The Wonderful Sea Holds Many Hidden Mysteries

Of the total surface area of the globe, the sea constitutes about 71 per cent, or about 140,000,000 square miles. Some interesting observations can be made about this tremendous body of water

If the globe were a smooth uniform sphere, this ocean body could cover it to a depth of about 8,000 feet. As it is the sea has a mean depth of something like two miles.

The enormity of the sea is difficult to grasp. Just to mention that it covers this vast proportion of the globe is not enough. It's enormity is realized only when its total volume is considered. This has variously been calculated at between 300 and 330 million cubic miles.

The sea is nothing more than a vast nutrient mixture capable of supporting myriad forms of plant and animal life, both as to sustinence and physical body support.

OCEAN DEPTH

It ranges in depth from 35,600 feet in the Pacific and 28,200 feet in the Atlantic up to the coastal continental shelves of the world which constitute about eight per cent of the acean

The temperature range of this sea of life is even more narrow than the earth itself. When the land range extends from 130 degrees F to 90 degrees below zero, the sea ranges only from 95 F to 28 F, a maximum temperature difference of 67 degrees.

Three quarters of the ocean however has a seasonal difference of less than five degrees. The ocean levels below 800 feet have litle or no variation.

HUGE FLY-WHEEL

The sea is a huge temperature fly-wheel capable of storing vast amounts of solar heat energy to be later released.

It takes 3,000 times as much heat to raise a given volume of water one degree of temperature as it does to raise an equal volume of air the same amount. It is difficult to conceive how much energy is involved.

Scientists say that the sun shining on Bikini Atoll in the South Pacific, provides more energy in two days than was released by two atomic bombs.

Every year about 80,000 cubic miles of water are evaporated from the ocean surface. About 56,000 cubic miles of this is returned in rainfall at sea while the rest falls on the land. At least 9,000 cubic miles yearly rush to the sea carrying with it three billion tons of salts and nutrients.

Some idea of the seas immensity can be gained when it is noted that one cubic mile of sea would contain about 4½ billion tons of water.

It would take a lake 26 miles long, ten miles wide and twenty feet deep to contain it. Or in other words a body of water as long as from here to Morell and as wide as from here to Stanhope Beach.

MAIN ELEMENTS

In millions of tons this body of sea water would contain sodium chloride (128.2), magnesium chloride (17.9), magnesium sulphate (7.8), calcium sulphate (5.9) potassium sulphate (4.0), calcium carbonate (.5).

These are the main elements found in sea water but in addition to these it contains compounds of bromine, carbon, silicon, boron, phosphorus, barium, iodine, arsenic, iron, manganese, copper, zinc, lead, even some gold and radium. Of the 96 elements, 49 are present in sea water.

How is this richness made available to life in various parts of the sea? How is it kept in balance? The answer of course is, the sea currents, the ocean rivers that course through the surface and the deep.

THE ROLE OF CURRENTS

Currents are the product of different factors and of the combination of these factors. There are currents motivated by rotation, wind, and the density of waters.

Perhaps the most familiarly known are the surface currents moved by the rotation of the wind. The closest to this Province is the Gulf Stream.

It originates in the Gulf of Mexico where the waters of the Westward Equatorial current build up and become warm in its shallow basin.

South of the West Indian Islands, the Caribbean current passes northward into the Mexican basin at a point between Yucatan and Cuba. It is here that the warm Florida current veers seaward and goes around the tip of Florida, thence northward between Miami and the Bahamas.

SPEED OF CURRENT

At this point the current is travelling four to five miles per hour, moving 1,500 tons of water a minute compared to the Mississippi's 1,200 tons past any given point.

Further along this path, off the Virginia Capes it is joined by the North Equatorial current adding half as much volume again. This streams northward and eastward until it meets the cold Arctic current off Canada's east coast.

Here is seen Nature's way of mixing and making available the seas vast treasure of minerals. Just as there is turbulence when hot and cold masses of air come together, so there is the same phenomena when hot and cold masses of water meet.

LIFE BLOSSOMS

On the one side are the green cold waters of the north laden with microscope life and on the other the deep blue warm waters of the south. Where they meet, life will blossom; there will be updwelling from the deep and food for the myriads of plant and animal life.

Perhaps a more fascinating type of current is the density current about which much less is known. One good example of this type of current is the Mediterranean current.

The Mediterranean basin is shallow in comparison to the ocean depths and naturally a terrific evaporation occurs within this basin. Something like 70,000 tons of water a second, over six billion tons daily are evaporated in the Mediterranean area. This leaves the more dense water to sink to the bottom and it also means that more water is drawn in to replace it.

INTERESTING PHENOMENA

These factors combine to produce the most interesting phenomena at the Mediterranean sill between Tangier and Gibraltra. Here two rivers meet, each carrying eight times the volume of the Mississippi.

Through this narrow channel 900 feet deep, two million tons of water per second enter the inland sea at surface level and about 193 million tons per second flows out at the bottom over the sill. This is dense saline water which continues to flow outwards and downwards to a depth of about 3,000 feet in the Atlantic basin.

These density currents are perhaps the most fascinating study of water movements in the ocean. A particle of water may at one time be on the surface, at another time considerably below the surface and at still another time in the abysmal depths.

MIXING PROCESS

Still another powerful factor in this vast mixing process of the sea are the tides. One of the best known examples to Maritimers is in the Bay of Fundy and its well known tidal bore.

The sweeping in and out of the waters twice daily moves about 3,680 billion cu. ft. of water. This 6,000 sq. mile basin has its complete water supply replaced every 75 days. Under favorable conditions it is replaced every fifty days.

Excluding insects there are more forms of life in the sea than in the rest of the world. About 475,000 species have been named. Eighty per cent of described animal forms exist in the sea. For instance there are 40,000 species of mollusk which includes clams, oysters, etc. There are 23,000 species of crustaceans such as lobster, shrimp and myriad similar forms of life. There are 500 species of flat fish and 60 species of herring and as yet the depths have been relatively unexplored.

PLANT LIFE

Plant life does not go beyond a depth of 250 feet. Plant life however is the main link of the food chain supporting life. In the realm of plant life the sea can boast some huge species.

Some giant kelp grows to a length of 200 feet. Sea plants differ from land plants in that land plants draw sustenance from the earth through roots. The sea plant has no such counterpart. Its root is merely an anchor to hold it in position.

Its sustenance is fixed by photosynthesis in the parts of the plant which extends upwards to the surface of the sea. The largest section of plant life however is not comprised of this form. It is made up of microscopic planktonic life which is the main source of the sea's source of food.

Rustico Remembers Much Leaner Days In The Past

The people of North Rustico, a village with a population of approximately nine hundred, situated on the North Shore of Prince Edward Island, depend for the most part, either directly or indirectly on the fishing industry for their livelihood.

Two organizations, The North Rustico Fishermen's Co-operative Assn. Ltd. and the North Rustico Canning Co. Ltd. are well equipped to handle the fish landings, and approximately one hundred persons are employed by these firms during the fishing season. Besides the facilities presently available, the Fishermen's Co-op. has practically finished building a fifty-thousand dollar cold storage plant which will serve the needs of the fishermen in this area.

The General Merchants of this community are the people's Co-operative Assn. Ltd. and Alyre M. Gallant. This setup leaves the people at liberty to market their product and buy their commodities co-operatively or sell and buy through private business firms as they so desire. The Stella Maris Credit Union serves a good part of the financial needs of the public.

ALL WORK TOGETHER

Even though this group of organizations operates on a competitive basis, and the people have their own reasons for supporting the one of their own choosing, everyone works together in things pertaining to churches, schools and any other village activities.

One of the most noteworthy accomplishments which has been achieved through this community spirit is the Stella Maris High School. This school has ten classrooms, a lab. a domestic science room and all the necessary equipment to make it second to none in the rural districts of Prince Edward Island and possibly the Maritime Provinces.

LIVING STANDARDS

Although the standards of living in the Village of North Rustico compare favourably with other parts of Prince Edward Island, this wasn't always the case. As recently as twenty some years ago, living conditions in this community were at a very low level.

Not many owned their homes and the gear they fished with was practically all the property of the buyers. The people had no control whatsoever over the price they paid for goods or received for their fish. The general practice at that time was living on credit through the winter on the strength of what they might make the following season.

Although there is no reason to believe that they did not receive a fair deal, the fact still remained that there was nothing to give the fishermen any initiative to better themselves.

Their main concern was to make sure that they would have someone to buy their catch and supply them with goods. As a result they did not dare to even express an opinion, lest they might cause the conditions to deteriorate further and find themselves unable to obtain advances the following winter.

ADULT EDUCATION

The changing point came in 1936 with the arrival of the late Rev. J.D. McNeill, on his appointment as Pastor of Stella Maris Parish. The late Father McNeill, a man with tremendous initiative, a great believer in adult education and the social welfare of the people, started his work to better conditions shortly after his arrival.

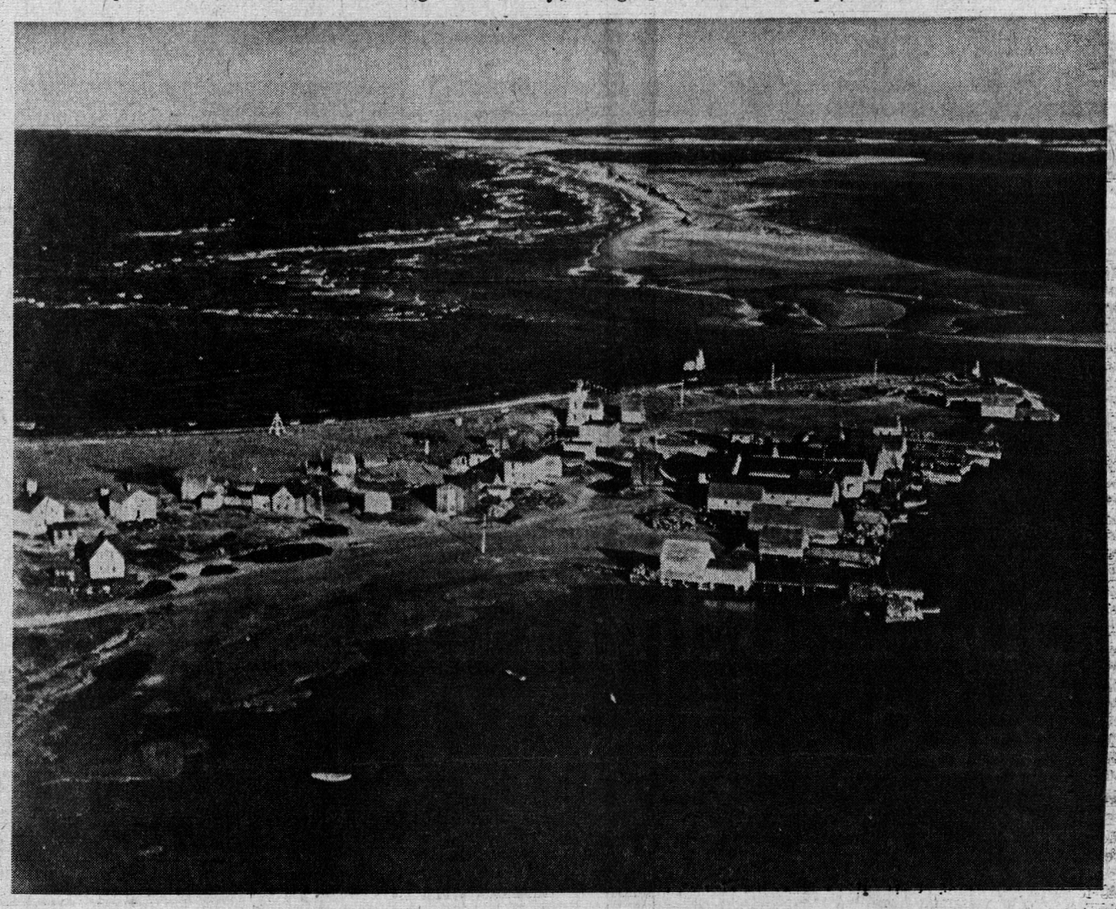
Many changes took place during his eleven year stay in this community; a shabby two room school had been replaced by a modern six room school—this school was destroyed in 1954 and has been replaced by the present high school—a small chapel had been replaced by a new church costing in the vicinity of $60,000, a parish hall, with a seating capacity of 400 had been built as well as a parochial house and a convent.

The Stella Maris Credit Union, the People's Co-op. Assn., Ltd. and the North Rustico Fishermen's Co-op Assn. Ltd. had been organized and were on their way to success. The fishermen owned their own gears and boats and had educated themselves to the point where they could run their own businesses.

BETTER WAYS

During the last ten years conditions have continued to improve. Better ways of processing and marketing have been adopted, and this along with the tourist trade, which is derived by this village being situated so near the National Park, has been instrumental in getting better returns to the fishermen.

The standards of living are far from being all that can be desired in a fishing village. However, the fishermen of North Rustico, as well as those of other communities, have proven that given the leadership and the tools of their trade, they can make the fishing industry very profitable to themselves in particular and the Province as a whole.



AERIAL VIEW OF NORTH RUSTICO HARBOUR

CHICKEN HADDIE HAS STRONG MARKET

PREPARING SALT COD

List Four Main Methods Of Fish Preservation

Fisheries products are classified into four major form: fresh frozen, cured and canned. These represent the various methods that have been used to arrest or decay the deterioration and spoilage of fish and shell fish from the time they are taken from the water.

Drying was probably the earliest method used to preserve meat and fish. Through the action ot warm dry air where the climate is suitable this process is carried out. A further development is the application of salt to draw moisture from the fish cells or a combination of salting and drying where periods of damp weather might prevent the process of drying alone.

When the raw product was fatty or oily, salting and drying could not prevent the appearance of undesirable odour and colour but smoking was found to be effective and the exclusion of the oily fish from the air was also found to retard rancidity.

The combination of salting and smoking and tight coppering to provide barrles that would retain brine and exclude air formed the basis of the extensive use of herring as food during the middle ages.

When salt pickling was extended to include sugar, vinegar and spices the range of cured products was multiplied many times.

CANNING

Canning, the sterilization of food by heat with hermetically sealing to prevent bacterial reinfection from the air was improved and brought into extensive use by the end of the 19th century and canned and cured products were widely distributed in world trade.

Steam power for sea and rail transportation made it possible to provide inland consumers with nearly fresh fish, particularly when ice was used to slow down the process of deterioration.

Where distances were great, however, as in North America, the development of commerical freezing and the establishment of distribution and holding facilities for frozen fish were necessary to the growth of a mass market.

For a long time frozen fish products were often poor in quality because of technical ignorance of fresh raw material, low temperatures, freezing time and the exclusion of air.

Later, quick freezing and other improvements yielded frozen fish increasingly like fresh fish in taste, odour and appearance.

WIDE RANGE

It is obvious that a wide range of fisheries products is possible with more than 150 species and four methods of preparation with their numerous subforms or variants.

Fisheries statistics of Canada 1953 issued by the Dominion Bureau of Statistics lists 400 products with many small items included in "all other" groupings.

These products are turned out for the most part close to the place where fish are landed and there is in the industry a high degree of integration of catching, processing and marketing activities.

Trawler Catches A-Sub In Net

The dramatic story of what happened when the world's largest submarine ran into the net of a fishing trawler came to light recently.

The United States Navy officially confirmed that for 10 action-packed minutes the 67-foot trawler Jennie had the Navy's pride and joy, the atom-powered submarine Nautilus, in its 80-foot-wide net.

About noon April 22 the Jennie was moving at a leisurely three knots off shore.

The fluke were running and the five man crew, including Captain Tonnes Anderson, was happy.

What they didn't know then was that mixed in with the little fish was a huge "fish"—the Natuilus, on her way to home base at Groton, Conn., about 150 feet below water.

Suddenly the boat jarred to a spine-snapping halt and started cutting the water in the opposite direction about 20 miles an hour.

"We must have hooked a sea serpent," one crew member gasped.

"Sea serpent, hell!" Anderson shouted. "There ain't no fish that big. We must have tangled with a submarine".

The stern where the net was attached, kept sinking lower as the ship back-pedalled. The radio was out so there was no hope of aid there.

As crew member tried to think of something to do, the net cable finally snapped and the submarine headed into Groton, its captain unaware of the sea drama which had taken place above him.

When the giant $55,000,000 sub came up for air, the flabbergasted crew found the torn fishing net draped around the superstructure. It lost only a broken running light.

Anderson submitted his bill to the Fourth Naval District at Philadelphia. He wanted $1,300 for loss of net, cable and fishing gear.

Propellor

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vessels. This propeller has about 10 per cent of the power of the main engine.

It has been shown from full-scale trials that, when both propellers are working in a tandem, there is no loss of efficiency, as when the total power is delivered by the main propeller.

EASY HANDLING

Such an installation has two advantages. The manoeuverability, especially in harbors, is excellent, and even large commercial vessels can be berthed without the assistance of tugs.

For fishing vessels the rudder propeller is very useful, especially when hauling drift nets. Furthermore, in fisheries research vessels such an installation might make it possible to do away with expensive and complicated engine arrangements such as diesel electric drive, controllable pitch propellers, etc. so far as the questions of manoeuverability and operation at low speeds are concerned.

SPEED VALUES

When the true values of the speeds at which fishing boats will operate are know, there should be no great difficulty in selecting propellers with a high efficiency.

One must also know the wake in order to estimate the correct speed of advance of the propeller. There are today a number of textbooks available which give useful information about the proper calculation of propellers, based on extensive model experiments.

Unfortunately, there is still too much rule of thumb used in the propeller selection by some engine builders, and some naval architects do not take the time to check propellers suggested by engine manufacturers.

BIG INDUSTRY

Primary and secondary forest industries in British Columbia employ more than 60,000 workers.