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In this issue

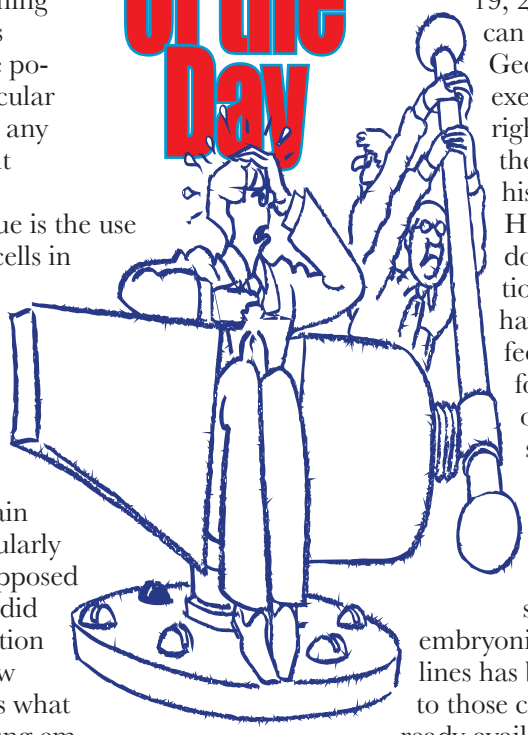
Pressing Issues of the Day

by Moxie

We have seen scientists in the past, like famous evolutionist Stephen Jay Gould, who declared that "science" and "ethics" including religion, were separate issues, each with their own spheres of influence. The implication was that everyone should be free to support the philosophy of one's choice. Well that was then, and this is now. Today, with ethical issues as with everything else, it seems there is only one respectable position, that of the secular scientist. To support any other views is to fight "all of science."

One current issue is the use of embryonic stem cells in research. On July 24, the council of the European Union narrowly agreed to fund research on new human embryonic stem cell lines. Certain countries, particularly Germany, had opposed this move. They did not want to sanction the sacrificing of new human lives which is what happens when a young embryo is torn apart to obtain the stem cells inside. In response to Germany's position, a British scientist declared that "The whole of science is under attack." (*Nature* July 27/06 p. 335). One might wonder how opposition to a small aspect of medical research could constitute an attack on all of science. The attack, of course, was to oppose the interests or views of some secular scientists.

The British official suggested that such opposition on Germany's part constituted an attempt to impose its own moral and cultural views over the entirety of European research. He had no problem with foisting his own views on an entire country however. Similar controversies rage elsewhere too. On Wednesday July 19, 2006 American President George W. Bush exercised his right of veto for the first time in his presidency. His veto struck down legislation that would have expanded federal funds for research on embryonic stem cells. Ever since 2001, US federal support for research on embryonic stem cell lines has been limited to those cultures already available before August 9 of that year. The president did not want to completely discourage research, but he did not want to condone or encourage further killing of human embryos either.



This uneasy compromise has continued to the present in the United States, but there is new urgency in calls from many researchers for access

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Scientists Discover a Bygone Greenhouse World

by Josh Munan

Scientists have found what might have been the perfect ancient vacation hotspot with average sea water temperatures of 24 degrees C. Now that's a warm ocean. Where? Smack in the middle of the Arctic.

Several geologists recently pulled a core of sediment from the bottom of the Arctic Ocean and discovered a bygone greenhouse world. No one expected to find evidence of temperatures high enough to make Santa sweat.

But according to Jan Backman, a marine geologist at Stockholm University in Sweden, "this is a major, major surprise."

The discovery suggests that at one time there was very little difference between equatorial and Arctic climates. Some scientists believe the ancient climate was driven by a global factor such as higher than modern greenhouse gas concentrations that came about naturally. These scientists point to very high levels of carbon

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to embryonic stem cell lines. Apparently the cultures do not stay healthy indefinitely. Over time they are prone, so it has been discovered, to gain extra copies of human chromosome number seventeen and occasionally also chromosome twelve. This is bad news for those hoping to carry out continued research on these cultures. Apparently during cell division, the process does not always proceed smoothly so that some daughter cells receive too many copies of a chromosome and others receive too few. (For those of you in Biology 30, this process is called non-disjunction.) Neither type of cell would be expected to perform in normal fashion. Thus such a culture is useless.

A symptom of this situation occurred in June of this year when the US National Institute of Health halted research involving a human embryonic stem cell line from South Korea. Apparently Seoul's MizMedi hospital had been selling legal (made before August 2001) stem cell cultures to American institutions. This legal stem cell culture was called Miz-1. Since 2002 the NIH had paid this hospital $930,000 to grow, characterize and distribute Miz-1. However in December of 2003, the South Koreans discovered a chromosomal abnormality in that culture. They thus quietly substituted a more recent (and thus illegal in the US) culture called Miz-5. They nevertheless shipped it to the US labeled as Miz-1. Altogether about 16 research groups in the US received the mislabeled culture. Of course the new culture worked perfectly well in experiments, but these projects now did not qualify for federal funding.

It is a fact that cultures of human cells have long been used in research, but these are cancer cells, notorious for their ability to divide indefinitely. These cultures however do not develop into other types of cell. The special property of being able to divide indefinitely is thus found only in cancer cells and in stem cells, particularly those obtained from the early stages of embryonic development. No one knows why or how the human egg cell has the special ability to grow and differentiate (develop new types of cells) once that cell is fertilized. It is obviously an essential design feature of the egg cell, which enables new individuals to develop and be born. It is not only good ethics, but also good science, to respect this special property and special life. No one should be allowed to rip apart fertilized human eggs.

In short then, no one scientist or group of scientists speaks for the whole discipline of science. That goes for all aspects of scientific interpretation including origins and environmental issues. Think for yourself and always evaluate the issues.

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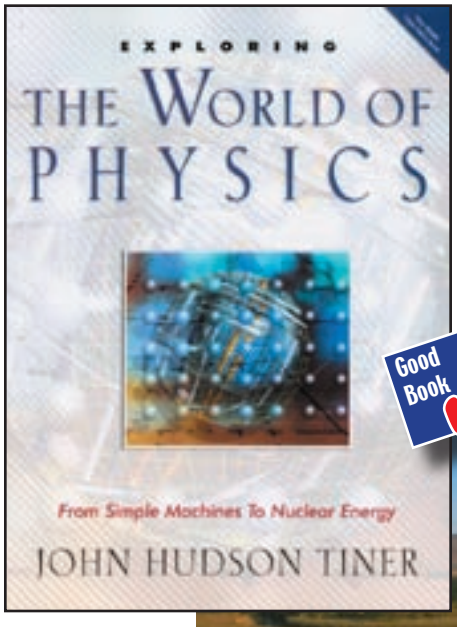
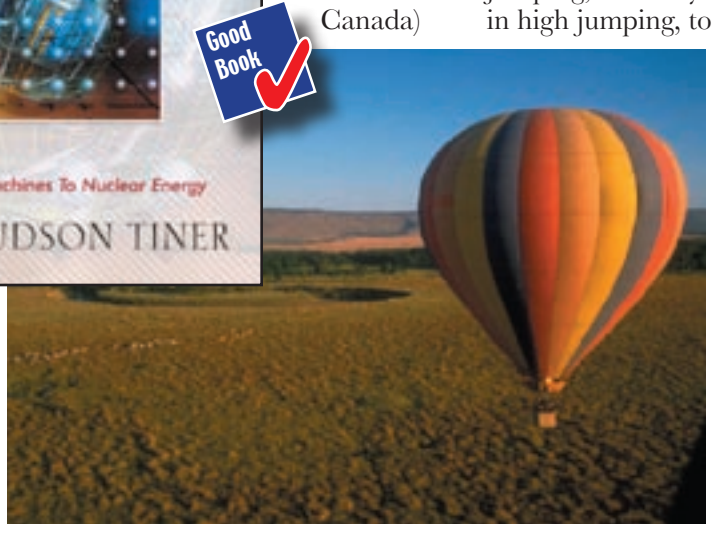
Physics is relevant

The objective of the "exploring" series is to demonstrate to junior high readers, as well as to everyone else, that all of nature, be it mathematics, chemistry, astronomy, biology or whatever – all of it belongs within the Christian worldview. Thus Mr. Tiner turns his attention now to physics. The unifying themes of this book are that experiments are an essential prelude to learning how nature works. Moreover, since all things are created, we can expect that easy to understand principles rather than confusing and contradictory explanations, are what we will discover from such studies. This is based on the understanding that the Creator is not capricious, but dependable. Like some of the early Bible believing physicists, we too expect that a few basic laws are suitable to explain the physical workings of nature. In this book not only does the author explain the development of physics as a discipline, but he also explains why each one of the topics considered is interesting and relevant to us today.



In logical fashion Mr. Tiner proceeds from classical physics, to a brief consideration of quantum physics. An introduction at the beginning of the book outlines how this material can be used at different levels of understanding. It can function, with adult assistance, as an introduction to young children, as an independent learning tool for young junior high readers and as a refresher for more advanced students. The "For more study" sidebars are intended as a springboard to more advanced investigations for the advanced student. There are challenging questions at the end of each chapter with answers in the back of the book. Also three problems relevant to each chapter, are presented at the beginning of a discussion, with solutions provided at the end. Age appropriate reading resources are listed at the back as well as a number of suitable web sites.

Interestingly, most of the mathematics in the book (other than in sidebars), is presented in the first three chapters. These chapters deal with motion, laws of motion, and gravity. The author includes both imperial units (we used to call them in Canada) and metric units. Canadian students have long dealt mainly with metric, and inclusion of the other units will perhaps make them thankful that this is so. At any rate, it can't hurt to see equations presented in alternative units.



The book highlights most of the important pioneers in the development of physics theory. The objectives of these people, and the problems which they overcame to make their contributions, really add to the interest of the story. Often, in the course of reading, we encounter unexpected applications within a topic. For example, a comparison of horsepower and "person power" is included in a section on energy. In connection with this, we learn how much energy output the pilot required who flew the *Gossamer Albatross*, a human powered aircraft, across the English Channel. Within the chapter on wave motion, surprisingly we come, by logical steps, to a discussion of sound, music, bird calls and the Doppler effect. Soon after, in another chapter, we come to light, refraction, and light waves.

The book includes numerous references to sports, like the kinetic and potential energy involved in bungee jumping, the body's centre of gravity in high jumping, to modern technology such as power generation, hot air balloons, the lunar rover and so on.

If we didn't already know it, we soon learn that physics is relevant to modern life, to our enjoyment of nature, and to our appreciation of the creation.

This new publication is an ideal way to encourage interest in further learning in the physical sciences. If physics is not among your interests, maybe it will be after reading this book.

John Hudson Tiner. 2006.***Exploring the World of Physics: from simple machines to nuclear energy***. Master Books. 158 pages.

Introducing You

by Margaret Helder

Recently scientists finished the detailed study of each human chromosome. The whole effort, begun in the 1980s, ended when the analysis of human chromosome number 1 was published on May 18/06. Since each of these strings of chemical code or genetic information is so different, allow me then to introduce you to some of your own chromosomes.

There are 22 different chromosomes which can be found in the nucleus of every human cell. In pictorial representations of these chromosomes, scientists usually arrange them from longest to shortest, and number them accordingly. There are also two chromosomes involved in gender determination: the large X chromosome and the small Y chromosome.

Chromosome number 1, since it is the longest, not too surprisingly also represents the largest amount of information. It controls more than 3100 packets of information which affect specific body characteristics. Each packet of information, or gene, typically calls for the synthesis of a single protein. The basic idea, although simplified, is that the physical characteristics of each individual are determined by the genes.

Not only is chromosome number 1 very long, but it is also "gene dense." Of all the chemical information present on human chromosomes, scientists have only been able to find genes (protein coding information) on 1-2% of the entire length of DNA. Some chromosomes contain more packed genetic information than others. The average for the whole human genome (all the chromosomes considered together) is 7.8 genes per million units of information (a unit is like an individual letter in a word). Thus in a million letters, on average, there is coding for only 7.8 proteins. Chromosome 1 however, contains 14.2 genes on average per million units of information. These units are called nitrogen bases, or bases, or nucleotides. Scientists represent this as 14.2 genes/Mb.

Scientists have no idea why there are such vast stretches of DNA in the human genome which do not code for proteins. Other kinds of organisms lack this feature. Scientists used to call this non-coding material, junk or nonsense DNA. They considered that some genes might have been left over from previous evolutionary uses and are no longer needed. These people are not so ready to label anything as junk any more. They now suspect that some of this information may be involved in signaling between cells, or various other regulatory activities.

Chromosome 1 is actually the third most gene dense chromosome, while the most gene dense is found way down the list at chromosome 19. With a gene density of 26.2 genes/Mb, although it is very short, chromosome 19 contains about 1500 genes. The second most gene dense chromosome is number 17, also way down the size range. With 16.2 genes/Mb, it contains 1266 genes. Amusingly, the most gene poor chromosome is chromosome 18, in size just between numbers 17 and 19. Chromosome 18 has 4.4 genes/Mb and only 337 genes. Even at first sight, it is apparent that each chromosome is entirely different in character from the others.

Chromosome 11 is one of the most gene rich chromosomes. An important claim to fame of this chromosome is the large number of genes which contribute to our sense of smell. This sense involves hundreds of different kinds of sensor in the nose. Each type of sensor responds only to a single part of a large molecule. Our sense of smell is the blended perception of many different chemicals perceived at the same time. Each sensor type is controlled by an individual gene. Of the 856 olfactory (smell) receptor genes in the human genome, more than 40% of them are located on this chromosome.

Chromosome 15 is one of seven

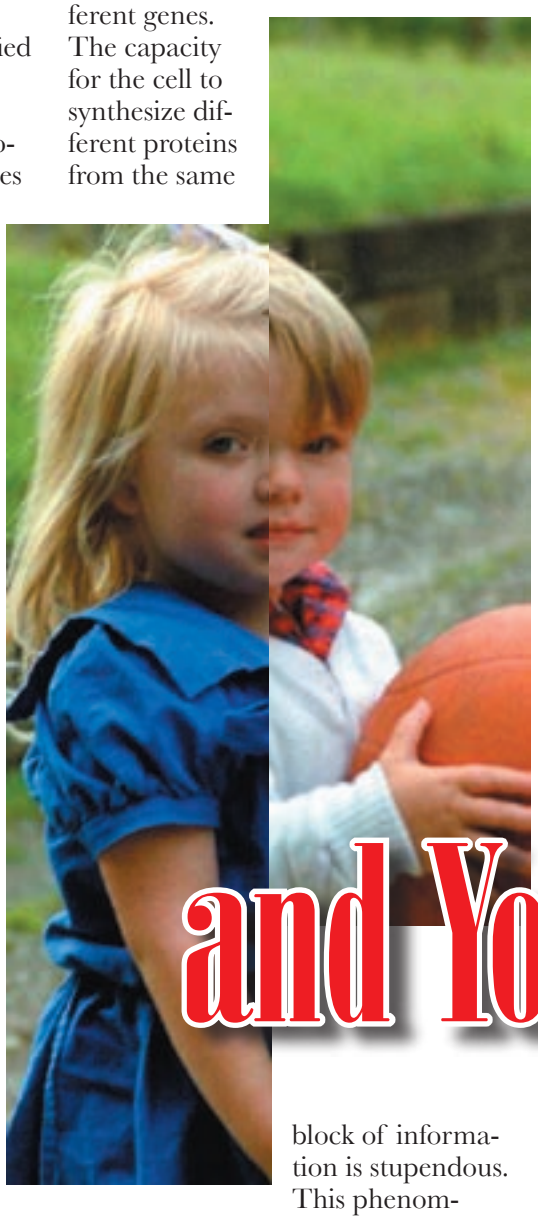
human chromosomes with large sections present in duplicate sequences. For example, there are 37 nearly full-length copies of a certain sequence on this chromosome. Nobody knows why they are there. There are also two copies on the Y, male determining chromosome, and one each on chromosomes 2 and 10. Moreover almost 700 genes have been identified on this chromosome.

Chromosome 18 has the lowest gene density of any human chromosome. One of the interesting features of this chromosome are 24 gene deserts. A gene desert is a length of DNA 500,000 nitrogen bases long or longer, which contains no protein coding information. On this chromosome, 28 million nitrogen bases or 38% of the total chromosome length are considered deserts. The sparsest region contains only 3 genes in 4.5 million nitrogen bases.

Probably because the genes are so scarce here, they are easier to study. One remarkable feature, also noted on chromosomes 1 and 11, is the overlapping of genes. This means that part of the coding sequence for one gene, also forms part of the coding sequence for an adjacent gene. This discovery demonstrates that genes are not obvious units, but blocks of information which can in fact overlap. Scientists discovered 59 pairs of overlapping genes on this chromosome.

Another strange phenomenon, very apparent on this chromosome as well as on others, is "alternative splicing of genes". The normal situation involves the copying of a block of DNA code. The process is not however finished at this stage. Along come special enzymes which snip out large chunks of this information. The removed chunks are called introns. Other enzymes reattach the remaining sections (called exons). On chromosome 18, there are typically many exons which must be glued together to form the practical information unit or transcript (formerly called the gene). Appropriate enzymes glue together the exons in various different orders. Some exons may come from stretches of DNA far away from others to which they are later attached.

The opportunities for variation are readily apparent. Each small section of code can be used in many different genes. The capacity for the cell to synthesize different proteins from the same block of information is stupendous. This phenomenon represents highly compressed information. Considering how every protein must be extremely precisely produced, this storage and retrieval system is indeed an impressive mark of design. Many genetic diseases result from a small mistake in a gene's information. These demonstrate how precisely the system needs to function for normal healthy individuals.



and You...

Of the 22 different chromosomes found in each person's cells, one set is inherited from the mother and another set is inherited from the father. There are also two other chromosomes, the gender determining chromosomes. Every person receives an X chromosome from the mother. The father can contribute either an X chromosome or a Y. The X chromosome exhibits low gene density (7.1 genes/Mb) but since it is long, there are comparatively speaking, a lot of genes. Almost 1100 genes have been counted on the X chromosome

By comparison, the Y chromosome is small. Besides 12 genes which control non-sexual characteristics, there are 11 others which are expressed in the male sex organ. Most of these latter genes are located in a unique section of the chromosome involving repeating sequences, the most spectacular of which are the palindromes. These are sequences of letters which can be read from either end with identical results (e.g., madamImadam). These are very hard to design, yet on the Y chromosome there are 8 massive palindromes, at least six of which contain genes. The palindromes are typically about one million nitrogen bases long. One really spectacular one is 2.9 million nitrogen bases long with 2 smaller palindromes nested within it. These structures help the cell maintain accuracy of the Y chromosome. One arm of a palindrome acts as a standard that the other half can be corrected to match. This is important since there is no similar Y chromosome in the cell with which it can be compared for correction.

What amazing sophistication we see within every human cell!! With what finesse we have been designed. Our imaginations could never have conceived of such details, much less could chance have produced this exquisite information system. Evolution theory is certainly in trouble.

Water by Design

Did you ever stop to think about water? That most precious or resources, is an amazing compound. Indeed, as we all know, without this commodity, there is no life. No other substance appears as a solid, a liquid or a gas within earth's normal temperature range. In fact within the normal temperatures found in most places on earth, we find water in the liquid form. No other common substance is liquid at ordinary temperatures. This liquid phase of water is absolutely essential to all living cells and therefore, naturally, to all living creatures. Nutrients enter the cells in solution and all components of these living structures (cells) are associated with water.

Another remarkable characteristic of water is its heat capacity. This enables that compound to absorb a great deal of heat energy without itself warming much. This extra energy, which is absorbed without a resulting increase in temperature, is called latent heat. It takes, for example, five times the heat energy to raise water 1 degree Celsius as it does to raise air 1 degree Celsius. To raise 1 gram of water 1 degree C takes 1 calorie. However to evaporate 1 g of water takes incredibly more energy. It takes 536 calories to convert 1 g of water to vapour at 100 degree C. It also takes much energy to melt ice: 80 calories to melt 1 g of ice to 0 degrees C.

The heat capacity of water has a dramatic effect on the earth's climate. It moderates temperature extremes, making the environment much more suitable for living creatures. Water not only absorbs vast quantities of incoming energy from the sun, but it also cools down much more slowly than most substances. Both the water free in nature and that in vegetation, exerts its effect on climate.

One of the most important reasons why plants cool a local climate is the large amount of evaporation from leaf surfaces. All plants, but particularly trees, can be considered as natural air conditioners. A single mature tree, for example, can evaporate as much as 400 L or water per day. The process of evaporating that much water uses up 230,000 Kcal of energy. This means that a tree has an effect locally of five average room air conditions (2500kcal/hr) each running 20 hours per day. It is obvious that replacing vegetation in one's yard with stones, will locally produce a heat island instead of cooling. Nevertheless some people do this in the name of protecting the environment!

Those of us who live in northern climates must also consider the properties of water as a solid. Most substances, as we all know, contract as they grow colder. Water, however, contracts only down to 4 degrees C. Below this point, however, water expands. Further marked expansion occurs when water freezes. Thus ice floats on the surface of liquid water. If water contracted upon freezing, as most substances do, then ice would sink. If this happened, then many places on earth would become a desert. The summer heat would soon prove inadequate to melt ice at the bottom of lakes and rivers. In time, all water would turn to solid ice except for a thin layer on the surface during the summer. The hydrologic cycle would have been drastically reduced long since. There would be little water vapour and no rain. Nothing could live save perhaps a few aquatic creatures.

We can indeed be thankful that our planet is so well endowed with water, a substance which, by virtue of its unusual properties, is absolutely essential to life. Obviously water was designed to support life. As in much else in nature, we see in the properties of this compound, abundant evidence of the Creator. It also doesn't hurt to conserve this resource in so far as we are able!

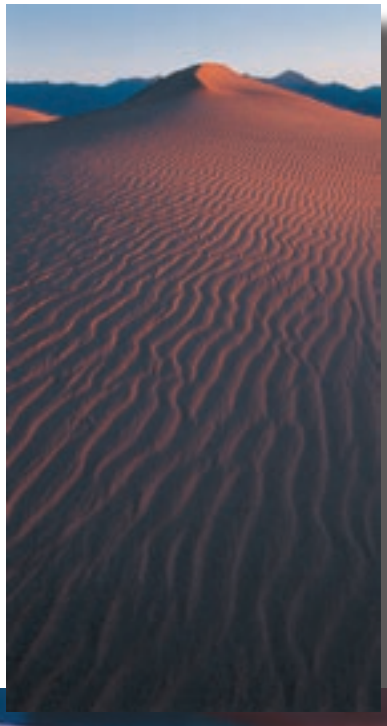
Scientists Discover a Bygone Greenhouse World

continued from page 1

Dioxide as the greenhouse gas responsible for the balmy climate.

The greenhouse effect gets its name from the observation that air inside a greenhouse is warmer than air outside because the glass panes trap heat. Think of getting into your parked car after it has sat in the sun for a while. Greenhouse gases in our atmosphere trap the sun's heat and keep the planet fairly warm. If our atmosphere did not have these gases, earth would be like the moon which gets extremely hot during the day and extremely cold at night.

When we hear "greenhouse effect," like a knee jerk reaction we automatically think carbon dioxide. But carbon dioxide is not the only greenhouse gas that effectively traps heat. Methane and water vapour are also good heat trappers. The study on arctic climate also suggests that ice crystals in the earth's atmosphere may have contributed to a warmer than presently normal climate. (*Nature* June 1/06 pp. 580 and 610.)



How did the balmy north become the cold white place it is today? Some suggest that a drop in greenhouse gases caused a cooling effect at the Poles. Climatic computer models, cited in *Nature*, however, are unable to explain how the change could have happened, even over a period of millions of years (p. 612).

An interesting feature of the current studies on past arctic climate (based on the contents of sediment cores of the ocean bottom) is that one large section of the deposit contains abundant remains of the fresh water tropical fern *Azolla.* Now what was this fern doing in the Arctic ocean? Apparently there was an excess of fresh water input over evaporation at the time, enough to drastically dilute the salt content of the sea so that *Azolla* could grow. (*Nature* pp. 580 and 606.) Hmm… .. a lot of rain, enough to turn the sea into fresh water. How unusual. Are there any explanations for these observations? There are indeed.

Some creation scientists believe that the earth was very different in the past. Carbon dioxide may not have been the greenhouse gas responsible for those balmy temperatures after all.

Genesis 1:6-8 speaks about what some interpret as a water vapour canopy encircling the earth. This canopy, high up in the earth's atmosphere, was probably no thicker than six inches, yet it was enough to create the tropical climate of the early earth. During the flood, this canopy collapsed, providing some of the flood waters. However six inches of water vapour would not be enough to create the vast waters that flooded the earth. Most of the flood waters likely came from vast subterranean reservoirs (see Genesis 7:11)

It could thus have been the collapse of the vapour canopy that pulled the Arctic from a hothouse into an icehouse. The current suggestion that ice crystals in the atmosphere may have contributed to warming, certainly sounds like the vapour canopy. This may be corroboration for such an idea.

Other creation based scientists wonder whether so much water above the atmosphere would heat the climate to temperatures lethal for life. Some of the latter scientists cite studies with computer models which suggest that heavy evaporation from the post flood ocean surface (warm as a result of volcanic eruptions) would lead to cooling at the poles. This would cause snow to fall there and plunge the world into an ice age.

Thus while the current computer models are unable to explain these unexpected observations from the Canadian Arctic, creation based models predict warm preflood conditions and ways by means of which the climate could have quickly changed.

The objective of creation based scientists thus has always been to discover how nature, as we see it today, bears the marks of past events described in the Bible. This is an ideal example of such an approach.

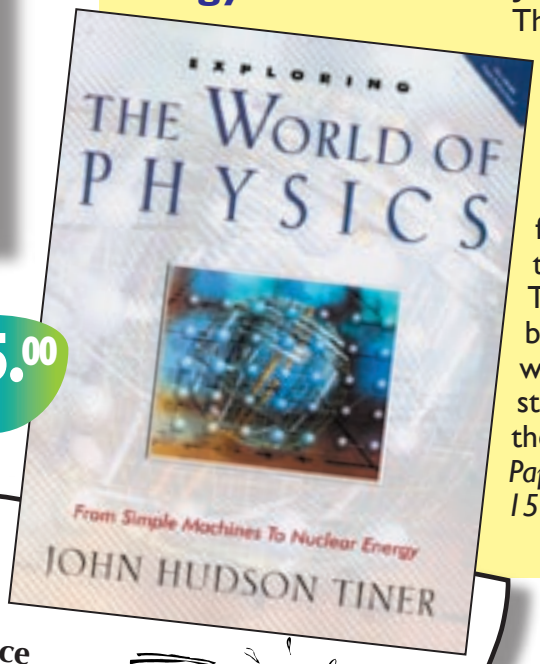
The Hidden World of Africa

$18.00

This DVD provides spectacular scenes of the African plains, with a particular focus on insects. While it is produced by the same people who bring us the popular Incredible Creatures that Defy Evolution series, this new program does not specifically discuss evolution. Except for young children who may not appreciate insects on animal corpses, the video provides an entertaining learning experience.

DVD/50 minutes

Exploring the World of Physics: *from simple machines to nuclear energy.*

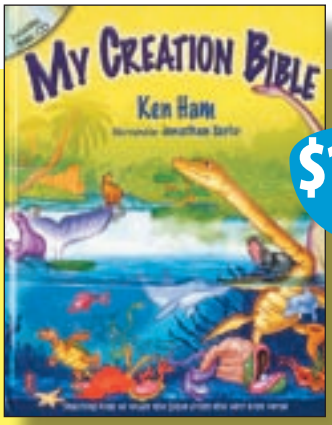


$15.00

John Hudson Tiner

This is another title in the "Exploring" series written for junior high readers. The book features the same successful format as other titles in this series. This is a user friendly book for readers who want to understand the basics of the topic.

Paper with line drawings, 158 pages



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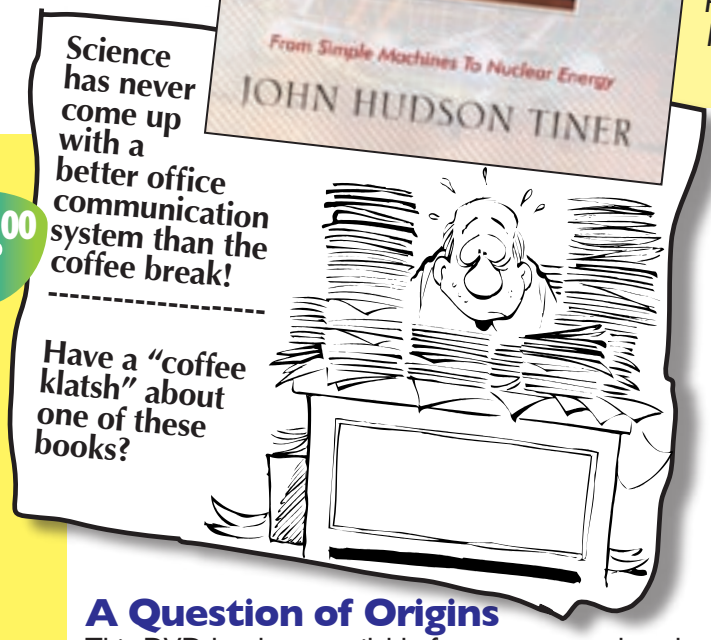
My Creation Bible

Ken Ham

Very young children will love the thick cardboard pages, full colour drawings and rhyming text plus free musical CD which introduce the story of creation, the fall of man and God's plan of salvation.

Cardboard with hard plastic handle for carrying

26 pages



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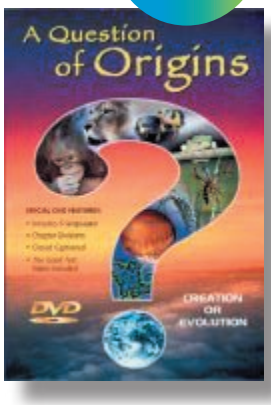

A Question of Origins

This DVD has been available for some years, but the visual quality and the message make it still timely and worthwhile. The discussion takes the viewer through the fields of cosmology, chemistry and biology in a search for mankind's origins. The viewer is asked to consider whether an evolutionary bias has blinded many to the overwhelming data that point to an awesome Creator.

DVD with multi-language feature/60 minutes

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