

The Source of Man's Inventiveness

by Chard Berndt

“What will they think of next?” we remark, impressed by the latest gadgets and innovations offered. God has surely gifted us the collective mind to design and to solve, seemingly out of thin air. Some of these innovations are borne out of need (“necessity is the mother of invention”), while many, particularly today, originate out of adventure; technology has become the playground of science. But when we invent, or as it is defined, *produce or contrive (something previously unknown) by the use of ingenuity or imagination*, how original, really, are our ideas? We might be surprised to discover that motors, monitors, telescopes, control systems, codes, levers, and a multitude of technologies—at one time thought new—have been embedded all along in the workings of the creation.

In Ecclesiastes 1:9-10, Solomon said *there is nothing new under the sun. Is there anything of which one can say, “Look! This is something new”? It was here already, long ago; it was here before our time.* His words may speak of previous generations, but we might extrapolate his statement back to the Originator of generations and of mankind itself: Creator God. The great scientist and innovator Isaac Newton expressed the idea another way, by describing his work as *thinking God's thoughts after him*. Yes, God has imparted the capacity to invent, but rather than an original creative task, invention is more so the task of creative discovery: mimicking and putting man's mark upon what God—who always was—has already fashioned.

To begin, let's look at electricity. The advances that sparked the industrial revolution of the 1800's included various motors, all using the principle of electromagnetic induction. More than a hundred years later, biologists, learning that tiny cells and single-celled organisms are not as simple as they assumed, found within several types of bacteria DC brush motors already at work. These creatures move by means of “flagellum,” whiplike structures attached to tiny electrochemical motors that no person designed, but that look exactly like those invented. It is as if the invention was placed subconsciously into men's minds—as if God had whispered, *you could make it work this way—I've perfected the design already.*

God has also gone before us in the field of optics. This perhaps inspired Newton's aforementioned statement, as Newton discovered the color spectrum of light, and in 1672 invented the reflecting telescope. By the mid-1900s, a variety of inventors had contributed to the development of color television. Any child who has gazed closely at a TV screen (disregarding his mother's warning, of course), may have noticed with fascination that little dots of only three colors

(red, green, and blue) compose the entire multi-color image. These three “primary additive colors,” in various combinations of intensity, can produce any color due to the wave nature of light. And yet our eyes interpret color by the same process, decoding and separating what enters by means of color-sensitive chemicals in “cone cells.” The physical principles that broadcast an infinite number of colors via a single RGB (red-green-blue) display, also allow for colors to be interpreted with great efficiency in the eye.

Furthermore, our eyes also use lenses and the principle of refraction as do telescopes. Yet, *ears to hear and eyes to see—the Lord has made them both* (Proverbs 20:12), in designs long before the first telescope. God’s ingenuity, however, extends even beyond our most modern telescopes. These use large arrays—multiple radio receiving dishes spread out over large areas—to compile images of distant, faint heavenly objects. Where has this “new” technology long been at work? In the compound eyes of many adult insects. And this design God has applied lavishly, using approximately 25,000 lenslike “facets” to compose the eye of a single dragonfly!

Whereas a bacterium’s motor and both simple and compound eyes show God’s specific inventiveness, we also find some design principles applied more widely in the creation. In all living things, we observe sophisticated feedback systems, clever coding and copying schemes for information, and a variety of levers. We will conclude our examples with these three.

Most homes today include some type of temperature control system, using either heating or cooling systems, or both. A device, known as a thermostat, controls these systems. When the room temperature drops, some resulting change (such as the coiling of a bimetallic strip) causes a metal contact to drift toward another contact (in its simplest form, a slider which is set by a person). This eventually closes a circuit, which turns on a timed heating device. If, on the other hand, the room becomes too warm, the bimetallic strip will uncoil and force the contact toward an upper boundary slider, also set by a person. The closing of this upper circuit instead triggers a cooling unit. In this way, the temperature is kept around an ideal value. The smaller the range of comfort that someone can live with, the more that the two devices will have to operate to maintain the balance. In living things, balance is also required; homeothermic organisms such as ourselves must maintain a precise body temperature, and most organisms must also maintain an ideal range of pressure, hydration, or dissolved minerals. All of these are regulated by built in control devices, much like the thermostat. Such control mechanisms in biology are known as “homeostatic” systems.

Much as how a thermostat works, our bodies are triggered to cool off when we become too warm. Internal mechanisms trigger perspiration, expansion of blood vessels near the skin, or relaxation of muscles themselves. When we become too cool, we may begin to shiver in order to generate additional heat, or we may clasp our arms inward in order to conserve the heat we have.

We do not have to know the details, because God has designed our thermostat to keep internal body temperature very near 98.6 degrees Fahrenheit.

Plants also rely on homeostatic systems. Such perfect designs may actually operate quite simply. For example, the “stomata” (small openings underneath a leaf) allow for water vapor to exit the leaf (“transpiration”), so that a plant with more water than necessary does not, in a sense, drown itself. This works by means of paired, curved “guard cells” that, when tightened up by water pressure, stretch open each stoma to allow water vapor to escape. Should the plant approach dehydration, these guard cells lose their pressure. As they relax, the stomata close up, and water is conserved inside the leaf. In this way, a plant does not wilt every time that water is not available.

Ever since computers have allowed us to transmit huge amounts of digitized data, we have been working on more and more reliable ways to send or copy it from point A to point B. This is accomplished by the use of “parity bits,” redundant pieces of information that help the receiving device to check the quality of what it receives. Parity bits require a trade-off: more data than the actual desired information must be sent. So, some storage space and speed is sacrificed for accuracy, but without the overkill of sending every file twice and having the computer compare both. If most of the transmission is successful, a receiving device can correct any scattered errors automatically. If the errors are too numerous to correct, the software will usually be programmed to tell you so. Without these pesky error messages, we’d go on as if nothing had failed, and our data would become more and more corrupted.

In the same way, every living organism must transmit and copy huge volumes of encoded instructions, or the organism’s “genome.” Strands of DNA serve as the coding medium: long, skinny, spiraled ladders made up of only four base pairs—little chemical building blocks known as “codons.” The copying process uses its own version of parity bits: limited “rules” for the combination of these bases restrict most errors. This remarkably efficient system operates like a language containing the ideal number of letters for saying much, while doing so in a compact amount of space, with ease of copying. Every time a cell divides, or a new organism is conceived, a huge library of information is copied, and almost always perfectly so. Thus, what computer programmers have devised in the past century, God already designed even in the simplest organisms.

Finally, we look at levers. Most organisms rely on the leverage of muscles against skeletal structures. This is how we grasp, lift, and throw. And even simpler creatures, such as springtails (found in multitudes in fertile soil) and fleas, use leverage to launch their bodies distances many times their own length. All machines that multiply force (such as a pulley or ramp), or that multiply speed (such as a wheel and axle) replicate something found in living things.

These are just a few examples to show that we do not invent things independently of God. In a sense, God has invented all things already, and we are just combining and making use his blueprints and materials. But however remarkable it is that inventions often mimic natural processes—even when inventors are unaware—it is perhaps more fascinating to note those things which we *cannot* mimic or improve upon. Though mankind has “invented flight,” we have never been able to successfully fly *as birds fly*. Perhaps you have seen film footage of comical attempts made by men in flapping contraptions. We may go from city to city by jet, but God has reserved individual organism-controlled flight only for his flying creatures. We will *always* marvel at a soaring eagle and a darting hummingbird. And though we have efficient machines, lubricated by high-tech polymers, their moving parts still fall short of the wonderful knee joints of brutish oxen, thousands of times more slippery our best designs. Likewise, we may be able to capture the energy of light for various uses, but the complexity of photosynthesis, which occurs *en masse* in vegetation every day, is still not a feasible industrial process.

How wonderful are God’s works! How scientific—how technologically advanced! The next time we marvel at what “they” or “we” have come up with, we ought instead to remember the Source, and regard our inventions as creative discoveries that God has allowed us to share in. Maybe this mindset will help us to keep technology in perspective, and use it prudently.

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