 4,800 feet, a little less than one mile, per second, so that if the time between signal and the echo is two seconds, the depth is about 4800 feet.

Perhaps the most fascinating study connected with the sea is the multitudinous life found in all oceanic waters from the surface down to the deepest abyss yet explored. Physical and chemical changes in the ocean-waters have profound influence upon marine life, its variety, its amount and its distribution. A knowledge of these influences will contribute in many ways not only to the study of evolutionary processes taking place in the sea but also to the practical problem of economic use of the ocean's food supply.

Science News-Letter, May 5, 1928

Animal Breeding

Agriculture

SYDNEY HILLYARD, in the *Scientific Monthly:*

In the breeding of animals the work of one man is not enough to furnish more than a mere foundation upon which his sons, grandsons and great-grandsons must build. The work of selection—the picking out of the strongest or fastest horse, the heaviest wooled sheep, the cow with the most or the richest milk—must continue for generations unbroken, or we can quickly have a retrogression, a devolution back to the wild stock—a much easier thing to get than an evolution toward the perfect specimen that has become so necessary to modern life.

Science News-Letter, May 5, 1928

A few centuries ago men of science believed that diamonds had sex and reproduced as living creatures do.