CREATOR

VOLUME 18 NUMBER 3

AN OCEAN OF GOD'S GREATNESS

God called the dry land Earth, and the waters that were gathered together he called Seas. And God saw that it was good (Genesis 1:10).

Divine Aquarium

The ocean is an enormous "aquarium" set up by Christ for the display of God's glory. If you have ever cared for tropical or saltwater fish, then you know that an aquarium must be faithfully attended or your fish will die. The same is true for the ocean.[1] Our Lord tends its waters, diligently maintaining its physical integrity, chemistry, and life. By carefully sculpting its shape—creating mountains, valleys, slopes and plains—the Lord Jesus Christ established the ocean as a prominent display of His own creative beauty and His Father's faithfulness!

If size is any measure of how much something proclaims the character of our Creator, then the sea has a monumental message concerning our Lord. Blanketing greater than seventy percent of the earth's surface, the ocean contains 343 quintillion gallons (343 billion billion gallons) or 1.3 sextillion liters (a sextillion is a 1 followed by 27 zeros) of water.[2] If it took you five minutes to fill a 40-gallon bathtub, then it would take you *81 trillion years* to fill a tub the size of the ocean.

Here is another way of picturing the vastness of the sea: If God had made our planet completely smooth like a ball, with no mountains or valleys, then Earth would be completely covered in water 8,500 feet (2.5 kilometers) deep. That's a lot of water!

Jesus carefully designed ocean water with special properties so that life could flourish there:

1. Water has a tremendous ability to store heat (known as its *high heat capacity*); it then releases its heat into the atmosphere

1 There is a religious belief, known as *deism*, that says God created the world, but left it to run on its own. *Nothing could be further from the truth!*
2 The average home aquarium holds 20 gallons or 76 liters of water.

very slowly. This helps prevent the temperature of the ocean from fluctuating wildly.

2. Water expands when it freezes, causing it to float on the surface of the sea. In the Arctic, ice helps insulate deeper water from the cold and prevents the ocean there from freezing solid.
3. No other liquid on Earth can dissolve as many substances necessary to life (water is known as the *universal solvent*).

Have you ever had the misfortune of swallowing a mouthful of seawater while swimming? Then you know that the most common chemical in seawater is salt (NaCl). In truth, God has mixed millions of substances into ocean water as well. The sea can be considered a complex chemical "soup!"

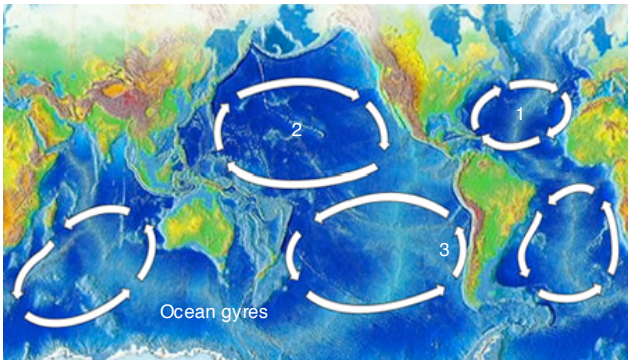
The concentration of salt in a given amount of seawater is known as its *salinity*. The average salinity of the ocean is around 3.5 percent. This means that one hundred pounds/kilograms of seawater contains, on average, roughly 3.5 pounds/ kilograms of salt. If we could remove all the salt from the ocean and pour it onto the world's continents, the land would be totally covered in a layer of salt 500 feet (166 meters) deep.

Salinity varies somewhat, depending on where in the world you take a measurement. For instance, the concentration of salt in the Mediterranean Sea is slightly higher than that of the rest of the ocean because it experiences a higher rate of evaporation. (Scientists estimate that *100,000 tons* of water evaporate from the surface of the Mediterranean Sea *each second*.)[3] These slight differences in salinity from one ocean basin to another help produce the great sea currents of Earth.

3 Salinity is also affected by rainfall, fresh water from rivers, and ice melt.
4 Deep-water currents are complex—they can move horizontally, vertically, or both.
5 Read ***CREATOR*** Volume 18 Number 2 to better understand the Coriolis effect and the dynamics of ocean currents.

Currents

God's Word portrays the ocean as restless (Jeremiah 49:23), and so it is. Using the special properties of the sea, Christ's Spirit forms enormous rivers of moving water to ensure the health and vitality of the world's oceans. (Home aquariums are also kept clean by circulating water through a tank.)



The great currents *on the ocean's surface* are primarily driven by the heat of the sun. Endlessly beating down on the equator, the sun's energy *warms and expands* equatorial waters. This expansion causes the sea level at the equator to rise a few inches, forming a slight "mound" or "hill" of water. This, in turn, causes warm water to flow "downhill" toward the poles, a phenomenon very similar to the way God moves warm air out from the equator and into the northern and southern hemispheres. Our Lord causes the exact opposite to occur at the poles; cold water—which is heavier than warm water—sinks and creeps slowly along the ocean bottom toward the equator as a deep-water current.[4]

Jesus also uses the constant spinning motion of the earth to redirect the movement of seawater.[5] At the equator, our world moves at 1,000 mph (1,600 kph) relative to space.

This rotation of Earth causes the north-south movement of water to "bend" around itself creating gigantic whirlpools.[6] These ocean-sized circular currents are called gyres (pronounced JI - urs, from the Greek word *gyros*, which means "circle"); they move clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere (see map—opposite—on page 2). God has created a total of five major ocean gyres and a number of smaller currents as well.

The first person to accurately describe one of these gyres was Benjamin Franklin in 1769. He talked at length with sailors arriving from Europe who told him of a great river of water flowing north along the coast of North America. Franklin correctly deduced that there was an enormous current of ocean water circling clockwise in the North Atlantic (see "1" on the map on the previous page). He dubbed this current the "Gulf Stream."

Benjamin Franklin's map of the Gulf Stream

The Gulf Stream is the most thoroughly studied of all ocean gyres—62 miles (100 km) wide, 3,300 feet (1,000 meters) deep, and equivalent to one thousand times the flow of the formidable Mississippi River. It transports an average of four billion tons of water past Miami, Florida *every minute*, round the clock.

Gyres greatly affect the climates of cities located along the coasts of the world. In summer, Washington, D.C. is warmed by water carried up from the tropics by the Gulf Stream. Conversely, San Francisco is cooled by the North Pacific gyre (the Kuroshio current—"2" on the map). Although both cities lie close to the same latitude, Washington, D.C. is typically hot and sticky in summer, whereas San Francisco enjoys a mild, cool climate.

Inside the Gulf Stream lies the strange Sargasso Sea ("1" on the map). This body of water got its name from Portuguese sailors who thought that the air bladders of floating seaweed reminded them of the Portuguese grape "sargaco." The Sargasso Sea is peppered with patches of this floating seaweed and is a very unique ecosystem displaying Christ's glory.

Jesus uses the circulation of gyres to nourish life in the sea. As the South Pacific gyre swings northward along the west coast of South America ("3" on the map), it causes an *upwelling* of cold, nutrient-rich water to rise to the surface from the ocean floor. This upward movement of nutrients, in turn, allows many species of marine creatures to thrive there—anchovies, sardines, mackerel, sea turtles, squid, sea lions, and sea birds. Twenty percent of all fish caught in the world come from these rich waters off the coast of Chile and Peru. In this way, the South Pacific gyre reveals Christ's extravagant care for us all (Psalm 104:27-28)!

6 This is due to the Coriolis effect; read ***CREATOR*** 18-2.

Ocean Anatomy

Historically, the sea has been divided into four (or five) oceans: Atlantic, Pacific, Indian and Arctic. Some *oceanographers*—scientists who study the ocean—include the Antarctic Ocean in this list. And when we speak of "the ocean" or "the sea," we mean all the oceans of the world put together.

The depth of the ocean ranges from a few feet or meters along the beach to 36,000 feet (11 kilometers) in the Marianna Trench off the coast of Guam. To show how inhumanly deep this is, let's look at some world record dives:

- Record free dive—331 feet (101 meters)
- Record SCUBA dive—1,044 feet (318 meters)

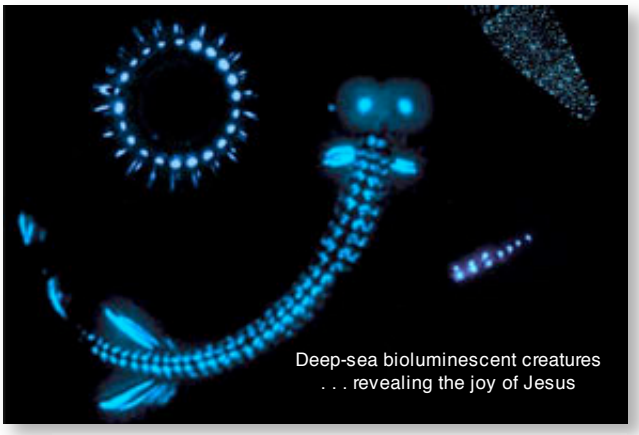
Water pressure in the Marianna Trench is about one thousand times what we experience at the surface, and would be like placing eight tons of steel on your thumb.[7] Ouch! The record depths listed above pale in comparison to the deepest part of the ocean, reminding us of our own limitations and how very great our Creator is.

When Jesus established the ocean's boundaries (Psalm 104:5-9; Proverbs 8:29), He used different construction materials for the foundation of the sea than for the land. The undergirding that supports the ocean floor is largely composed of an igneous rock[8] called *basalt*, while most of the towering mountains on land are made of a different igneous rock called *granite*. Another curious fact about the earth's crust is that it averages 20 miles (32 km) thick on land, but only 3 miles (5 km) thick under the sea.

It wasn't until the 20th century that people started to realize that the sea floor is not flat, but possesses numerous underwater mountains, valleys, volcanoes, and canyons. Using *sonar*,[9] oceanographers have discovered "trenches deep enough to swallow half dozen Grand Canyons, cliffs long enough to stretch from New York to San Francisco, deltas broader than the Mississippi's, mountains taller than the tallest in the world."[10]

Most of the water in the ocean is very deep and very cold, but warm water can be found at the surface. The warmest ocean temperatures are in the Pacific, northeast of Borneo, where it reaches 90° F (32° C). The surface temperature of water depends on *the amount of time* the sun shines down on the ocean and *the angle* of the sun. The poles receive far less sunshine than the tropics, thus polar seawater is far colder; Arctic waters usually hover around 29° F (-2° C). Deep ocean water—below a depth of 3,300 feet (1,000 meters)—is also near freezing, even at the equator. It might surprise you to learn that *the average temperature* of the entire ocean is only 39° F (4° C).

Sunlight warms the sea and illuminates its upper layer, but it doesn't penetrate very far into water. It is very difficult for a person to see below a depth of 1,000 feet (300 meters), and at 1,600 feet (500 meters) the human eye detects no light. Our Lord Jesus has



The sweet glory of Christ penetrates every part of the ocean, no matter how deep or dark.

7 Water pressure steadily increases with increasing ocean depth.
8 Read about igneous rocks in ***CREATOR*** Volume 15 Number 3.
9 SO(und) NA(vigation) R(anging)
10 Engel, Leonard, *The Sea* (New York: Time-Life, 1963), p 13.

supplied a number of deep-sea creatures—such as the giant squid—with huge, light-sensitive eyes so that these animals can see at that depth. Below 1,600 feet, however, no light penetrates from the surface and many creatures depend solely upon the artificial lights (bioluminescence) our gracious Creator has given them in this domain of darkness. Bioluminescence is the ability of an animal to produce its own light, as we see in a firefly.

Wind Waves

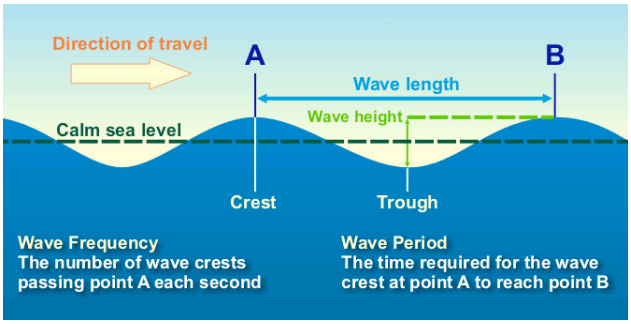
When we think of the ocean in our minds, we often picture waves upon the sea. Over the years, people have invented many colorful names for waves—rollers, breakers, swells, combers, spillers, plungers, surf, chop, coils, and sea billows. As with the rest of nature, waves truly reflect the praiseworthy character of our Lord Jesus Christ; after all, He made them (Jeremiah 31:35). Scientists—knowingly or unknowingly—speak of the glory of our Creator as seen in the vastness of the sea: "The greenish-blue breakers dancing on the shore fill [man] with *delight*; the black storm crests towering over a ship's deck fill him with *terror*" (italics added).[11] Who other than God can truly create both delight and terror?

We all seem to have a special fascination with waves. Jesus designed us to appreciate His glory displayed in waves, whether they be massive breakers crashing upon the shore or the gentle tides that bathe the world. And if no waves are available for us to enjoy, we simply toss a rock into a pond and make our own!

As a wave rolls over the surface of the sea, it looks like water is moving forward, *but it isn't*. Observe a bobber on a fishing line as it moves up and down in a train of small waves. The bobber doesn't travel horizontally unless it is pushed along by strong wind; rather it seems to make small circles as it bobs. Waves move *energy, not water*, across the ocean.

The most common way God creates waves is by sweeping wind over the face of the deep. Mysteriously—scientists don't fully comprehend how—Christ's Spirit transfers some of the wind's energy into the rhythm of the waves. The size of *wind waves*, as they're called, thus depends upon three main things:

1) the velocity of the wind,
2) the duration of the wind, and
3) the distance across the ocean that the waves travel (this is known as the "fetch").



Anatomy of a wave

FOR THE EXTRA CURIOUS

The average speed of ocean waves is 35 mph (56 kph) in the Pacific, a little slower in the Atlantic. Waves slow down as they approach land—usually when the ocean depth is one-half the wave length (the distance from one crest to another). A wave will normally break when it reaches shallow water that is just a little deeper than the wave height. For example, a three-foot wave will begin to break in four feet of water. As a wave grows in height, its energy level *greatly increases*. A six-foot wave has *four times the energy* of a three-foot wave.

11 Engel, Leonard, *The Sea* (New York: Time-Life, 1963), p 87.

The sea's tallest waves are born in storms on the open ocean, especially if wind blows continously for 72 hours or more. In 1916, the famous explorer Ernest Shackleton met with waves 100 feet (30 meters) high off the coast of Antarctica. And during the three-day-long 1991 Halloween Nor'easter, dubbed the "Perfect Storm," 100-foot-high waves were recorded off the coast of Nova Scotia.

It is also possible for waves to combine with one another to form superwaves known as *rogue waves*. What unnerves sailors most is that a rogue can appear out of nowhere, even in calm seas with no storms in sight.

Theoretically, these superwaves could reach 300 feet (90 meters) high, but God's mercy has not allowed this to happen . . . yet.

The greatest wind wave to date was observed by Lieutenant Commander R.P. Whitemarsh of the U.S.S. Navy tanker *Ramapo* on February 7, 1933. While crossing the Pacific, he and his crew encountered a rogue wave 112 feet (34 meters) tall—about the height of an eleven-story building!

Tsunami

The deadliest waves in the world are not created by wind, however, but by sudden or explosive changes in the earth's crust. Erroneously called "tidal waves" many years ago, a seismic wave is now called a tsunami (soo - NAH - mee, a combination of two Japanese words, *tsu* "harbor" + *nami* "wave"). Our Lord can easily trigger a tsunami by any number of means—an earthquake, a volcanic explosion, an asteroid impact or a sudden underwater landslide—but earthquakes are the most common cause.[12]

If the seafloor experiences a sudden rise or fall during an earthquake, the column of water above it will move the same amount. This rise or drop may amount to only a meter or two (three or six feet), but the volume of water above this sudden shift is so massive that it disturbs the entire ocean at this point.[13] (Wind waves affect only the ocean's surface.) As a result of this severe geologic trauma, enormous waves move outward at 450–600 mph (725–965 kph)—the speed of a jet airplane!

To some people's surprise, tsunamis usually create little surface disturbance on the open sea; the height of seismic waves here may be so slight that ocean-going ships don't even notice them. (They can be as little as one or two feet high—less than a meter.) And despite their tremendous velocity, it takes 15 to 20 minutes for each wave to pass; that's because the wavelength of a seismic wave is 125 miles or 200 kilometers. But as tsunamis approach land, *they grow greatly in height*.

Another common misconception is that seismic waves form enormous breakers as they reach the coast—like the waves surfers ride, though much bigger. Actually, a tsunami washing ashore can best be described as a 100-foot (30-meter) *mound of water*. And it is not the speed of the wave hitting the coast that does damage; by this time the tsunami has slowed down significantly. No, it's the sheer *volume of seawater* that drowns people

12 In theology, we would say that an earthquake is the *secondary cause*, while God is always the *primary* or *First Cause* (Romans 11:36).
13 The earthquake that triggered the 2004 Indian Ocean tsunami released 23,000 times more energy than the Hiroshima atomic bomb.

and washes away homes and buildings.

On average, one destructive tsunami strikes somewhere along the coasts of the world each year. It is only because of *Christ's mercy* that this doesn't happen more often.

Tides

Believe it or not, God sculpts the greatest waves in the ocean using, not wind, earthquakes or volcanoes, but *the moon*. The gravitational pull of the moon, and to a lesser degree the sun, moves the *entire ocean*—forming *tides*. Yet tides produce such gentle, slow risings and fallings of the sea, why should we call them, "the greatest waves?"

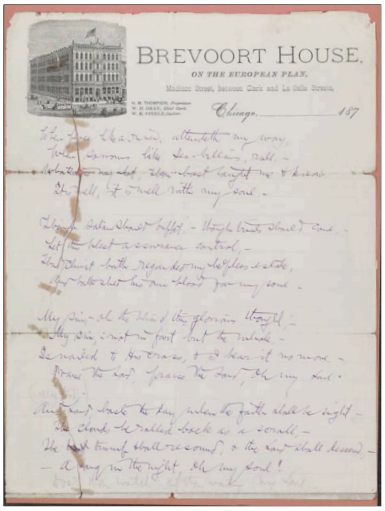
Low tide in Roscoff, Brittany, France

For one thing, the wavelength of the tide is *one-half the circumference of Earth*. And with it, the entire volume of the ocean—all 343 quintillion gallons—is set into motion.

Tides are highest when the sun, Earth, and moon line up—during full and new moons. These are known as *spring tides* (from the Middle English word, *springen*, which means "to move quickly"). The pattern of tides world-wide is actually quite complex because of the irregular shape of continents and coastlines.[14] Nantucket and Tahiti experience daily tides of little more than a foot, whereas tides visiting the Bay of Fundy in New Brunswick rise as much as 50 feet (15 meters).

Our Rock in the Storm

History testifies to the danger of our Creator's glory and the ocean is witness to this. Since 1620, over 5,000 fishermen from the small town of Gloucester, Massachusetts have bravely ventured onto the open sea and were never heard from again. Worldwide, the ocean has claimed the lives of many more people, sometimes in ways that seem incomprehensibly tragic. In November 1873, the four daughters of Horatio and Anna Spafford—Annie, Maggie, Bessie and Tanetta—drowned after their ship, the *S.S. Ville du Havre*, sank in the middle of the Atlantic Ocean. Only their mother, traveling with them to Europe, survived. Instead of allowing bitterness to overwhelm his heart, Horatio penned the words of the now-famous hymn, "It Is Well with My Soul," to express his confidence in an all-powerful God who is able to bring his daughters safely home to our Lord Jesus in Heaven.



Original Manuscript of "It Is Well with My Soul" as penned by Horatio Spafford

14 Oceanographers have identified at least 140 factors that affect tides. Some cities like Los Angeles experience two high & two low tides a day; others like Mobile, AL, experience just one high & one low tide.

Our Heavenly Father has provided us safety in the midst of His vast holiness, a holiness that *cannot coexist* with anything stained by sin. It is well with *our souls* if Christ is our Captain. The winds of worldly pride cannot sweep us away if we are anchored to Him (Hebrews 6:19). His Spirit will help us persevere through the storms of wickedness that have enveloped the entire earth, and He will quiet the swells of personal evil that tempt and buffet us daily, if we *fix our eyes on Jesus* (Hebrews 12:2). Christ died on a cross to become the one safe Rock upon which we can stand forever. Do you believe this?

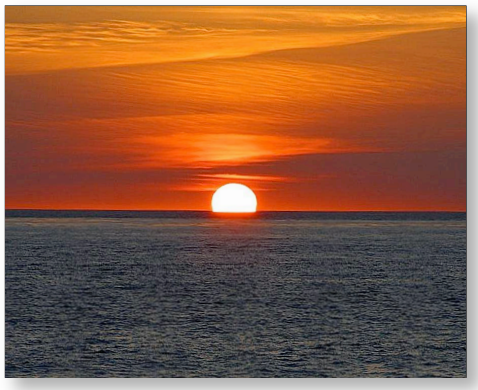
The Treasures of Grace

If the eyes of our heart are open (Ephesians 1:18), the ocean will teach us of God's love. The sea also proclaims God's anger at our sin; yet the Bible reassures us that "[God] will again have compassion on us; he will . . . cast all our sins into the depths of the sea" (Micah 7:19). Even if our iniquities were as vast as the sea, God's grace toward repentant sinners is "an ocean infinitely bigger" and Christ's blood is infinitely capable of cleansing us of all corruption (Colossians 2:13).

In 1840, the godly pastor Robert Murray McCheyne, in a letter to a friend, wrote: "unfathomable oceans of grace are in Christ for you. Dive and dive again, you will never come to the bottom of these depths. How many millions of dazzling pearls and gems are at this moment hid in the deep recesses of the ocean caves! But there are unsearchable riches in Christ. Seek more of them."[15] As awful as our sins are before the holy God of the universe, *the blood of Jesus is infinitely greater* to bring forgiveness to those who believe in Christ.

15 *Unfathomable Oceans of Grace*, letter to Miss Collier, Feb. 26, 1840

In 1927, a man named Merrill Dunlop meditated on these truths while crossing the Atlantic on the oceanliner, *The Leviathan*. His heart soared as he considered the great vastness of the sea and God's promise to bury our sins in its depths (Micah 7:18,19). Can you sing with Merrill Dunlop, "My sins are blotted out, I know! They are buried in the depths of the deepest sea: My sins are blotted out, I, know!"?



It is of the Lord's mercies that we are not consumed, because his compassions fail not (Lamentations 3:22 KJV). ❑

HIS CREATION

R.J. DESTREE
Editor

PASTOR CHRIS KAWA
Theology Editor

TREY TIPPIE
Science Editor

KOBUS ERASMUS
MAGGIE RICHARDSEN
JOSEPHINE WALKER
Editorial Proofing

KELLEY CARLSON
COLLEEN DESTREE
Art Directors

REED EVANS
Printing

VISIT US AT OUR WEB SITE:
www.hiscreation.com

CREATOR is published quarterly by **HIS CREATION**, PO Box 785, Arvada CO 80001- 0785.

Copyright © 2013 by **HIS CREATION**. All rights reserved. ***CREATOR*** is offered without charge; however, donations are greatly appreciated!

Unless otherwise marked, Scripture quotations are from The Holy Bible, English Standard Version® (ESV®), © 2001 by Crossway Bibles, a publishing ministry of Good News Publishers. Used by permission. All rights reserved.

PHOTO/ILLUSTRATION CREDITS

1 Fish—© cinoby/iStockphoto
2 Gyres—NOAA
3 Gulf Stream—Library of Congress
3 Sargassum—
Luis Miguel Bugallo Sánchez
4 Bioluminescence—NOAA
5 Wave anatomy—NOAA
6 Rogue—NOAA
7 Low tide—Zubro
7 Manuscript—Library of Congress
8 Sunset—Jon Sullivan