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While all Albertans are justly proud of the Royal Tyrrell Museum in Drumheller, not everyone appreciates the evolution-based commentary which the museum so strongly favours. Rather than avoiding the museum altogether, many Christian families and schools have asked for alternative commentary on the exhibits. Thus the first tour guide to the museum was published in 1991. Since then, dramatic changes have taken place in the museum, although not so much in the Great Dinosaur Hall. Thus another edition was produced in 1997 and now in 2003.

With each new edition, our tour guide has become more focused, more user friendly and more attractive. In the first edition, in keeping with the early layout of the museum which included many information packed galleries before one ever arrived at the dinosaur hall, the first tour guide concentrated on invertebrate (marine animals without backbones) fossils and supposed mechanisms of evolution. As a result, discussion on the dinosaur exhibits was comparatively brief.

Almost all of the invertebrate displays and discussions of mechanisms of evolution were removed by 1997. Thus a new tour guide was produced. It introduced some new features, including a table of contents, an index and questions at the back designed to help educators reinforce learning. This new tour guide also provided much more discussion on dinosaur exhibits in the Great Dinosaur Hall. The layout however meant that it was sometimes difficult to figure out which commentary applied to which exhibit.

The new tour guide is a marked improvement in all areas. The smaller size is easier to handle, and clear titles facilitate matching commentary with exhibits. The discussion also is much more focused, emphasizing five themes, examples of which the viewer is encouraged to notice as he/she proceeds around the facility. Lastly, in order to re-inforce the concepts learned, answers to questions with relevant page references are provided at the back of the booklet. A few line drawings are another new feature and there is, of course, still an index provided. One does not need to be at the museum to read the booklet.

Its contents give one an overview of the issues involved in the preservation of fossils found here in Alberta and elsewhere.

We expect this highly attractive and informative booklet to be a must for all families, schools and groups who wish to visit the museum. The dramatic colour cover and attractive layout are the work of graphic designer John Van Veen.

Margaret J. Helder. 2003. *Tour Guide: Royal Tyrrell Museum. Revised Edition.* Creation Science Association of Alberta. Coil format. 41 pages. $7.50 each including shipping or $6.00 if ordered with other books or no shipping required. In bulk, $45.00 for ten copies plus $6.00 for shipping.

FAQ

Who cares about astronomy anyway?

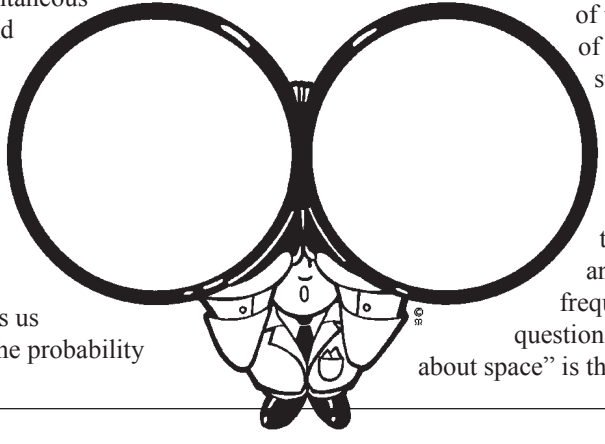
Once the heady days of the moon landings had faded into history, many people grew bored with space exploration. Some Christians even concluded that the main objectives were atheistic or evolution-based anyway, so why should we support such endeavours?

It is certainly true that the main objectives for exploration of the solar system are based on evolutionary preconceptions. According to longtime NASA scientist Dr. Robert Jastrow, exploration of the moon initially did not seem very interesting to the NASA planners. In his 1989 book *Journey to the Stars*, Dr. Jastrow declares that the top people at NASA "were not terribly interested in the moon at that time, in fact, from a scientific point of view they did not know it existed ...." (p 12) This was certainly strange when one considers that the mandate for the fledgling organization was to launch the US into space as soon as possible, and to explore what was there. Since the moon is by far the closest body in space, it would make sense to consider it first. However it was only when Dr. Jastrow suggested that the moon might hold clues concerning the origin of Earth and of life, that NASA determined to visit our closest neighbour. Those were exciting times, from 1969 to 1972, but few clues, if any, were discovered concerning origins. So attention has turned to Mars and beyond.

There is no doubt that the objective of studying Mars is to find life there. These scientists believe this will confirm their faith in the spontaneous origin of life and in evolution. Dr. Jastrow, in his 1989 book later declared concerning the search for life: "Life on *one* planet - the earth - tells us nothing about the probability of life in the Universe, but life on *two* planets in one solar system would tell us **nearly everything**. For if life has arisen independently on two planets in a single solar system, it cannot be a rare and unlikely accident .... No scientific discovery more significant in its implications can be imagined." (p. 120, italics his but not bold)

Certainly then, the objectives of space exploration as currently pursued, are regrettable. This, however, does not prevent us from enjoying the wonderful images and information that the space probes send back. The variety we see in space is at the same time beautiful, and a challenge to explain by means of atheistic or mechanistic origins models. Thus while the astronomers' objectives are poor, their results are a delight to study.

A number of creation based books on astronomy are available from our association. *The Astronomy Book* by Jonathan Henry at $21.00 includes beautiful colour photos. It is written for junior high readers. Also written at the junior high level are *Voyage to the Planets* by Richard Bliss and Donald De Young ($13.50) and *Voyage to the Stars* by Richard Bliss ($12.25). These books include numerous diagrams and line drawings. A question and answer book for junior high or high school readers is entitled *Astronomy and the Bible* by Donald De Young ($11.25). Two excellent adult books include *God and Cosmos* by John Byl ($23.00) and *Faith, Form and Time* by Kurt Wise ($23.00). This latter book deals with many topics but chapter 6, entitled "The Maker of Heaven" provides interesting insights on astronomy. Lastly for young children, the book *The Amazing Story of Creation* by Duane Gish ($22.50) includes discussion of the creation of light, the sun, moon, stars and other bodies in space as well as other topics. So the answer to this frequently asked question "who cares about space" is that we do!



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Address correspondence to:
Creation Science Dialogue
Creation Science Association of Alberta
5328 Calgary Trail
Suite 1136, Edmonton, Alberta, T6H 4J8

Creation Science Associations

Creation Science of Saskatchewan Inc.
P. O. Box 26
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S0G 2N0

Creation Science Association of British Columbia (B.C.)
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White Rock, British Columbia V4B 5L6

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Let's Learn from the Best

by MOXIE

We might suppose our technology is first class. With computers, satellites and precision devices, our society happily adapts to ever more sophisticated machines. Each achievement provides the platform for new uses of technology and further inventions. Rather than giving thanks for these insights, all too often we pride ourselves for our knowledge. The fact is however that our devices and skills are clumsy compared to the exquisite gifts conferred on living creatures. Like the lilies that do not spin fine fabric, yet are more beautifully clothed than man in his fanciest garb, so even small creatures have technological skills that put our best efforts to shame. Some scientists talk about irreducible complexity or intelligent design. These organisms demonstrate all of that. However, just like the wise man who considered the habits of ants, we feel enriched and filled with awe when we consider the results of modern studies into the wonders of the creation.

Upside down

Apparently it was Aristotle, the ancient Greek philosopher and naturalist, who first wondered about the abilities of geckos to scamper up vertical walls and across smooth ceilings. People have wondered ever since about these dramatic talents, but only recently have scientists discovered some answers. Geckos are small nocturnal lizards which live in all the warm regions of the world including the Mediterranean area. The species of choice for research is the Tokay gecko (*Gecko gecko*) which can grow as long as 35 cm (14 inches), and which weighs up to 100 g. That is a hefty creature to hang upside down from a smooth surface. The American military and other parties interested in commercial exploitation of such an astonishing adhesive, have heavily invested in this research.

Firstly interested scientists sought to eliminate all likely processes which the gecko does not employ. To do this they began by examining the soles of gecko feet. If the gecko used any kind of glue there would have to be glands to secrete the material. However there are no glands and the gecko leaves no residue on a surface after it has passed by. What is on the pads of their feet are about one half million very thin short hairs arranged in distinctive patterns. Ends of these hairs, called setae, are in their turn divided into about 1000 submicroscopic filaments called spatulae. Generally in biology the term spatulate means an almost spoon shaped, but flat, end. It was long popularly assumed that the spatulate endings function like suction cups. Nevertheless the fact that their feet work even in a vacuum, effectively disproved that idea. Moreover their feet stick to surfaces even when the air is electrically charged. Thus it must not be electrostatic attraction (such as when hair sticks to a balloon rubbed on a rough surface) which allows the geckos to work their ”magic”. Evidently obvious explanations do not work, so something a lot more subtle and sophisticated must be involved.

Within the past three years, a team of American scientists has discovered that an obscure phenomenon which accounts for the fact that water stays together as a liquid rather than dispersing as a gas, is the principle operating here. It was Johannes Diderik van der Waals (1837-1923) who discovered that even molecules with no potential for chemical bonding between themselves, are in fact weakly attracted to each other if the molecules are pushed closely enough together. What apparently happens is that individual molecules in the gecko spatulae and in the surface material trade electrical charges. A weak electrical bond is formed, which when multiplied by the number of spatulae per foot, acts like a powerful electrical glue. The molecules of the foot and surface material in effect are drawn together into a composite structure. Such a van der Waals force is all very well as an explanation for sticking the gecko to a surface, but these animals do not remain permanently anchored in one location. In order to walk or run, they must become unstuck again. Apparently the animal simply moves the foot so that the setae are peeled away from the surface. To engage the setae, the animal pushes the foot backwards and to remove, he pulls it forward.

Dutch physicist van der Waals received a Nobel Prize in 1910 for his discovery of this force. It remains to be seen what reward will accrue to the modern researchers who hope to exploit such knowledge to produce a powerful adhesive. Those involved in these pursuits admit that we do not at present have the expertise or know-how to engineer structures as exquisite as the gecko foot. An English team from University of Manchester recently produced a postage stamp sized piece of ”synthetic gecko-tape.” This ‘invention’ is covered in millions of plastic polymer ‘hairs’ and it works! The product is so effective that it could suspend a person by one hand from a ceiling. Nevertheless, although applications of the concept are ”nearly limitless”, the actual product exhibits some distinct disadvantages. While

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Pesticide Resistance in Insects

by Jerry Bergman

One of the "top arguments" against the creation world view is the well-documented development of insect resistance to insecticides. Many Neo-Darwinists claim that the historical development of pesticide resistance in insects is actually one of the strongest evidences of Neo-Darwinian evolution by mutations: "Insects that survived insecticides did so by helpful genetic mutations, and thus they bred a new generation that was not brought down by the farmers' poison" (Larry Witham. 2002. *Where Darwin Meets the Bible.* Oxford University Press p. 78)

The present article focuses on the common claim that the development of insect resistance to insecticides provides evidence for molecules-to-human evolution theory and, at its foundation, that such resistance is based on mutations.

Specifics

The development of insecticide resistance is well documented as a major problem today. Some insects are tolerant to so many insecticide families that chemical control has become almost useless. By 1990, over 500 insect species were known to be resistant to one or more insecticides. The question is, how did this resistance develop? Several reasons exist for this problem. Firstly, all insects possess many inbuilt complex resistance mechanisms that help them withstand a wide variety of toxins. For example, when exposed to insecticides, they can up-regulate a variety of insecticide detoxifying enzymes.

In some cases, mutations are involved in the development of resistance. For instance, mutations can result in the overproduction of detoxification compounds, producing abnormally high resistance levels (Sabourault *et al.* 2001. *Insect Molecular Biology* 10 #6: 609-618). Other cases are due to the disruption of the toxin-receptor binding or a condition that causes "relatively low receptor concentration in midgut cells" (Nielsen-Leroux *et al*. 2002. *Journal of Medical Entomology* 39 # 5: 729-735). The problem is so common that most insects eventually develop resistance to many insecticides, making control difficult. As Francisco Ayala remarked in 1978: "Insect resistance to a pesticide was first reported in 1947 for the housefly (*Musca domestica)* with respect to DDT. Since then the resistance to one or more pesticides has been reported in at least 225 species of insects and other arthropods. The genetic variants required for resistance to the most diverse kinds of pesticides were apparently present in every one of the populations exposed to these man-made compounds." (*Scientific American* 239 #3 p. 65).

A good example of how resistance develops is the situation observed with DDT. This compound functions by binding to a specific matching site on the membrane of the insect's nerve cells. When a certain level of DDT binds to the nerve cell membrane, the nervous system no longer is able to function properly. As a result, the insect dies. Any mutation that adversely affects the binding of DDT to the nerve cell, if it is not lethal or almost lethal, has the potential of conferring DDT resistance to the insect. The other side is that the mutation also interferes with the ability of the cell to bind to other products, causing it to be less effective. As a result, the DDT-resistant insect is less able to compete in an insecticide-free environment (the normal, natural environment.) The means by which insects develop DDT resistance is similar to that of bacterial antibiotic resistance; mutations in insects result in a certain "cost of resistance" or tradeoff, as does bacterial resistance (Cooper and Lefevere. 2002. *Heredity* 88 # 1: 35-38).

Cost of Resistance

Insects that have become resistant to insecticides by mutations have been shown to be *less fit* in the wild, a phenomenon called *the cost of resistance.* The reason why this cost is common is because the resistance that results from mutations normally damages a structure so that it works less effectively at what it was designed to do. As Gazave *et al* in 2001 note, resistance alters "some components of the basic physiology" and interferes "with fitness-related life history traits" (*Heredity* 87 p. 441). The result is a "high fitness cost" that can rapidly wipe out the resistant strains in a normal environment.

For example, pesticide resistance can be a consequence of damage to the cell membrane that results in slowing uptake of the pesticide into the cell and thus preventing cells from accumulating toxic concentrations. In an insecticide-free environment,

Bad News for Macroevolution Theory

these insects cannot take in needed materials as effectively and, consequently, the resistant insects are less able to compete, and usually die off *more* rapidly than the wild type. As Lenski notes in the 2002 *Encyclopedia of Evolution:* "the same mutation that confers resistance interferes with some other aspect of the organism's performance. Such multiple effects of the same mutation are termed pleiotropy in genetics" (volume 2 p. 1009). For example, many resistant insects are less active and slower to respond to various stimuli than other insects. This effect has been researched most extensively, specifically in the case of mosquitoes.

Although the DDT-resistant insect is more fit in the environment in which the insecticide is present, the more sluggish nervous system in the resistant insect causes it to be *less* fit in a normal, insecticide-free environment. Nonetheless, prolonged use of insecticides can produce large numbers of resistant insects that, even though they are less fit as a whole, are better able to survive in an environment that contains high levels of DDT. As a result, the resistant population becomes larger in spite of its members' overall less-effective nervous system. As Levine and Miller note: "resistance to poisons is rarely a 'free ride' for either insects or other organisms, because the selective trade-offs imposed by pleiotropy often maintain polymorphism either within or between populations of a species ... the same sort of phenomenon has been demonstrated for the alleles that confer resistance to DDT and to dieldrin in mosquitoes" (*Biology: Discovering Life.* 1994 p. 257).

Examples

The sheep blowfly (*Lucilia cuprina*) is a common insect pest in Australia that was effectively controlled for years by diazinon insecticide. A mutation eventually appeared that conferred resistance to this compound. Nevertheless the resistance had a clear fitness cost. For example, the resistant flies were "noticeably inferior to their sensitive counterparts in certain other respects, such as requiring a longer time to develop from eggs into adults in the absence of the insecticide" (Lenski p. 1009). In the blowfy and other insects, it was found that resistant forms have a "higher mortality during colder, wetter and windier weather, caused by a direct mortality through freezing and/or an indirect mortality through maladaptive behaviour" (Gazave *et al* p. 442).

Another resistance mechanism in the blowfy involves certain cytochrome p450s and glutathione S-transferases that help to break down and detoxify toxins in all normal insects. In multiresistant strains, the genes for these proteins are constitutively *overexpressed,* producing very high levels of detoxification enzymes. A mutation has been implicated in causing overproduction of the cytochrome p450 protein CYPGA1, evidently by release of the transitional repression controlling genes coding for several detoxification enzymes including CYPGA1 (Sabourault *et al*). This over expression costs energy and is advantageous *only* in an environment that contains the toxin.

Probably the most common example of resistance is the mosquito *Culex pipiens,* which becomes resistant by overproduction of esterase as a result of either gene amplification or gene regulation abnormalities. In one study by Gazave *et al*, the authors found that a "large fitness cost (42%)" resulted from the development of insecticide resistance (441).

It is evident that the recent development of insect resistance to pesticides does not support Neo-Darwinism. Macroevolution requires information-building that adds *new* information to the genome and we do not see that here. In all confirmed cases, insect resistance is a result of the exploitation of existing systems or is due to mutations that result in an organism which is *less* fit *except* only in an insecticide environment. In the few cases where a mutation is involved, development of resistance involves only a loss mutation, such as one that produces deformed enzymes. This finding is confirmed by the fact that insect resistance usually is acquired very rapidly, in far too brief a period for the evolutionary emergence of complex biochemical or physiological systems. Mutation-caused resistance results in *less* viability in the wild, and as a result the resistant insects usually cannot compete effectively with the wild type in an insecticide free environment. None of this is good news for evolution theory.

Dr. Bergman is based in Archbold, Ohio. A detailed bibliography for this article is available upon request.

At Last, a Book on Mount St. Helens

reviewed by Margaret Helder

There is something fascinating about accounts of nature with a scary twist and few people would doubt that volcanoes qualify as scary subjects. The eruption of Krakatoa on August 27, 1883, for example, is said to have constituted the greatest explosion ever recorded by man. The blast, which involved a tiny island in the Sunda Strait between Java and Sumatra, was heard on Rodriguez Island more than 4600 kilometres west across the Indian Ocean, and in Perth, Australia, 3500 kilometres to the east. The resulting shock wave is said to have circled the globe seven times. An ash cloud ascended 40 kilometres into the stratosphere and a resulting tidal wave (tsunami) resulted in the deaths of about 35,000 people.

Perhaps the world's most intensively studied volcanic catastrophe was that of Mount St. Helens which erupted May 18, 1980. In all, 57 people lost their lives in this event. Many scientists have based their research programs on study of the Mount St. Helens eruption. One of these is geologist Steven A. Austin of the Institute for Creation Research in El Cajon, California. Familiar with the pre-eruption situation, Dr. Austin has since then carried out numerous field studies on the mountain and its environs. Through the years, he has delivered many lectures on this topic and videos have also been made based on his material. Then finally in 2003 Dr. Austin and colleague Dr. John Morris, published a book on the mountain.

This work points out some interesting facts about Mount St. Helens. Firstly, scientists estimate that about one cubic kilometre of ash was released in the eruption and this fell as far as Yellowstone National Park, one thousand kilometres to the east. This may have seemed impressive at the time, but apparently this was scarcely significant compared to some previous events. The eruption of Krakatoa, in comparison, is estimated to have released about 17 cubic kilometres of material. Even that is practically a non-event compared to some eruptions in the past which we did not witness, but which left a record of their impact in the distribution of ash or tuff (ash welded together by heat) ejected during the explosion. Mount Mazama (now Crater Lake) in Oregon, for example, scattered ash over southern parts of British Columbia and Alberta, as well as parts of eight states in the Pacific northwest of the United States. A six inch thick layer of bentonite exposed in the North Saskatchewan river valley in Edmonton, is said to have come from the Mount Mazama eruption. Bentonite is defined as soft, absorbent, swelling clay formed from the alteration of volcanic ash. Altogether, this event is said to have generated 75 cubic kilometres of ash.

The Mount Mazama eruption was nevertheless almost insignificant compared to the volcanic tuff (hardened volcanic ash) left behind by eruptions at Yellowstone in the state of Wyoming. The Lava Creek event is estimated to have generated 1000 cubic kilometres of tuff distributed over much of the American west. Even more dramatic was an earlier blast. The Huckleberry Ridge event draped its signature tuff over an even wider area, estimated to represent 2500 cubic kilometres of material. Thus, even in this small area of our globe, points out Dr. Austin, the impact of Mount St. Helens on the landscape was minimal indeed compared to devastation that occurred in the past. Nevertheless, Mount St. Helens, has much to tell us concerning the *kinds* of impact a volcano can exert on the landscape. The recent event thus has some interesting implications for our interpretation of certain geological formations.

In their new book, Drs. Austin and Morris compare the events of Mount St. Helens to the Great Flood of Noah. At first glance, this connection may seem obscure. The eruption of

May 18, 1980 was a volcanic event whereas Noah's flood obviously involved water. It is however their contention that the events of the flood were initiated and driven in part by volcanic and earth moving processes. Moreover, much of the devastation produced by Mount St. Helens was, in fact, the result of the action of water. These included the catastrophic release of steam, rushing mudslides lubricated by water, and a mountain scouring tidal wave resulting from the mudslides which displaced the contents of a local lake.

The site of the devastation in Washington state was designated a national monument in 1982. What the present day visitor discovers, say Morris and Austin, are clearly defined, thinly layered sedimentary rock strata stacked so deep they might be supposed to have accumulated in thousands or millions of years rather than just days. Also, suddenly released water was able to erode solid rock. The torrent produced a 43 metre deep canyon where previously there was no canyon. In appearance this landscape looks much like the Grand Canyon, only forty times smaller.

Since Dr. Austin's field of expertise is coal geology, he has spent considerable time documenting the fate of a forest which was swept into Spirit Lake when a tidal wave scoured the mountain. There on the lake bed, sunken logs and bark are forming peat which is the precursor of coal. Interestingly, some logs have sunk with root end down, so that the trunks end up in a vertical position. These resemble so-called buried forests which geologists generally interpret as having required tens of thousands of years to have grown and been buried in one location. Obviously there are other explanations for such phenomena. Lastly the authors discuss the rapid ecological recovery, which is far faster than scientists would have imagined possible.

Authors John Morris and Steven Austin have produced a deluxe book written for the general reader. Spectacular colour photographs are found on every page. The text follows the events of May 18 in detail, and then documents the aftermath. Considerable attention is given at the beginning, and end of the book, to the significance of this information. The lesson of Mount St. Helens is that formations which appear geologically ancient, can in fact develop over very short periods. The event which caused the greatest impact on our globe, of course, was the Flood of Noah. A comparison of the small scale of modern events compared with those of the past, shows the capacity of something on the scale of a universal flood to drastically change earth's geology in a short time frame.

We guarantee that this book is a best seller! It is perfect for gifts, for churches and schools, but especially for your own library!

John Morris and Steven A. Austin. 2003. Footprints in the ASH. Master Books. Green Forest, Arizona. Hardcover. 128 pages.

SASKATCHEWAN CREATION FAMILY CAMP

Creation Science of Saskatchewan Inc. has rented the beautiful facilities at Echo Lake Bible Camp, 5 km from Fort Qu'Appelle and 80 km northeast of Regina for sessions July 25-30, 2004. If your family is looking for an inspiring holiday for the whole family, available at a reasonable cost, then the Saskatchewan program is worth considering. **Dr. Gary Parker,** well known science educator and a favourite author and speaker on creation, is scheduled to be the keynote speaker. Dr. Parker has in the past been associated with Institute for Creation Research, Answers in Genesis and Clearwater Christian College. His most recent book is *Exploring the World Around You* just published by Master Books and reviewed in the previous issue of *Dialogue.* A former student of Dr. Parker's is **Vance Nelson** of Creation Truth Ministries based in Red Deer, Alberta. Vance and his wife Korelei are scheduled to provide concurrent sessions for children 5 to 10 years old, and perhaps to show some of their beautiful fossil collection to the other campers.

The fee schedule which includes everything except bedding and toiletries, is a maximum of $525 per family (2 adults and all children under 18). A break down of individual fees for the various age groups is also available. There is a late fee per person for late registration after June 27. For more information on details phone/fax (306) 252-2842 or consult <www.creation-science.sk.ca>

Let's Learn from the Best

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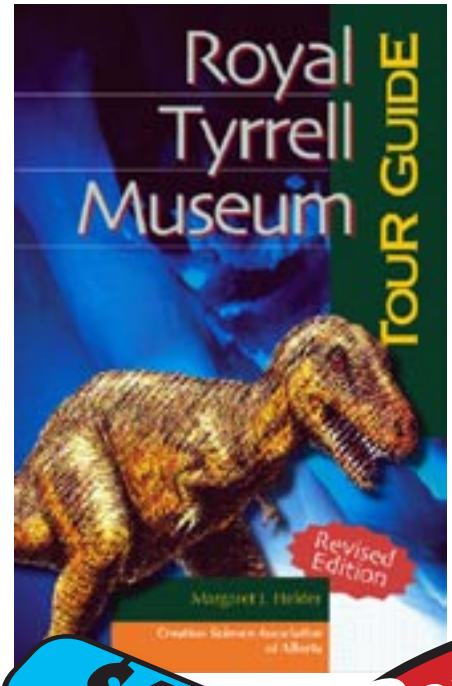
the real product continues to work throughout a gecko lifetime, the synthetic tape stayed sticky for only seven or eight applications. Moreover the artificial version is unbelievably expensive. A one metre square piece of tape would cost tens of thousands of English pounds to produce. Thus not surprisingly, frenetic research continues on this project. Even the Canadian government has leaped into the fray with a $200,000 grant over five years to a zoologist at University of Calgary. In this era of reduced government expenditures, that is a lot of money for one research project. The Canadian government must be expecting a good financial return on their investment! Meanwhile all involved agree that the living creatures themselves are the place to look for further ideas and inspiration.



TOUR GUIDE : ROYAL TYRRELL MUSEUM

Margaret Helder

This beautiful new discussion of the exhibits in the museum is interesting as a preview to a visit and for insights into actual displays once you are there. If this booklet only is ordered, add $1.50 per copy (maximum $6.00) for shipping. For bulk copies of 10 or more, pay only $4.50 each plus $6.00 shipping, as usual)

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Paul S. Taylor

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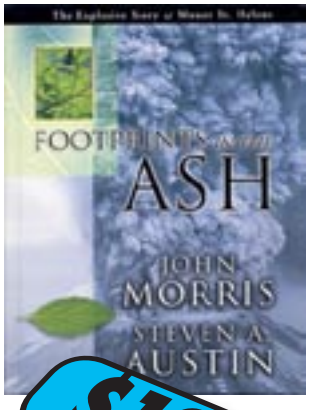

FOOTSTEPS IN THE ASH

John Morris and Stephen Austin

At last we have a book on Mount St. Helens and what a book! Deluxe colour photos and interesting discussion come at a price that is great too.

Hardcover - 128 pages

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SEVEN MEN WHO RULE THE WORLD FROM THE GRAVE

Dave Breese

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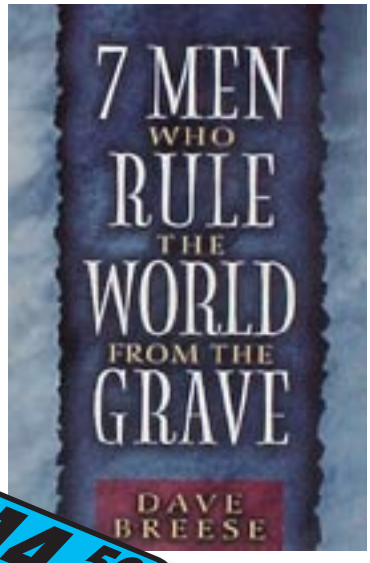

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