

Creation and Intelligent Design Lesson 5: Wonders of God's Design, Part I

"Nature is too thin a screen; the glory of the omnipresent God bursts through everywhere."

Ralph Waldo Emerson

- Visitors, prayer requests, prayer

Control Systems—A Measure of System Complexity

1. Control systems are present in all higher-order systems to control/modify **behavior**
 - a. Consist of **many distinct subsystems**, all of which must **present and working**
 - b. Not enough to have better **hardware**—also need better **software!**
 - c. Remember, no examples of **learned behavior** becoming a **genetic trait**
 - i. And every use of an evolved, better piece of hardware would have to be **learned**
2. Control systems are a measure of **system complexity**
3. Seven types of control systems (in increasing order of complexity)
 - a. **Open loop** systems (0th order)
 - i. **Simplest** type of animated system
 - ii. **No feedback** to direct behavior (running without control)
 - b. **Closed loop** systems (1st order)
 - i. **Self-correcting** through **feedback**
 - (1) System needs a "**sensor**" mechanism and **feedback path**
 - ii. Feedback mechanism follows rigid, **pre-programmed rules**
 - c. **Adaptive** systems (2nd order)
 - i. Able to **adjust** the **type** and **amount of feedback** during operation
 - ii. "Adjustability" is **pre-programmed in**
 - (1) All control rules are present in the system
 - (2) Certain rules used/ignored as needed according to feedback
 - d. **Intelligent** systems (3rd order)
 - i. System "**learns**" how to **adjust** its own feedback based on **goals**
 - (1) This adaptability is **discovered by the system itself**
 - (2) Contains **fixed, pre-programmed rules** for basic survival
 - (3) **Additional** rules are **learned, implemented, and remembered** over time
 - ii. System can "**gracefully degrade**" (i.e. **compensate** for malfunctions)
 - e. **Self-repairing** systems (4th order)
 - i. Able to repair/replace malfunctioning components
 - ii. System can **correct** certain malfunctions
 - f. **Self-reproducing** systems (5th order)
 - i. The most complex type of physical systems on earth
 - ii. Able to **procreate** and "**perpetuate the species**"
 - g. **Omniscient** systems (6th order)
 - i. The **most complex** system possible
 - ii. **All-knowing, all-powerful**
 - iii. Able to **create all other types** of self-reproducing systems
4. Each jump above represents **orders of magnitude** jumps in **complexity**
5. Living systems consist of many "**Systems of Systems**"—*extremely complex*

• Electric fan

• Thermostat w/ AC unit and governor

• Auto-switching heat/AC unit
• ABS brakes (wet, dry, fast, slow)

Computer-based systems
• Chess
• "Agents" (MS Help)
• Car engine computer

Learned behavior can be passed on via teaching, but not genetics (no evidence of this)!

• Biological systems

Fast Facts

Monarch “trivia:”

- ½ gram (5 per penny)
- 2000 mile trip
- 50 miles/day
- 100 million Monarchs!
- Navigation—how? (magnetic, terrain mapping)

- **Flying creatures** are amazing—**efficient** physical structures, **flight-capable** hardware; extraordinary **navigational** abilities
- **Monarch butterflies** have a **lifespan** of about **four to six weeks**. In early spring, they’re found in **southern states**. By late spring, they’ve moved steadily north into **Minnesota, Massachusetts** and **southern Canada**, following the **milkweed**. Here they **breed** all summer. In early fall, however, one generation is born that can survive **much longer**—for approximately **eight months**—long enough to migrate to one of just a few **specific nesting sites** in the interior of **central Mexico**—5-6 million per acre! There they wait out the winter, then **fly back** to the southern U.S. in early spring, **lay eggs** and **die**, and the **cycle repeats**. The Monarchs that make the Mexico journey do so **only once** (and they don’t even flock)—and yet each generation flies to the **same spot** year after year. Wow!



- Bats are the only mammals that fly
- A 1,000,000 bat colony locates and eats **200 tons** of insects per **night**—in the **dark!**
- They have fairly good **eyesight**, but they **fly, navigate** and **hunt** using a sophisticated form of **sonar**
- Bat’s sonar is **ultrasonic**, in the 50Khz to 200Khz range (short “**clicks**” of HF sound)
- Bats pick up the **echoes** of these clicks to **locate objects**. So **sensitive** that they can **distinguish** between **different** types of **insects**, choosing the kinds they like to **eat!**
- Sonar allows them to determine **size, relative velocity**, even **texture** of objects (a bat can differentiate between ripples created by a **fish**, an **insect**, or a **leaf** falling on a pond)
- They also **avoid collisions** with objects—and each other—using sonar. When scared out of sleep, thousands and thousands of frightened bats will **swirl frantically**, but will avoid cave walls and each other. They are able to **distinguish their own echoes** from the echoes of all the other bats **occurring at the same time!** We don’t know just how, but they do.
- There are currently **17 species of Penguins** (fossils indicate there were more in the past)
- Penguins are **birds** (lay **eggs**, have **feathers**, breathe **air**, have **clawed feet** and **beaks**)
- Penguins are **uniquely suited** for an aquatic life in **Antarctica**—wings that function as short **flippers** for swimming, feet (at the **end** of the body, **not the middle** like other birds) for **waddling** on the ice and **steering** in the water, feathers with special **tufts** at the base to form a **mat** that wind and water can’t penetrate, and a thick layer of **blubber**.
- After courtship and mating, a female emperor penguin lays her **single egg** and heads out to sea to feed. The **male** (who hasn’t eaten for almost two months at this point) stays behind to sit with the egg. He **balances the egg** on his **feet**, keeping it warm with his body for **two more months without eating**. She arrives back **just in time** to feed the newly hatched chick. The parents spend the next five months taking two-week turns caring for the chick (recognized by its voice from **thousands** of others!) and hunting.

- **Salmon**—persistence personified!
- Born in **freshwater** streams high in the mountains
- They live there for a **few weeks** to as long as **three years**, depending on the species
- One **spring evening** they begin swimming for the **ocean**. And remember, they’re going where they’ve never been before and no one shows them the way!
- Once in the ocean, they live for 1-4 years, depending on the species (*NB*: These fresh water fish have special biological systems that let them live in **salt water**!)
- While in the ocean they swim **thousands of miles** in great migration circles
- Finally, after several years in the ocean, they begin the journey back to their **birthplace** (their *exact* birthplace—they all arrive within a few weeks of each other, in mid-late October)
- As they start upstream, they **switch back** to “freshwater” mode!
- They survive on **instinct** and **desire**—**no food** is eaten once they begin the return trip
- Salmon can **leap** out more than **six feet**! They **routinely** overcome **water falls**.
- Overall, they traverse **hundreds of streams, creeks, and tributaries**
- Once they reach their **destination**, they **spawn** and **die** and the cycle begins again
- Even if they are caught as juveniles and released in a different place before beginning their journey, they will find their original birthplace!
- How do they do it? **Smell!** Highly specialized scent glands guide them home.
- Salmon can detect the chemical “**signature**” or “**fingerprint**” of their birthplace. They can distinguish chemicals down to **1 part per billion** (that’s like detecting a tablespoon of salt across a distance of 18 Olympic-sized swimming pools!)
- **Prairie Creek Hatchery**—Salmon got back to the hatching pond via drainpipes!

“Who teaches us more than the beasts of the earth and makes us wiser than the birds of the heavens?”

Job 35:11

“Look at the birds of the air, that they do not sow, nor reap nor gather into barns, and yet your heavenly Father feeds them. Are you not worth much more than they?”

Matt 6:26

The Woodpecker

- 214 species of **woodpeckers**—with some **very interesting varieties**
 - Woodpeckers drill new nest holes each year—other birds **depend** on these old nests
 - Woodpeckers can eat as many as **3000 ants per day** (1000 at a single sitting!)
 - Woodpeckers are found on **all continents** except **Australia**
1. What do woodpeckers do? They drill holes with their beaks, right? Why?
 - a. To find **food** (wood-boring insects—tree **sap** contains **ants** and **beetles**)
 - b. To excavate **homes** (symbiotic relationship with other birds and small animals)
 - c. To defend **territory** (via **noise**, but **sap** also **repels snakes** by getting in their scales)
 - d. Attract a **mate** (quick, loud “drumming,” then pause and repeat)
 - i. Boys do more drumming than girls!
 2. Woodpeckers are an **excellent example** of a **designed system**
 - a. Many **highly specialized** subsystems **organized** to work **together**
 - b. All subsystems must be **present** and **fully functional** for the woodpecker to function
 - c. We see this over and over in **God’s design**

Runs counter to the “natural selection working on random variation” of evolution.

3. **Specialized feet**
 - a. Most birds perch, but not woodpeckers
 - b. Two toes pointing **backwards**, two pointing **forward**
 - i. Like having an extra thumb!
 - c. All four toes have **barbs** to hook into tree trunks
 - i. The woodpecker needs a **firm anchor** when pounding on trees!
4. **Reinforced tail feathers**
 - a. **Short** and **stiff**—aerodynamic, but also designed for **strength**
 - b. Used to **brace** the bird against the trunk
 - i. Provides **leverage** and adds to pecking force
5. **Beak is strong and sharp**
 - a. They've been known to peck through “woodpecker-proof” **concrete boxes!**
6. A highly effective **shock absorber** between head and beak
 - a. Far **better** than **man-made** shock absorbers
 - b. Woodpecker pecks about **15-16** times per second
 - c. One peck delivers a **stress equivalent** to **1000 times** the force of **gravity**
 - i. More than **250 times** the stress on an **astronaut** during a **rocket launch!**
 - d. Woodpeckers can pound on **hard wood** for **five or six hours per day**
 - i. That's $16 \times 60 \times 60 \times 6 = 345,600$ **pecks per day!!** (@ 1000 times the force of gravity!)
 - ii. And **don't forget** those concrete boxes!
7. Three **specialized** sets of **muscles** to enable this strong pecking action
 - i. Strong **pecking muscles**
 - ii. If the woodpecker's **head** were to **twist** even slightly while hammering the tree, the rotation of its head, combined with the pecking force, would **tear away the bird's beak**. But the woodpecker was designed with **superbly coordinated neck muscles** to keep its head **perfectly straight**
 - iii. For **added protection** to its **brain**, the woodpecker has **special muscles** which **pull its brain-case away from its beak** every time it strikes a blow
 - iv. Ask yourself, if these systems simply evolved, what good was the first “improvement” without the other two? And the second without the third?
8. Special **slit-like nostrils** covered by fine wiry feathers **keep out the sawdust**
 - a. Other birds don't have such protection
9. A very interesting (and controversial—see below) **tongue**
 - a. Woodpecker **seldom** drills right into an insect nest
 - b. After drilling, must follow insect **tunnels** inside wood to find bugs
 - c. In some woodpeckers, the **tongue is longer** than the **bird**
 - i. Not all woodpeckers have long tongues
 - ii. Long tongues are not unique to woodpeckers
 - d. Tongue has **barbs** and manufactures a **special glue** to trap and hold bugs
10. Together, these features **set the woodpecker apart** from other birds
 - a. Features function **as a system to allow** the woodpecker to survive
 - b. I believe woodpeckers are an **engineered system**—engineered by **God!**

“But now ask the beasts and let them teach you; And the birds of the heavens, and let them tell you. Or speak to the earth and let it teach you; And let the fish of the sea declare to you. Who among all these does not know that the hand of the Lord has done this, in whose hand is the life of every living thing, and the breath of all mankind?”

Job 12:7-10

- c. The birds really do tell us “*that the hand of the Lord has done this*”
- 11. The **topic** of the woodpecker’s tongue is **highly controversial**
 - a. This has become a flashpoint between creationists and evolutionists
 - b. Many creationist publications point to this tongue as evidence that the woodpecker’s tongue couldn’t have evolved, that it’s just too bizarre to have happened by chance
 - c. Alternatively, many evolutionist publications take issue with this and claim that the tongue is a perfect example of evolution—that it has all the parts of a “normal” tongue, just better suited to the job of eating bugs from deep within trees
 - d. For an interesting explanation of woodpecker’s tongue, see Rusty Ryan’s webpage:
 - i. <http://omega.med.yale.edu/~rjr38/Woodpecker.htm>

“As the following information shows, however, the strange tongue of woodpeckers is actually just an elongated version of that found in all birds, and is in fact a perfect example of how anatomical structures can be shaped into new forms by mutations and natural selection.” (Rusty Ryan)
 - ii. Warning—Mr. Ryan is **critical** of creationism and creationists
 - (1) Deserves some consideration—even creationists can lie and distort the truth
 - e. A very complete set of **creation and evolution links** can be found at http://nsmserver2.fullerton.edu/departments/chemistry/evolution_creation/web/#23
 - i. Syllabus for an **honors seminar** class on **evolution and creation** from James Hofmann (philosophy prof) and Bruce Weber (biochem prof), Cal State (Fullerton)
 - ii. Many, many links on both sides of the debate
 - iii. Warning—both sides are dominated by camps with very specific agendas!
 - f. But remember, it’s not just about the **facts**, but also about **conclusions**!