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GOD OF BLAZING GLORY

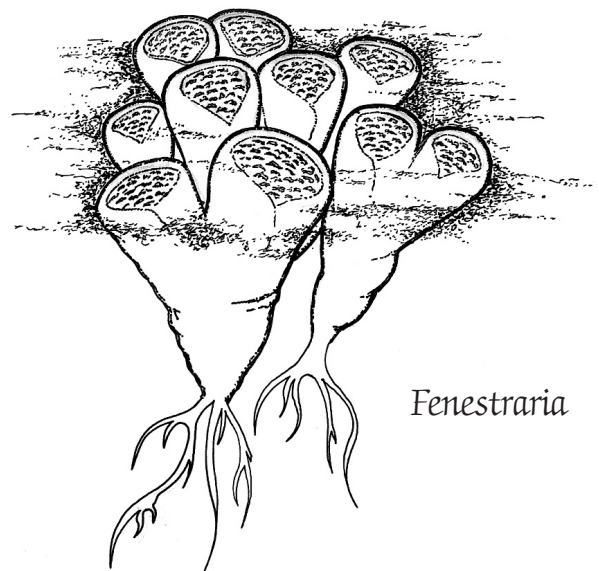
*For the LORD God is a sun and shield
(Psalm 84:11 a).*

It's midsummer and the sun beats down from high above. You've just finished a long hike in a desert region near your favorite vacation spot. You brought along ample water, but the heat of the day is starting to overwhelm you and you're relieved the hike is over. Suddenly, a thought pops into your mind, "How does anything survive for long in an environment like this?"

It is so good for us to be reminded that Christ our awesome Creator personally controls every aspect of His vast creation. And He has lovingly designed most organisms with the ability to endure hot temperatures. On its own, a fragile plant or animal cannot defend itself from the power of our sun's fiery furnace. But in the hands of our ever-present Maker, life is safe. Hot weather can, in fact, teach us two vital things about our incredible God: 1) He is very kind and faithfully protects His creation (Psalm 36:6), and 2) He is a "consuming fire" (Hebrews 12:29). He is both our "sun" and our "shield," and He carefully commands the lives of His

creatures down to the minutest details. Join us now in adoring our great Lord Jesus who always brings honor to His Father through the things He has made by His Spirit.

During the heat of summer, most living things can easily become overwhelmed; they are said to be under the burden of "heat stress." We might think of hot weather, and the strain it creates, as a "heavy weight" put upon organisms. Too much heat can "crush" them. In God's infinite kindness, our Lord Jesus has provided ways for plants and animals to endure this "weight" or burden. He perfectly governs the paradox of the sun's



Fenestraria

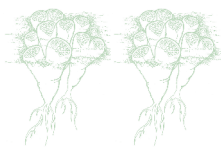
life-giving and life-destroying energy. As the Commander of all creation, Christ Jesus prevents the heat of the sun from destroying the very life He so carefully nurtures.

ATMOSPHERIC INSULATION

To fully appreciate God's control over the sun's effects on life, we must begin by looking at Earth from a couple hundred miles out in space. At this distance, we notice a thin layer of air wrapped around the world. Our Lord God uses the



atmosphere like a shield, screening His creatures below from the high-energy gamma-rays, x-rays, and ultraviolet-rays that radiate from the sun. Without an atmosphere, the earth would heat up to a lethal 260° F (127° C) during the day, and plummet to minus 280° F (minus 173° C) at night. No other planet in our solar system has just the right amount and combination of gases, moisture and particles in its atmosphere to protect and sustain life.



COOLING BY WATER

Here on the surface of the earth, our Lord Jesus uses a rich variety of means to fine-tune His creation. All life exists within a fairly narrow temperature range. Most complex animals will die at ambient temperatures higher than 120° F (49° C), and most plants will perish above 140° F (60° C). To help prevent this, God gave every living thing on Earth four fundamental ways to cool itself:

1. Radiation—heat released from a body via infrared radiation (for example, heat radiating from someone who has just exercised),
2. Conduction—the transfer of heat from one body to another through direct contact (for example, when you suck on an ice cube you transfer the heat of your body to the ice),
3. Convection—heat lost due to the movement of air (such as a cool breeze),
4. Evaporation—release of heat by water evaporating off the surface of something or someone (such as sweating).

Although all four are useful in preventing overheating (hyperthermia) in a plant or an animal, evaporation is the most important, especially in hot climates. In extremely hot weather, conduction and convection cease to be effective at removing heat from a body.

Water's ability to absorb heat is about 25 times that of air. You're much more likely to become chilled while swimming in 65° F (18° C) water than air of the same temperature because the heat of your body is transferred to the water much more efficiently. And our Lord gave water yet another unique property—when water changes from a liquid to a vapor, a tremendous amount of heat is carried



off with it. This is the principle behind sweating.

People sweat, as do many animals—horses, cattle, goats, sheep, dogs, and pigs to name a few. Sweat is essentially water with a little salt mixed in, released by special glands in the skin. On hot days the evaporation of this water removes heat from our bodies. Depending on the humidity, we may lose only a pint (one half liter) of fluid from our skin on a mild spring day. In the heat of the summer, however, it is possible for a hard-working adult to lose almost two quarts (two liters) of water each hour.

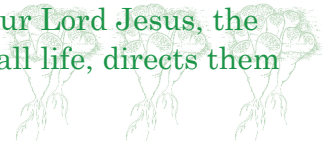
Many animals cannot sweat because they possess few or no sweat glands—notably dolphins, rabbits, water buffalo and pachyderms.¹ Jesus thus lovingly designed other ways for these creatures to stay cool using water. Some of these sweat-less animals, like the water buffalo, engage in wallowing behavior on hot days, wetting their skin and losing heat as water evaporates, which has the same effect as sweating. Marsupials of Australia—

including the kangaroo and koala bear—cool themselves by licking the fur of their arms. Among all mammals, the most common form of aquatic cooling is panting. Dogs and sheep do possess some sweat glands, but primarily cool themselves by increasing their rate of breathing. As a dog pants, it moves air in and out of its throat and lungs very rapidly. This causes water to evaporate from its respiratory tract, and with it large amounts of heat, thus allowing the canine to maintain its normal body temperature of 102° F (39° C).

Birds and reptiles do not pant, but use a similar method to get relief from the heat. They rapidly bring air in and out of their mouths, known as gular (GUH - lar) fluttering. This causes evaporation from their mucous membranes and subsequent cooling. Gular fluttering is especially important for birds because their feathers prevent them from losing much heat from their skin.

Bees and wasps do not sweat, pant or gular flutter, but they do know how to use water to air condition their hives and nests, respectively. Our Lord Jesus, the regal Commander of all life, directs them

¹ A pachyderm is a large animal with "thick skin." This includes the elephant, rhinoceros, and hippopotamus.



to utilize evaporative cooling to maintain a relatively comfortable temperature. These insects transport water into their homes and then spread it around the hive or nest. On particularly hot days, bees and wasps beat their wings while standing in place to speed up evaporation. As a result, the inside of a beehive, for instance, stays at or below 95° F (35° C) while the surface of the hive may reach an unbearable 160° F (71° C)!

Animals living in arid environments, where water is scarce, must also be protected against excess water loss—this is especially true for smaller mammals. Despite their diminutive size, mice, jerboas and gerbils are important to our Lord and He has taught them to use their God-given digging skills to create burrows underground (burrowing creatures are known as *fossorial* animals). The temperature of the sand or soil in which they live decreases dramatically the further down the animals dig. At 10 to 12 feet (3 to 4 meters) underground, the average temperature is 55° F (13° C), no matter how hot the surface is.

Jesus also faithfully tends green growing things. As with animals, He fitted many plants with water-assisted cooling. Trees and other types of vegetation engage in their own form of “sweating.” God placed tiny holes (stomata) on the underside of leaves, which allow air and water to go in or out of each leaf. Trees can open these holes on hot days and release a lot of water into the surrounding air and with it a goodly amount of heat. This water release by plants is known as *transpiration*. Anyone who has spent time in a temperate forest in summer has probably experienced the trees’ ability to change the local climate. Through evaporation of water from pores

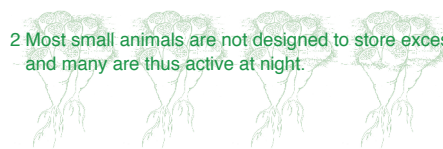
in their leaves, trees cool the air beneath their canopy. As mentioned earlier, we might think of the cooling effect that both sweating (in animals) and transpiration (in green plants) provides as a “weight” being lifted from a heat-stressed organism.

CARRYING AN EXTRA HEAT LOAD

Our intensely caring Creator further protects large animals by giving them the unique ability to “carry” an extra “heat load” in hot weather.² Under His watchful eye, Christ accomplishes this by allowing a cow or an elephant or a fur seal to increase its body temperature throughout the day. An African elephant’s temperature, for instance, can increase several degrees in hot weather without ill effects. The elephant effectively “stores” heat in its body during the day and then “unloads” or releases this excess heat to its surroundings in the cool of the night (through radiation, conduction, and convection), thus preventing the animal from being “crushed” by hot weather. This also lessens the need for an animal to sweat—decreasing potential water loss, which can be dangerous in the desert.



² Most small animals are not designed to store excess heat during the day and many are thus active at night.



HEAT—INSIDE AND OUT

God uses other elements of His creation to moderate the effects of the sun. Lizards, in particular, take advantage of the shade of rocks, bushes, and trees to adjust their body temperature. Most reptiles produce little of their own heat and thus take on the temperature of their surroundings. In the early morning, lizards crawl onto rocks to warm themselves in the sun. As their temperature reaches an optimum 96° to 100° F (36° to 38° C), they then find shade to keep their bodies from overheating.

HOT AND COLD BLOOD

When it comes to body warmth, our Lord Jesus ingeniously created two kinds of animals . . . warm-blooded creatures or endotherms (Greek endos = “inside” + therm = “temperature”), and cold-blooded creatures or ectotherms (Greek ectos = “outside” + therm = “temperature”). Endotherms (mammals and birds) produce their own heat, and using a special part of the brain known as the hypothalamus, God controls their internal temperature within a very narrow margin—usually two or three degrees. Ectotherms include reptiles, amphibians, fish, and all invertebrates. They normally cannot generate their own heat and their body temperature is wholly dependent upon the surroundings.

In hot weather, endotherms tend to eat less because the metabolism of food adds an extra heat burden to their already warm bodies. (The opposite is true for mammals living in cold environments—they typically double their food intake if they can.)

This is the rationale for the old saying, “It’s too hot to eat.” It is also what’s behind the adage, “Feed a cold, starve a fever.” It’s not that feverish people literally starve themselves, but they usually have little or no desire to eat because eating would only increase their heat load.

Our Lord also built into the desert environment a feature that greatly increases the survival of creatures living there. Surprisingly, the temperature not far above ground level during midday can be significantly lower than at the surface. This may be the main reason why flamingos of East Africa build their nests of mud 6-18 inches (15-46 cm) high. By elevating the clutch above the ground, a parent bird can cool the nest by as much as 40° F (20° C) relative to ground temperature. Jesus provides some animals, such as the camel, with long legs for the same purpose—to elevate their body above the surface heat. And He gives smaller creatures (insects, spiders, lizards) the ability to extend their legs and take on a posture known as “stilting.” A stiling animal can then



Stiling chameleon

take advantage of this somewhat cooler air above the soil's surface. Of course, if a creature has wings and can fly, it's able to reach much higher into the atmosphere. Eagles and falcons in many of the earth's arid regions soar on extremely hot days, rather than perch near the desert floor. A quarter of a mile above ground, the air may be as much as fifty degrees cooler.

A THERMAL MYSTERY

Some of Christ's creatures are able to withstand especially high temperatures, but no one knows how they do it (i.e., they have no obvious means of heat dispersal). A Pacific salmon will die in seawater much warmer than 70° F (21° C), yet a desert



pupfish thrives in small pools of 108° F (42° C). There is a beetle (*Onymacris plana*) living in the Namib Desert that seems unfazed when its skin temperature reaches 140° F (60° C). And certain ant species of the same region (*Orymyrmex robustier*) can tolerate sand as hot as 154° F (68° C). There are obviously many things in God's creation that remain secret to us and known only to Him (Deuteronomy 29:29)!



BUILT IN HEAT PROTECTION

Aside from sweating, panting, and gular fluttering, another way our Creator rids organisms of excess heat is by shunting warm blood from inside the body to the surface. For many creatures, the main place where heat exchange occurs is in the skin and the lining of the respiratory tract. The rosy cheeks of an active child are an example of this process at work. Shunting also exists in insects. When a bumblebee becomes too warm, its heart beats more rapidly and pumps blood to the surface of its abdomen to dissipate heat. Our Lord Jesus uses a similar principle to eliminate extra heat through His design of the eland. The nose of this cow-like mammal found in Africa is filled with a two-way flow of blood vessels in very close contact with one another. Evaporation of water from its nasal passages cools the veins located there. Cool venous blood, in turn, is used to chill the warmer arterial blood circulating through the eland's brain. The eland is thus able to endure temperatures higher than most animals by keeping a "cool head."





Another truly fascinating thermally-protected invention of our Creator is seen in the plant *Fenestraria* (see front page and photo above). To avoid excess heat and take advantage of the cool soil underground, the Lord buries each of its thick, finger-like leaves so that only the crown is exposed to the sun. The top parts of these leaves contain clear crystals, creating windows to allow light into the buried portion of the plant. In this way, its chlorophyll is exposed to enough light to ensure survival, yet the damaging rays of the sun are effectively prevented from reaching most of the plant.

ESCAPE THE HEAT

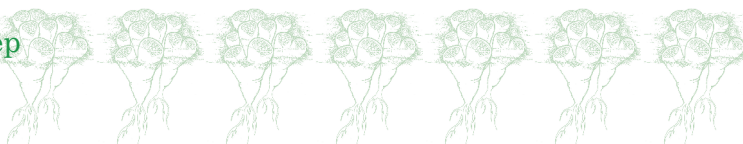
Yet another important way our Lord Jesus protects His creatures from heat is by altering their behavior. Naturally, the most prominent examples of those adept at avoiding heat are desert and tropical animals. (We've already mentioned the shade-seeking behavior of desert reptiles.) The easiest way for an animal in an arid or tropical environment to stay cool is by sleeping during the daytime and being active at night. The many deserts of the world may seem lifeless by day, but burst alive with activity after dusk. Some organisms take this sleeping pattern a step

further and become dormant for weeks on end during the hottest seasons of the year. Marsupials, insect-eating rodents, desert ground squirrels, and spadefoot toads all go into a deep sleep, much like hibernation, until summer days start to cool. This "summer hibernation" of animals is called *estivation*, which may last several hours, days, or weeks.

Though plants don't sleep or estivate, God has provided the ocotillo (ah - kah - TEE - yo) a means of "resting" as the sun sizzles. The ocotillo is a shrub-like desert plant that loses its leaves, not in autumn, but during long spells of hot, dry weather. This prevents solar damage to its leaves and conserves its limited water resources for the rainy season when conditions are more tolerable.



Ocotillo





Horned viper

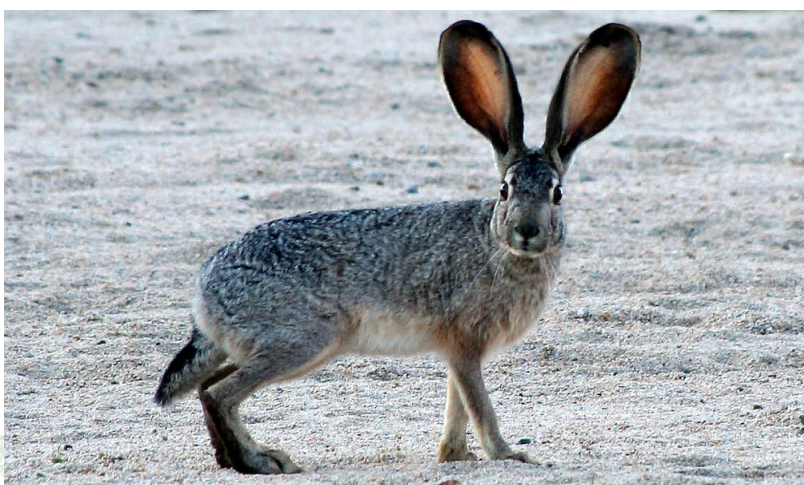
OUR AWESOME CREATOR!

Further examples of how organisms flourish in the desert include two types of snakes. Most snakes slither along the ground with their entire body touching the surface. Jesus has gifted the sidewinder of the American West (*Crotalus cerastes*) and the horned viper of the Sahara (*Cerastes cerastes*) with an unusual means of locomotion. Instead of moving forward, as most snakes do, they are able to glide sideways over the searing sand. As the snake travels, only two small spots on the underside of its body touch the hot ground. And these two points of contact are always changing to prevent the snake from being

burned. The Lord also provided the sand skink of the Sahara desert a unique, almost bizarre way of preventing it from being scorched by the sun. It swims through the sand! It is able to eat and breathe underground, avoiding the surface heat altogether.

Our great God protects His creation from the intense heat of the sun in yet other ways too numerous to count. The following is a brief list:

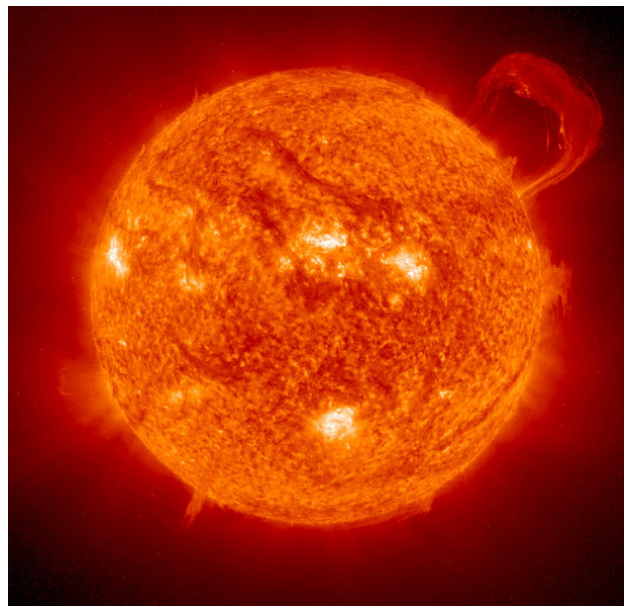
- Aquatic mammals—seals, dolphins and whales—shed excess heat via their flippers.
- A rabbit and desert (fennec) fox use their ears to radiate heat from their bodies.



- The fur of mammals and feathers of birds insulate the skin underneath their bodies from heat rising up from the ground. (The surface of the fur or feathers may reach 180° F or 82° C, yet the skin temperature remains normal.)
- Skin pigmentation in people shields them from ultraviolet radiation.
- The horns of goats and cattle contain many blood vessels, which can readily release heat on warm days.
- The silvery coating of fine hair on the leaves of many desert plants, and the spines of a cactus, reflect the sun's rays.
- The north-south placement and narrow shape of a termite's mound in the tropics minimize the amount of the sun's rays striking the mound at midday.



- On hot days, many animals will orient themselves in such a way to decrease exposure to the sun and increase exposure to the wind.



AMAZING! UTTERLY AMAZING!

Isn't our Lord Jesus amazing in His ability to perfectly control the transfer of energy between two seemingly incompatible realms—the sun blazing with a surface temperature of 10,000° F (5,500° C) and Earth? He harnesses the wealth of the sun to benefit all life, while using special mechanisms to precisely protect His plants and animals here. As the Commander of all creation, Christ shows Himself as a burning Sun, but also as a loving and impenetrable Shield.



THE FURNACE OF GOD'S GLORY

*Come, you children, listen to me;
I will teach you the fear of the LORD (Psalm 34:11).*

The Bible describes God as a “consuming fire” (Hebrews 12:29). What does this mean? Should people fear that He will destroy them because of their sins? And if so, is there a way to be safe in God’s presence? Both the creation and the Bible give clear answers to these questions, answers that need to be taken seriously.

The Sun and its power are a *dim* reflection of our Lord’s infinitely greater glory, and a warning that no one can escape the fire of His holiness. All the wonderful ways Christ protects His creation from heat are but mere shadows of the far greater, eternal protection He gives to those who love Him. Our Creator could easily change global climate so that it is always pleasant, and that no plant or animal suffers the searing heat of the sun. But if He did, these remarkable ways He lovingly cares for His creation would be lost from our view. We would also lose the far-greater message “spoken” by the Sun (Psalm 19:1-6), that because of sin *He is a Consuming Fire!*

In Daniel 3, we see the great Babylonian king, Nebuchadnezzar, erecting a nine-story-high gold idol that was to be worshiped by all people. Certain Jews—notably Shadrach, Meshach and Abednego—refused to bow a knee and venerate this monstrosity. So the king, in a rage, bound these men hand and foot, and had them thrown into a seething furnace. To Nebuchadnezzar’s amazement, the fire did not touch Daniel’s comrades, and in the flames there appeared a fourth man: “And these three men, Shadrach, Meshach,

and Abednego, fell down bound into the midst of the burning fiery furnace. . . . [Nebuchadnezzar] answered and said, ‘Lo, I see four men loose, walking in the midst of the fire, and they have no hurt; and the form of the fourth is like the Son of God.’” (Daniel 3:23, 25 KJV).

We would hardly think that the safest place from our enemies would be in the heart of a consuming fire, but that is exactly what this account is communicating to us. Most early Church Fathers believed that the fourth man seen in Nebuchadnezzar’s oven was an appearance of Jesus in bodily form.³ If so, then it is clear that Shadrach, Meshach and Abednego were perfectly safe from Nebuchadnezzar’s wrath because they were with the Lord. Any attempt by the king to further harm these men would have been met with instant death from the flames (see Daniel 3:22)!

Again, creation gives us another clue in answering our opening questions. Our Lord Jesus did not design the camel to escape the heat of the desert, but to *thrive in it*. Likewise, we who believe in Christ do not escape God the Consuming Fire, for no one escapes Him (Psalm 139:7-8), but we are made fit by Christ’s righteousness to enjoy the presence of our holy God forever (Psalm 16:11). Those who love Christ become new creatures (2 Corinthians 5:17), conformed to His image (Romans 8:29), and as such are welcomed into the court and garden of our awesome King.

By God’s mercy and grace, all those alive right now are safe from the furnace of His anger at man’s rebellion against His authority. But once they die and leave this life, no one is safe, save those

³ Theologians refer to this as a preincarnate appearance of Christ.

who are joined—like Shadrach, Meshach and Abednego—to “the Son of God.” Any attempt at being good and “earning” a way into Heaven (trying to be holy on our own), is like a person lighting candles in order to appease some incensed diety while his house burns down around him. Oh, what a horrible place to be in!

Borrowing another illustration from creation, God’s wrath is as a raging forest fire in which humanity stands helpless. Trees are bursting into flames all around—the fallen wood hisses and explodes—and there is nowhere to hide. This inferno of His anger at our sin is bigger than the universe, and it will soon engulf the whole of creation (please read 2 Peter 3:7-14).

could be likened to an inexperienced hiker who thinks he can traverse a vast desert without expert help and guidance. He overestimates his own abilities and underestimates the severity of the desert environment. His friends warn him not to attempt this on his own, but he ignores their pleadings and pays with his life.

Christ did not appear on Earth to extinguish the Inextinguishable. God took on human flesh and, as a man, Jesus died on a cross to absorb forever the burnings of His own wrath against sin on behalf of His people. For those who love Him, Christ is both the Sun of righteousness and a Shield, enabling them to stand in God’s holy presence (Psalm 84:11). Jesus



Sadly, most people today either are unaware of this truth or simply don’t believe it. Man has a wrong view of God and a wrong view of himself. On its own, humanity cannot conceive of a Creator who is terrifying in His justice against sin nor accept that man possesses no goodness in himself to recommend us to God (Romans 3:10-18). These fatal misconceptions

lived a life of perfect obedience to His Father and “rose from the ashes” of His own sacrifice to become the Righteousness of all true Believers. Our Lord Jesus perfectly protected Daniel’s friends from Nebuchadnezzar’s conflagration; how much more will He shield from divine wrath those who repent of their sins and believe in Him? Christ’s righteousness then becomes

the impenetrable, pure-white clothing that forever protects the Saints (Isaiah 1:27; Matthew 22:1-14; Romans 3:22).

He who trusts in the LORD, lovingkindness shall surround him (Psalm 32:10 b).

But what of those who reject the salvation of the Lord? Well, what would have happened to Daniel's friends if they had foolishly refused help from the Son of God? Incineration! Horrifying as it seems, this is what faces all who spurn the Messiah of God (Matthew 13:49-50). As Shadrach, Meshach and Abednego received life from Jesus in the midst of the furnace, so we must receive Christ's life or perish (1 Corinthians 1:18).

Where are you? Are you safe in Christ's all-powerful and loving arms, washed clean of all your sins by His blood? Is your life hidden in His (Colossians 3:3)? Or are you in the forest of God's wrath, along with most of humanity? If the latter, please know that the divine fire is already licking at your heels; and the flames will grow larger and never go out—you will experience them for *all eternity* (Matthew 25:41).

Please humble yourself and recognize your guilt before God. Pray that His Spirit opens the eyes of your heart to see the beauty of Jesus as your Lord and Savior, leads you to renounce your rebellion against the Almighty, and causes you to believe in His Son, so that you may receive the clothes of Christ's righteousness. And please recognize that apart from Christ, there is no other safety (Acts 4:12). Jesus died to set His people free from their sins and shield them from the fiery wrath soon to be revealed (1 Thessalonians 1:10). May the God of infinite grace and mercy grant you repentance and saving faith in His Son (Mark 1:15; 2 Peter 1:4)!



*The LORD is my strength and my shield;
My heart trusts in Him, and I am helped;
Therefore my heart exults, And with my song
I shall thank Him. The LORD is their strength,
And He is a saving defense to His anointed.
Save Your people and bless Your inheritance;
Be their shepherd also, and carry them forever
(Psalm 28:7-9).*



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