

**C**SAA's featured speaker for Creation Weekend 2011 was well known creation apologist Dr. Jerry Bergman. Large numbers of people came to hear one or more of his lectures and all declared themselves delighted with his genial, non-confrontational manner and his interesting material. In that Dr. Bergman's area of exper-

Church officials had never objected to similar views promoted by Copernicus (1473-1543) from Poland. Initially the Italian Church officials were very friendly to Galileo and they showered him with honours. There were however among the ranks of his fellow scientists, some who were jealous of the attention paid to Galileo. One of the problems for Galileo also was that the actual observations of the sky made at that time, did not fit well with the heliocentric position.



**Why Ugly Bats are Beautiful!**

If bats were prettier to look at, we might appreciate their amazing talents more. The fact is that bats exhibit some astonishing design features which our engineers and technologists really envy. Traditionally scientists have grouped bats according to their food preferences. There are the fruit bats with good eyesight, the insect consuming, echolocating bats and the vampire or blood consuming bats. Further research has revealed how amazingly these animals are designed for their life styles. Such studies have also revealed that the old fashioned ways of categorizing the creatures according to lifestyle and physical appearance do not really work. This has had some serious implications for ideas concerning whether Darwinian evolution could ever work or not.

The three species of vampire bats all live in the Americas. These ugly looking creatures need blood meals to live. Obviously they need to find a blood vessel in a victim that will allow blood to flow freely. This is not the easiest of tasks, but vampire bats have a special design feature which allows them to find good blood sources. In their upper lip and modified noseleaf, they have special nerve endings which are more sensitive than most nerves to body heat. These special tissues in the face allow them to find hot spots on the bodies of their victims. Here the blood vessels are located close to the surface. The bat nips the skin with his teeth in order to drink the flowing blood.

Many animals of course display normal heat receptors all over the body. These receptors are designed to respond to

- Continued on page 3

## ENTHUSIASTIC RECEPTION FOR DR. JERRY BERGMAN

tise is biology, chemistry and medical anatomy, the issues he discussed were quite different from the geological topics which we have considered in recent years. This material demonstrated anew that the issue of creation is



**By MOXIE** broad and encompasses all aspects of nature.

The first lecture, on Friday evening, dealt with Galileo (1564-1642), the famous Italian astronomer who ostensibly ran into trouble because of his support for the heliocentric view of our solar system (sun in the centre rather than the earth). Most students have heard the story of how the Church of his day persecuted Galileo on account of his interpretation of the solar system. The idea is that the Church, in order to protect dogma, tried to silence somebody who was describing nature as it is. Obviously we see portrayed the popularly imagined confrontation between religion and science. And the implication is made that Christians have been indulging in similar confrontations with science ever since. That however is not what happened in the case of Galileo, declared Dr. Bergman.

Eventually Galileo's enemies managed to bring about a judicial inquiry on the part of the Church into the truth of the issue. The process is termed inquisition or inquiry, but it was nothing like the infamous Spanish inquisition. Thus the story of Galileo is not one of the Church fighting science, but of one set of scientists seeking to repress another scientist whose professional honours they coveted. This is not the story of religious persecution of science as many today would maintain. We should further note that all the

- Continued on page 7



**By Margaret Helder**

# Exactly How Does a Caterpillar Become a Butterfly?

**H**ave you ever wondered how this transformation takes place? The caterpillar makes his cocoon (or chrysalis) and out pops the butterfly – pretty simple, right? Simple – until you realize that nearly every single organ in the caterpillar body is destroyed and then remade into a beautiful butterfly. Eat leaves? Now change your diet to drinking nectar. Those tiny suction-cupped feet? Forget those – now you can fly with wings that make the whole world envious of your beauty.

explored, allowing us to see the detail of a butterfly wing, and the complexity of their eyes.

Then came the part my children were fascinated by - the migration of the Monarch butterflies. Beautiful pictures of the migrating butterflies, and cool facts about the mystery of this phenomenon are presented. The yearly ~2500 mile migration is accomplished by butterflies that have never made this trip before, yet with their tiny brain they migrate to the same locations each year.

Every aspect of the butterfly's life cycle is a conundrum for the evolutionist. How can simple mutations lead to such a complex transformation? There is insightful discussion on the implausibility of evolution to account for the metamorphosis of caterpillar to butterfly. The great question and answer section in the bonus features is worthwhile and should not be overlooked.

This video is ideally suited for children aged 12 and up and provides some excellent discussion topics. Younger ones will enjoy the impressive scenes and the incredible beauty of butterflies portrayed in this video but will get lost in the actual details of the metamorphosis.

I would definitely recommend this video for all nature lovers; especially for those who have always wondered exactly how a caterpillar becomes a butterfly.

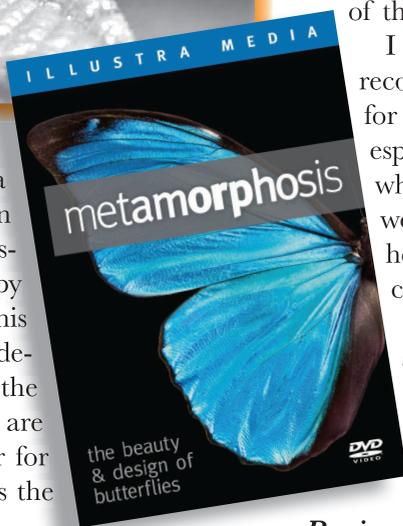
*Metamorphosis: the beauty and design of butterflies.* Illustra Media. DVD. 64 minutes

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*Reviewed by Catherine  
and Anthony Neumann and family*



**Metamorphosis** provides a window into the transformation of a caterpillar to a butterfly. Using scanning electron microscopy and magnetic resonance images this feature provides some amazing details of the transformation within the cocoon. These complex details are explained in a very clear manner for the average 12 year old as well as the science enthusiast.

The intricacies of butterflies are also



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*Creation Science Dialogue* is a quarterly publication of the Creation Science Association of Alberta (CSAA).

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# Why Ugly Bats are Beautiful!

- Continued from Page 1

heat that is dangerous to the health of the creature. This applies to vampire bats as well. However in some nerves in the face of vampire bats, the nerves instead respond to a heat source which is much lower, about 30 degrees C. This protein receptor in the heat sensing nerves is unique to vampire bats and the way that this new sensor works is really astonishing.

There is a gene which scientists label *Trpv1* which is found in all nerve cells sensitive to heat. This includes nerve cells all over the bodies of bats. In the case of the special nerve endings in vampire bat faces, the gene is the same. However those cells express an alternative form of the message derived from the gene. Into the blue print to build the protein (i.e. the information copied from the DNA molecule), a tiny piece of genetic information only 23 base pairs long is spliced. That tiny insert causes the construction of the protein to end somewhat prematurely, resulting in a molecule that lacks the last 62 amino acids. This is a very minimal difference in a large protein molecule, but that is what allows these cells to respond to the temperature range of hot spots in a victim's body.

In the genetic code, base pairs are like rungs along the DNA molecule's spiral length. Each rung also represents one of four choices of letter. Three letters or rungs in a row, code for an amino acid. In a protein molecule there might be 1000 amino acids or more. Thus the 23 base pair insertion in the case of the vampire bat protein, would only code for 7 amino acids. Yet this tiny insertion changes the whole character of the protein and this change allows for a whole different life style for the creature. Moreover this changed expression of the protein happens only in the appropriate nerve cells in the bat's face, not anywhere else in the body.

Since the ability by bats to detect infrared radiation (heat) is so different from in snakes, scientists consider that there is no evolutionary connection between the two designs.



Either each appeared as a spontaneous or novel feature, however complicated, or each was separately designed in its entirety.

It is the engineering triumph of echolocation (like sonar) however which really commands our attention. This system is truly complicated with many features that must work precisely. The bat must produce powerful ultrasonic signals which will bounce off objects and travel back as echoes. The creature must know the mathematic characteristics of the sound emitted in order to be able to compare it with the echo. The echo will be much softer, so the creature must be able to hear the incoming signal. Often the tempo of sounds emitted will include intervals between notes so that the incoming echoes can be heard. The bat must be able to judge its own position and speed relative to the returning

echo which indicates the position and speed of the target object. This ability requires special mathematical programs in the brain to calculate the differences in speed and constantly changing location.

As far as the bats themselves are concerned, one might imagine that the echolocating bats would represent a cluster of creatures with other features in common. Even when the echolocating system is similar however, there are bats which seem closer in their genetics to the fruit bats. In addition, one fruit bat echolocates by means of tongue clicks instead of noise from the larynx. Does this represent a separate group too?



When one considers echolocation, scientists now declare that this complex capability arose spontaneously at least seven or eight times. We see similar fancy systems in whales, bats, shrews, tenrecs (hedgehog like mammal native to Madagascar) as well as in oilbirds and cave swiftlets (another bird.) And the ability to detect infrared radiation arose, scientists now declare, twice independently in snakes and once independently in bats. Scientists use the word "convergence" to cover situations where descent with modification is not a convincing explanation for the source of the feature. Thus convergence means separate appearance for no obvious cause. The alternative explanation for these situations of course is separate designs. God used his tool kit of wonderful design features as he saw fit, conferring them on similar or very different creatures for our interest and delight.

Recently scientists have discovered that the ability of bats to sense their environment is even more sensitive than previously imagined. In 2010, a team of scientists reported that some echolocating bats can control the width of the ultrasonic beam which they emit. The subject of this study involved bats that release sounds from their larynx, which is by far the most common method. More recently, another team investigated whether the tongue clicking Egyptian fruit bats are similarly versatile in their ability to respond to variation in the environment. This team found that Egyptian fruit bats simultaneously direct one beam of sound to the left and another to the right. They do this by aiming consecutive clicks in opposite directions. As the environment becomes more cluttered with objects, the angle between the two beams of sound becomes wider (and the beam thus broader). This enables the animal to focus on a particular object while paying less attention to other distracting structures in the environment. Also as the bat closes in on his target, the beam becomes broader and the sound more intense. This degree of sophistication in this echolocating system is a surprise to everyone.

Many scientists claim that biochemical details from DNA sequencing confirm ideas about descent with modification which were developed over many years from anatomical comparisons.

The molecular details however have turned upside down ideas about evolutionary relationships (descent with modification). Often we hear about "convergence" or separate appearance of highly complicated features. It was not convincing when the argument was for the spontaneous appearance of even one complex system, but to suggest that it could happen multiple times, really strains credulity! What these amazing designs really demonstrate is the choices of an awesome Creator!

References: *Nature* Jan 13/00 pp. 188-192; Feb. 18/10 pp. 939-942; Apr 15/10 pp. 1006-1011; Aug 4/11 pp. 88-91; *PLoS Biol.* September 13/11.



# The Egg Creation's Perfect Package

**E**ggs are complex structures designed to allow the embryo to develop outside of the mother's body. An animal egg (Latin, ovum) provides a protective shell in which an embryo can develop. In most birds, reptiles, insects, mollusks, fish, and monotremes (mammals that lay eggs instead of giving birth to live young), the egg contains an ovum or, if fertilized, a zygote. A zygote results from fertilization of an ovum, and develops into an embryo.

By  
Jerry  
Bergman

After the egg is appropriately produced, it is expelled from the mother's body. If fertilized, it further develops until the organism can survive on its own. When adequately developed, the embryo breaks out of the egg's shell to begin its life in the outside world, a process called hatching. Some embryos have a temporary egg tooth with which to crack, or break the egg's covering or eggshell. A few days after hatching, the egg tooth is no longer needed and is absorbed. Baby animals that have just hatched are called *hatchlings*, and standard names are used for babies of each particular species, such as "chick" for a baby chicken. Animals that lay eggs are called *oviparous* and the study of eggs (and also the hobby of collecting eggs, commonly bird eggs) is termed *oology*. The embryo develops from the small germinal disc located on the egg yoke edge.

## The Eggshell

Eggs typically have an outer covering called a shell consisting of calcium carbonate. Reptile eggs, bird eggs, and monotreme eggs, which are laid on dry land, are all surrounded by a protective eggshell that can be either flexible or hard and inflexible, as is the familiar chicken egg. The shell of a bird's egg is a remarkable piece of engineering. It is very lightweight, but the shell is often so strong that it takes some birds over a day to chip their way through it to the outside world.

A shell membrane separates the eggshell from the albumen, or egg white, a gelatin-like substance that provides food for the growing embryo. Two layers of albumen exist, a thick albumen near the yolk and a thin layer near the eggshell. Between the eggshell and the shell membrane is a space called an *air chamber* designed to hold air. In the center

of the egg is the yolk, a yellow liquid, and the germ spot, the zygote. A string like-structure inside at each end of the shell, called the *chalaza*, is attached to the yolk or nucleus to hold the yolk in the same position no matter how the egg is turned.

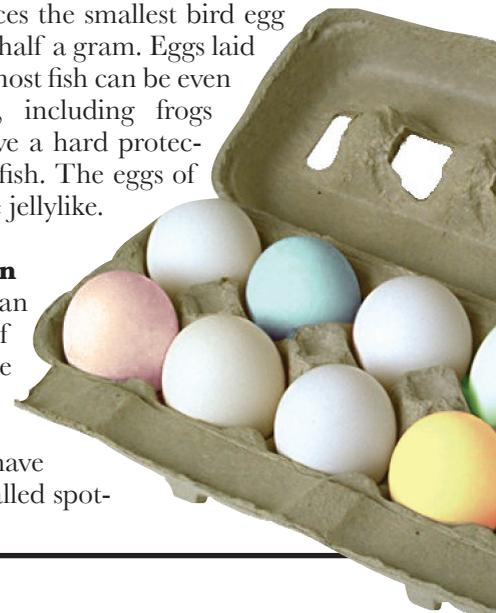
The specific construction of bird eggshells varies enormously. For example, duck eggs are oily and waterproof, cormorant (medium-to-large seabirds) eggs are rough and chalky, tinamou eggs are shiny and very colorful, and emu and cassowary eggs are rough, grainy and heavily pitted. The small pores in the hard eggshells allow the embryo to breathe oxygen and expel carbon dioxide. The domestic hen's egg has around 7,500 microscopic pores and some have as many as 17,000. The small pores also allow pathogens to enter, a problem solved in most vertebrate eggs by the production of lysozymes, an effective anti-bacterial enzyme, and several membranes.

The membranes that surround these eggs are typical of all amniotes (terrestrial tetrapods or four footed creatures that lay eggs, including mammals). Eggs laid on the dry land or in nests are usually kept by the mother within a temperature range that is favorable to the embryo's development.

The largest known egg is the 1.5 kg (3.3 lb) ostrich egg, although some extinct dinosaurs had larger eggs. The Bee Hummingbird produces the smallest bird egg known, which weighs half a gram. Eggs laid by some reptiles and most fish can be even smaller. Amphibians, including frogs and toads, do not have a hard protective egg shell, nor do fish. The eggs of these latter groups are jellylike.

## Eggshell Coloration

Eggshells have an amazing variety of solid colors that range from white to bright blue, purple, and even black. They may also have a mixture of colors called spot-



ting. The color of individual eggs is both environmentally influenced and genetically inherited through the mother, suggesting that the gene responsible for egg pigmentation is on the sex-determining W chromosome (female birds are WZ, males ZZ). The default color of all vertebrate eggs is white, produced by the calcium carbonate from which shells are constructed. The green or blue color comes from biliverdin pigments and a brown “ground” color from zinc chelate. Protoporphyrin (a protein that imparts color to the egg) produces a reddish brown color or a spotting paint.

In species which nest in large groups, such as the Common Guillemot, each female’s eggs have very different markings which allow females to identify their own eggs on the crowded cliff ledges on which they breed. Birds typically have white eggs except in certain ground-nesting birds that use egg markings for camouflage. Examples include the colored Charadriiformes (a diverse order of small to medium-large birds, most of which live near water) and non-passerines (birds that have feet designed for specific functions, like webbed feet for swimming or feet for grabbing prey).

### Brood Parasitism

When one bird species lays its eggs in the nest of another it is called bird brood parasitism. Some brood parasitic birds, such as cuckoos, have egg coloration that matches eggs of the host passerine (perching birds or, less accurately, songbirds; includes more than half of all bird species). In some cases, the host’s eggs are removed or eaten by the invading female, or expelled from the nest by her chicks. Brood parasites include the cowbirds and many Old World cuckoos. In contrast to the general rule, most passerines lay colored eggs, even if there is no camouflage requirement for cryptic colors (coloration designed for camouflage, from *crypsis* meaning hiding).

The protoporphyrin markings on passerine eggs function to reduce shell brittleness by acting as a solid-state lubricant. If insufficient calcium exists in the bird’s feed, the eggshells may be too thin, especially in the circle area around the broad end. Protoporphyrin speckling compensates for the brittleness caused by thin eggshells, and protoporphyrin increases inversely to the amount of calcium in a bird’s diet. For this reason eggs laid later in a clutch are more spotted than earlier ones because the female’s calcium store is often increasingly depleted with each egg produced.

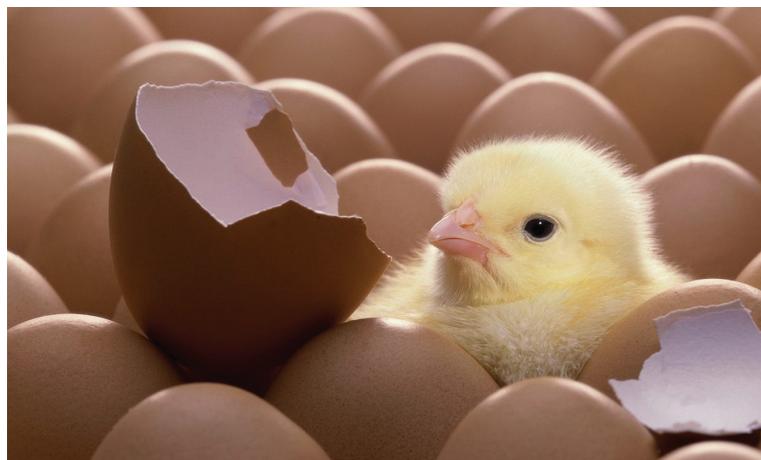
It was once believed that the color was applied to the shell immediately before laying, but research has shown that coloration is an integral part of shell development, and the same protein is also responsible

for depositing calcium carbonate, or the protoporphyrins, when a lack of that mineral exists.

### The Egg Shape

Most bird eggs have an oval shape, with one end rounded and the other end more pointed. This shape results from the egg being forced through the bird’s oviduct by muscles that contract behind the egg, pushing it forward. The egg’s wall is often still slightly malleable when expelled, and the pointed end forms at the back. Cliff-nesting birds often have highly conical eggs because this design of the egg makes it less likely to roll off the cliff. Instead, they roll around in a tight circle. In contrast, many hole-nesting birds tend to have nearly spherical eggs.

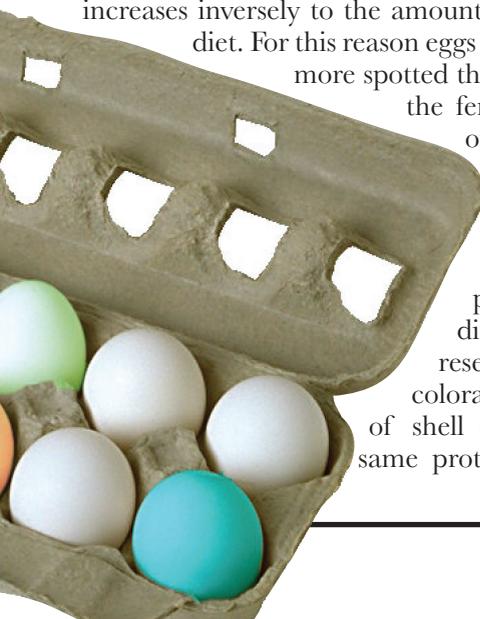
The weight bearing capacity of many eggs is well known and derives partly from their shape. The more pointed end



of many eggs is a natural example of an arch continued around in three dimensions to form a dome. The eggshell is strong under compression because domes exhibit horizontal and vertical resistance so that compression, applied to any one point, is evenly distributed across the entire surface. The more sharply curved the dome, the stronger its resistance to compression will be. Thus eggs will not be crushed by the weight of the incubating mother bird.

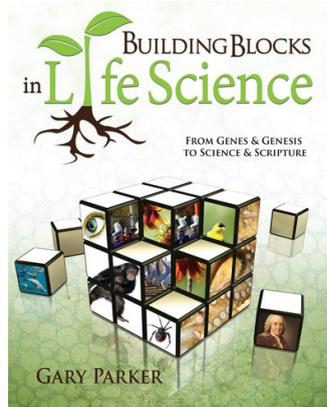
### Evolution of the Animal Egg

No evidence exists for the evolution of animal eggs. Sexual reproduction involving the production of eggs has “continued, unaltered in essentials, almost since animal life began” (Robert Burton, 1987, *Eggs: Nature’s Perfect Package*. New York: Facts on File p. 10). Other than this, little else can be said about egg evolution except that “Whatever the reason for the evolution of sex, it is found at all levels of the animal kingdom and the egg in its many forms is its manifestation” (Burton, p. 12). Many fossil eggs have been found, especially dinosaur eggs, but as far as can be determined from the abundant number of fossils found, eggs have always been close to identical to modern egg types, all wonderfully designed.



# Illuminating Modern Biology with Scripture

Of the many experts who explain nature to us in terms of Biblical revelation, Dr. Gary Parker, is one of the most delightful. He is non-confrontational, clearly happy with the material under discussion, and truly a pleasure to read (or to view on dvd). His new book *Building Blocks in Life Science* is no exception. Do genes, chromosomes and DNA seem way beyond your interests? Gary Parker not only makes them interesting and understandable, but he also places the details in the context of Scripture. For example he demonstrates that chemicals can never on their own form living cells because that requires exquisite organization and the work of God. Also he shows how easily the grandchildren of Adam and Eve could have included individuals representing



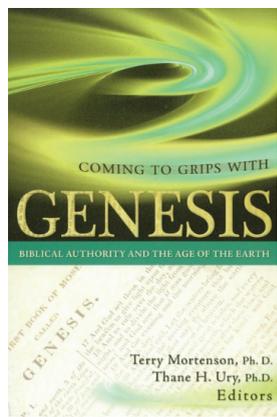
all the major human races. There was no need for millions of years, just simple genetics. And natural selection serves to protect created kinds, it does not lead to new life forms.

Interested adults too long frustrated by such topics as DNA, will find this book user friendly. The numerous line drawings certainly contribute to the discussion. Dr. Parker provides many drawings

of biochemical molecules and numerous drawings enhance the discussion of how DNA works. He even tells us why we should care about these issues. Besides adults new to these topics, the book provides excellent supplemental discussion for students who have studied these issues or are about to study them.

Gary Parker. 2011. *Building Blocks in Life Science: from Genes & Genesis to Science and Scripture*. Master Books. Pp. 158.

Since Genesis is so foundational, Christians have always paid a lot of attention to it. This is as it should be. But do we need yet another book on the topic? Well yes, we do. Many Christians are unaware of the situation, but there is an elephant in the room and it is scientific declarations about the age of the earth. Over the past two hundred years, more and more Christians have come to accept scientific views on deep time. These people consider that this issue has minimal impact on their Christian faith. In this they are wrong. This recent book discusses how supporting deep time impacts our understanding of the whole Bible. This is a scholarly volume, written for academics and seminary students, but also of interest to people like you and me.



My favourite chapters include the teachings of the church fathers on Genesis; the views of Luther, Calvin and Wesley on the traditional orthodox interpretation; modern hermeneutical approaches to Genesis 1-11; a critique of the framework hypothesis; and how Luther, Calvin and Wesley explained where natural evil came from. In the words of the editors of this book, it all boils down to “Ultimately what is at stake in this controversy about the age of the earth is the perspicuity and authority of Scripture.” (p. 433) The reader may well be surprised at how many aspects of doctrine are impacted by the issue of long ages. CSAA sells this book for \$15.00 plus shipping.

Terry Mortenson and Thane H Ury (Eds.). 2008. *Coming to Grips with Genesis: Biblical Authority and the Age of the Earth*. Master Books. pp. 486.



## ENTHUSIASTIC RECEPTION FOR DR. JERRY BERGMAN

*Continued from Page 1*

references cited by Dr. Bergman in this lecture and the others, were secular and major authorities in their fields.

The second lecture on Saturday morning, dealt with the Neanderthals, whose skeletal remains were first found near Dusseldorf Germany in 1856. After discussing various imaginative depictions of who and what these artifacts represented, Dr. Bergman discussed more modern findings and conclusions. When reconstructions are made from the bones, modern authorities conclude that the people looked modern. Judging by associated artifacts, modern authorities conclude that the Neanderthals wore clothes, makeup, jewelry, and they had musical instruments and paintings. In short, the Neanderthals were fully modern individuals who lived in a cold climate in Europe. We and they constitute one species, not two. There are no signs of human evolution here.

Dr. Bergman's discussion of mutations was definitely more technical than the previous two topics. However he moderated that impact with pictures of some mutations. One of the more amusing was the story of Belgian Blue cattle which were bred for their increased muscle mass and tender quality of the meat. The mutation however resulted from a small loss of information (11 base pairs for any technically minded readers). One gentleman in the audience, told us that he once owned a Belgian Blue bull. It was his worst investment ever, he said, and it soon died!

Such sad cases set the stage for a discussion of mutations in terms of details in the DNA. There are, for example, mutation hotspots, which lead to the same mistake, time after time. This is not going to add new information. He cited one population in which only two mutations were observed to account for 94% of all the mutations observed. He stressed that there are no good examples of beneficial mutations which add information to the cell or organism instead of adding to the fitness costs (meaning a mutation is more fit in a narrow environment but less fit in most environments). Many mutations are of very minor effect, but over time these can accumulate to the point where a species becomes extinct. Moreover the expression of DNA in humans is so complex that most mutations actually affect multiple traits. The same stretch of DNA typically will exhibit multiple reading frames [parts are combined in different ways], so one potentially positive mutation often displays at least some negative impacts.

On Saturday evening, Dr. Bergman discussed irreducible complexity or design. He began by pointing out that

the whole universe is too complex to have developed spontaneously. He defined complexity as any phenomenon that requires two or more parts in order to function. The elements that make up chemical compounds, of course, have to operate in a reliable fashion or there would be no structure in the universe and no life would be possible. The elements are made up of specific component parts which are themselves made up of even smaller component parts. What that means is that without precision in every aspect of the natural laws, nothing would exist. Such precision is highly improbable unless the system were designed for a purpose.

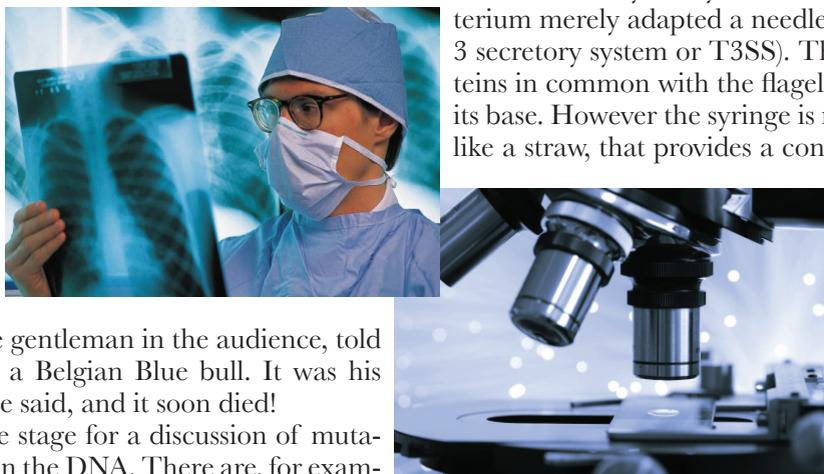
From there Dr. Bergman turned his attention to the living cell, the most complex machine in the universe. One of the phenomena which he discussed is the famous flagellum (a structure on many bacteria that works like a propeller) displayed by the bacterium *E. coli*. The construction of the flagellum is extremely complicated, requiring about 70 kinds of large precisely shaped proteins that must be properly organized and assembled to direct the system. The production of each protein is controlled by a suitable lengthy section of DNA, the expression of which is controlled by other proteins which are read from other lengthy sections of DNA. Today many evolutionists suggest that this bacterium merely adapted a needle nose syringe system (type 3 secretory system or T3SS). The T3SS shares a few proteins in common with the flagellum and it looks similar at its base. However the syringe is merely a stationary system like a straw, that provides a conduit to inject toxic chemicals into another cell.

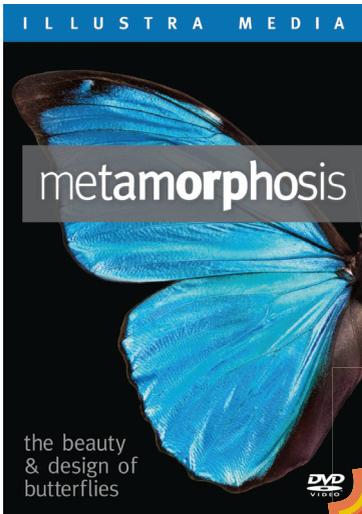
It would be quite the engineering feat to adapt that straw secretory system into a machine that spins 6000-17,000 rpm and can stop and change direction almost instantaneously. Of course the new machine would also need a power source and

a steering mechanism. All this is quite a tall order for spontaneous processes to produce something that is functional at the same time! If the component parts did not all appear together as a unit, the first appearing would be lost again before the rest of the system could have developed.

Dr. Bergman declared in summary that the new information which appears each week in the scientific literature, dramatically adds to the story of how intricate and wonderfully designed all life is, beginning with that fundamental unit of life, the cell.

After each lecture Dr. Bergman answered many diverse questions. Altogether everyone felt encouraged to further consider the issues that were covered. From Edmonton, Dr. Bergman travelled to Kelowna where he delivered three lectures at the University of British Columbia Okanagan Campus and Creation Kelowna, before travelling back home to Ohio.





## Metamorphosis: the beauty and design of butterflies.

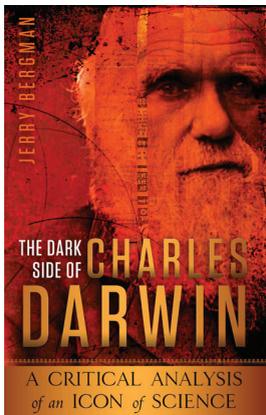
DVD Illustra Media

From caterpillars to the amazing details of what happens in the chrysalis, to astonishing details of the Monarch butterflies' migration patterns, this DVD is certain to provide new insights, even to nature lovers. The discussion concludes that beauty is not essential to survival, it is an optional extra which bears striking testimony to the character of the designer.

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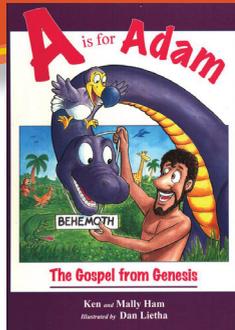
## The Dark Side of Charles Darwin

Jerry Bergman

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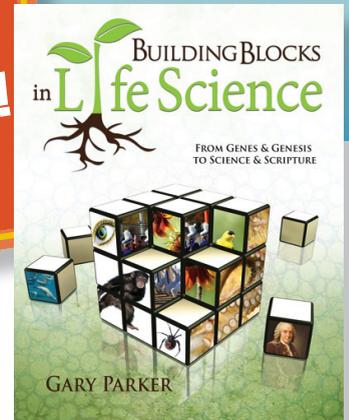
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## Building Blocks in Life Science

Gary Parker

Anyone too long frustrated by such topics as DNA, will find this book user friendly. The author shows that natural selection protects created kinds rather than leading to new life forms. Also we see how the grandchildren of Adam and Eve could have included individuals representing the major human races, with no need for millions of years. Recommended for junior high or high school, as well as interested adults.

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