

CREATOR

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LORD OF COMPASSION

"The LORD is good to all; He has compassion on all He has made . . . [He is] loving toward all He has made" (Psalm 145:9, 13).

GOOD EARTH

Between World War I and World War II, God poured out His mercy upon the world in an incredible way. The First World War saw many soldiers die—not from bullets but from various types of infections, including a large number of wound infections. By the end of the Second World War, the number of soldiers who died from infections had dropped from 52 percent to less than six percent. Why the drastic change?

But you, O Lord, are a compassionate and gracious God, slow to anger, abounding in love and faithfulness (Psalm 86:15).

Prior to these awful conflicts, God had already been stirring in the minds of scientists who, knowingly or unknowingly, became His servants. In the cramped, poorly-lit laboratories of the late 19th century, two men in particular committed their lives to

investigating the nature of germs. It was in these labs that our Lord Jesus led Louis Pasteur of France and Robert Koch of Germany to discover that tiny microbes called *bacteria* could cause deadly diseases. (Koch identified the germs that cause anthrax, tuberculosis, and cholera.)

By 1900, it was recognized that bacteria were associated with *many* diseases. And the medical community started wondering if drugs could be found or created that would kill the germs invading the human body.

The first *anti-bacterials*, as they came to be known, were actually toxic chemicals—such as arsenic, cyanide, and mercury. These drugs fought infections sure enough, but they also had terrible side effects. In those days it was common for a person to die from the treatment, rather than the disease.

So doctors needed medications that would kill bacteria, not patients—a delicate



Scanning electron microscope image of *Vibrio cholerae*, the bacterium that causes cholera

balance to achieve. A big breakthrough came in the 1930s under the watchful eye and meticulous research of Dr. Gerhard Domagk (pronounced DOE - mack), a lead scientist in the Bayer company of Germany. After years of testing, he discovered that certain sulfur-containing compounds—sulfa drugs—could be used in patients to treat strep infections, with little or no side effects from the medicine. This was an important finding, because strep causes a number of deadly diseases—pneumonia, meningitis and scarlet fever, to name a few. In the 1930s, a large percentage of pregnant women were dying from a deadly strep infection known as “childbed fever.” By 1938, sulfa drugs were saving the lives of thousands of mothers in the U.S. and Great Britain alone. Sulfas were hailed as “wonder drugs.”

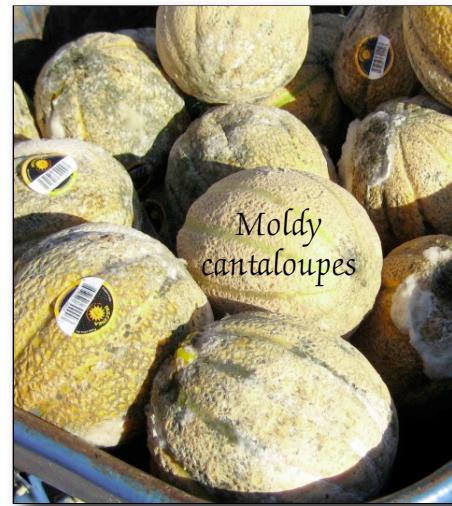
Since no one antibiotic can kill all types of harmful bacteria, Jesus began providing the world with other even more naturally-occurring and powerful drugs.

God's mercy spans history. Antibiotics were available in China two and a half thousand years ago. Back then, Chinese doctors successfully used a curd of moldy soybeans to treat skin infections.

In 1928, Scottish scientist, Sir Alexander Fleming, “stumbled upon” a type of blue-green mold that inhibited the growth of bacteria in his lab. The fungus was *Penicillium notatum* and the antibiotic it produced was *penicillin*, a name coined by Sir Alexander. Despite intense research, however, he could not come up with a stable form of the drug. Ten years later, Australian-

born Howard Florey and his colleagues at Oxford perfected a way of obtaining a pure grade of penicillin. All that remained was a means of its mass production.

God then led scientists to America, to a quiet town along the Illinois River, where this expression of His mercy—penicillin—became fully realized. At the newly-constructed Northern Regional Research Laboratory in Peoria, IL, penicillin was successfully mass produced for the first time in history. And it was here that Christ demonstrated His providential love for mankind in a very special way. By 1943, scientists had searched the world over in hopes of finding a variety of *Penicillium* mold that would yield a large amount of penicillin. It just so “happened” that a type of *Penicillium* fungus—which ended up producing far and away more penicillin than any other—was found on a moldy cantaloupe at a Peoria fruit market by a housewife.¹



This strain of *Penicillium* yielded about 200 times more penicillin than Alexander Fleming's original mold. Was this a chance discovery? . . . Not a chance!

¹ The housewife was Mary Hunt, or “Moldy Mary” as she came to be known at the lab. Her job was to scour Peoria looking for moldy fruit.

About this same time, our Lord also led a scientist by the name of Selman Waksman to discover other powerful antibiotics—in soil of all places.² The first of his discoveries was *streptomycin*, a drug effective against tuberculosis. It was soon widely recognized that microbes in the ground—bacteria, fungi, and especially actinomycetes (ak - tin - oh - my - SEET - eez)—routinely produce a whole host of chemicals that can be used to keep other microbes (in the soil) at bay. After World War II, many of these soil antibiotics were mass produced and quickly became the safest and most powerful weapons against serious infections in the drug arsenals of physicians.

Christ's love has always been with us—it's right beneath our feet! Pick up a handful of soil and lightly smell it. That familiar earthy odor is the "smell of God's mercy" (Psalm 34:8). Growing in the ground is a fungus-like bacteria called actinomycetes—the source of most antibiotics. This microbe also produces the volatile chemical *geosmin*. It is geosmin that gives dirt its characteristic fragrance, especially after it rains. So, where there is this rich aroma of soil, there are antibiotics!



FLOWERS OF HIS LOVE

... the LORD has compassion on those who fear Him (Psalm 103:13).

Do you ever doubt the goodness of God? Many in this anguished world have concluded that, if God exists, He must be cruel since He allows mankind to suffer. The Bible teaches

2 Dr. Waksman tested about 10,000 types of soil from all over the world for antibiotic activity.

otherwise. Christ is our *Compassionate Physician* (Job 5:18; Hosea 6:1; Matt. 4:24; 11:28-30), and nature faithfully proclaims His Father's kindness. Creation is a rich storehouse of medicines that Jesus sweetly supplies to all people, both rich and poor.³

God has sown into the world a flower possessing powerful pain-killing properties. For years, the indigenous people of Asia have used the extracts of the delicate poppy plant (*Papaver somniferum*) to quiet symptoms of agonizing diseases. Ancient Greeks and Romans also prescribed its milky sap to help relieve the many causes of misery. Centuries passed, however, before doctors realized that the poppy flower contains the very potent pain reliever *morphine*. Ironically, a poppy's incredible pain-killing properties have absolutely no known function in the natural world. It seems obvious that our loving Lord specifically designed this flower in order to pour forth His unmatched mercy to suffering people.

A number of analgesics (pain-killing medicines) can be derived from the opium poppy. Morphine, the chemical with the



The beautiful
poppy flower
(*Papaver somniferum*)

highest concentration in this plant, was first isolated in a laboratory in 1805. *Codeine*—also produced by poppies—was isolated in 1832. By the 1850s, pure forms of these drugs became available to doctors. And it was during

3 More than half of the world's population relies entirely on natural medicines to relieve suffering.

this time period that the hypodermic needle was invented as well. (A hypodermic “shot” was needed to inject morphine into the body.)

The poppy reveals the depth of God’s compassion. Christ Jesus, our Creator, concentrates enough morphine into *a single poppy flower* to alleviate the suffering someone might experience during a heart attack. Amazing! Used properly, morphine also greatly lessens the gnawing pain of surgery, cancer, and broken bones.

All of creation presents a loud testimony to our Lord’s love. The poppy plant is just one of a million mercies God gives us. But, oh, what a mercy it is! This flower teaches us that no one is kinder than Jesus, our caring Creator and Savior and Lord!

We shouldn’t be surprised that God uses flowers to show compassion (after all, they’re such a wonderful testimony to Christ’s gentle beauty). Twenty five percent of the raw materials used to produce modern drugs come from flowers. Meadowsweet—a

Native Americans often used meadowsweet to treat headaches, fever, and inflammation. And it was the salicylic acid found in this plant that was used by the Bayer company in 1897 to manufacture aspirin—a stable form of *acetyl* salicylic acid.⁵ The old botanical name for meadowsweet, *Spiraea ulmaria*, became the basis for the trademark name, Aspirin® (a-spiraea—short for acetyl-spiraea).⁶

Long before Germany’s discovery of aspirin, however, Jesus had also sown salicylic acid in the bark of willow and sweet birch trees. Around 400 B.C., the Greek physician Hippocrates described a powder, made from the bark of the willow, that could be used in the treatment of fever and headaches. Today, an estimated *120 billion* aspirin tablets (300-325 mg size) are consumed annually!

IN HIS GRIP

We have this hope as an anchor for the soul, firm and secure (Hebrews 6:19).

Jesus demonstrates His Father’s compassion for His creation in another special way. This concern reaches all the way down to the smallest of His creatures, yet may one day benefit us as well. Organisms living in the sea—especially those along the coast—experience strong waves, rip tides, and churning eddies. Those animals lacking fins or some other means of locomotion are at the mercy of their environment. But Christ has not left His creatures on their own. He encourages them to “stick together” for safety.

Oysters, for instance, can glue themselves to each other—for protection from the pounding surf and from predators. (The Church could learn from the oyster—the glory of



perennial shrub in the rose family—contains large amounts of methyl salicylate (METH - uhl suh - LIS - uh - late), or *methyl* salicylic acid, also known as oil of wintergreen.⁴

⁴ Oil of wintergreen is loaded with salicylic acid and is therefore potentially dangerous. One ounce of this oil is equivalent to 171 adult aspirin tablets!

⁵ Bayer chemists replaced the methyl- group with an acetyl- group to make aspirin.

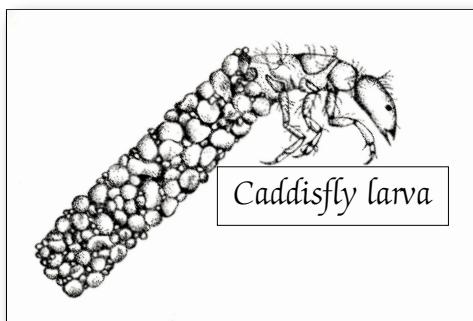
⁶ About one in five persons with asthma have their symptoms induced by aspirin, so it's important that they are aware of meadowsweet.

Christ is the “glue” that unites all authentic Christians and it is a safeguard against the present-day waves of heresy!) Because of God’s gift of this special glue, oysters can form huge reefs stretching for miles. In turn, these oyster super-colonies act as storm walls, protecting the coastline from disaster.

God also provides mussels and barnacles their own versions of Super Glue®. These creatures use adhesives to securely attach themselves to the shore and one another for basically the same reasons that oysters do. Mussels secrete an amino acid that forms countless microscopic threads in water. These threads of protein are what give the mussel a vise-like grip on rocks. (By contrast, man-made glues can’t “dry” under water and are therefore useless in wet environments.)

Scientists have also discovered that some portions of the protein in barnacle glue are identical to protein used by the human body to form blood clots (yet another mercy of God). Only a Triune God, who is Unity in Diversity, could create identical proteins in two vastly different creatures—barnacles and people!

Then, there is the engineering skill of the sandcastle worm⁷ and the caddisfly⁸ larva



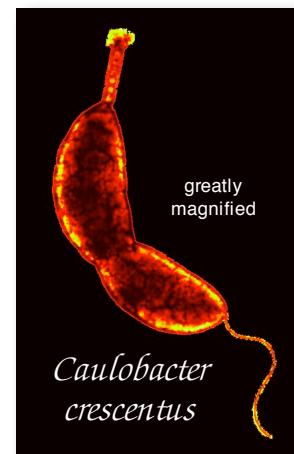
(LAR - vah)—small creatures that live in the ocean and in freshwater, respectively. Both construct a tubular home by gluing together bits of broken shell or tiny pieces of wood with grains of sand. The sandcastle worm lives in

⁷ *Phragmatopoma californica*
⁸ *Trichoptera*

a chaotic environment that is frequently battered by waves; the caddisfly larva is at risk of being eaten by predators, such as fish. So, their God-given homes are means by which our loving Lord protects these animals, made possible by the glue He supplies.

Finally, bacteria need protection too. I know what you’re thinking—“Bacteria need to be protected? I thought that bacteria cause disease!” Most microorganisms living in the soil or in water are of no danger to man and are essential for healthy ecosystems. (Bacteria, for instance, are actively involved in soil decomposition.) Like barnacles, mussels, and oysters, microbes living in streams or rivers are at risk of being swept away. So, Jesus gives these bacteria their own unique type of glue to prevent this from happening.

One such harmless bacteria, *Caulobacter crescentus*, is a rod-shaped organism that lives in fast-moving water. Jesus provided it with the most powerful cement known to science. This bacterial glue is basically a super-sticky sugar. It has an adhesive force of *five tons per square inch*. This means that with just a wee bit of this glue, you could successfully suspend three cars (five tons) from an area no bigger than a quarter. Now that’s sticky!



Of course, the average bacteria’s ability to adhere to almost anything is also what causes plaque on our teeth. So, life in this fallen world doesn’t always behave the way we’d like it to, does it?

Without these adhesives, oysters,



mussels, barnacles, and bacteria could not survive. Natural glues thus highlight God's mercy. Some day, our Lord Jesus may even allow this expression of His compassion to extend into human medicine, if doctors can find a way to apply barnacle or mussel glue to shattered bones or broken teeth. In the case of bones, this "bio-glue" might eliminate, in some cases, the need for screws and pins that are routinely used to hold together bone fragments. Glues might also be used by physicians to apply antibiotics and/or analgesics to broken bones.



It should give us great comfort that a God who can engineer such incredible natural glues will never "let go" of those He loves. If we are true believers, then we are permanently and safely sealed to the Rock, our Lord Jesus Christ (Psalm 18:1-2; 125:1; 1 Corinthians 10:4; Hebrews 13:5).

BOWELS OF MERCY

The Lord is full of compassion and mercy
(James 5:11).

We clearly see God's incomparable mercy expressed in these three "A's" found in nature—*Antibiotics, Analgesics, and Adhesives*. Stronger still is God's expression of compassion found in the Bible, and especially in James 5:11 (above). The Greek word for "compassion" in this verse is

⁹ πολύσπλαγχνος

polusplagchnos⁹ (pol-oo'-splank-nos), which literally means "many or much true bowels of mercy." This is not a passive or casual concern on God's part—it denotes an intense, intimate love. A person who has "polusplagchnos" experiences a deep ache in their heart when someone else suffers.

This is the kind of love God has for people! Although God, the Trinity, is unchanging and ever-joyful, Christ Jesus does experience sorrow over the blindness of this world (Luke 19:41-42) and the suffering of His people (John 11:35), because He is forever united to human flesh and He knows our pain.

As wonderful as medicines are, God's greatest expression of mercy came through the death and resurrection of His Son. And we can show this mercy toward others by telling them the truth about God, the truth about their own sin and rebellion against their Creator, and the hope of salvation that is found in Jesus Christ alone. □

Be merciful to those who doubt; snatch others from the fire and save them; to others show mercy, mixed with fear—hating even the clothing stained by corrupted flesh (Jude 22-23).



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