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Articles

The Maximum-Power Stimulus Theory For Muscle	213
Joseph Mastropaolo, Ph.D.	
Abraham Trembley and the Hydra	222
Arthur Manning	
Lack of Evidence for Subduction Renders Plate Tectonics Unlikely: Part II—Extension Dominant at “Convergent Subduction Zones”	227
Michael J. Oard	
A Critique of the Literary Framework View of the Days of Creation	237
Andrew S. Kulikovsky	

Notes from the Panorama of Science

Slumping at Grand Mesa, Colorado: Slow or Rapid?	245
Michael Shaver	
The Goblet Cell	248
Mark H. Armitage	
Are Uniformitarians Documenting Earth’s Biblical Creation?	249
Carl R. Froede Jr.	

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Departments

Photographic Essay	235
Mitchell Caverns: Evidence of Climate Change	
Paul W. Lewis	
Book Reviews	
<i>Creation, Time, and Dr. Hugh Ross</i>	220
by Bolton Davidheiser	
<i>Dinosaurs and Creation</i> by Don B. DeYoung	221
<i>How Now Shall We Live?</i>	225
by Charles Colson and Nancy Pearcey	
<i>The Mythology of Modern Dating Methods</i>	225
by John Woodmorappe	
<i>Ride to Glory</i> by Warren LeRoi Johns	226
<i>Noah’s Ark and the Ziusudra Epic</i> by Robert Best	244
<i>The Handy Dinosaur Answer Book</i>	244
by Thomas E. Svarney and Patricia Barnes-Svarney	
<i>How Now Shall We Live</i>	252
by Charles Colson and Nancy Pearcey	
<i>Noah’s Flood</i> by William Ryan and Walter Pitman	253
<i>Dinosaurs and Creation</i> by Don B. DeYoung	253
<i>Jonathan Park and the Secret of the Hidden Cave</i>	262
by Sandy and Pat Roy	
Erratum	226
Call for Papers: Fifth International Conference on Creationism 2003	255
Letters to the Editor	256
Membership/Subscription Application	263
Order Blank for Past Issues	264

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Haec Credimus

For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested on the seventh.—Exodus 20:11

The Maximum-Power Stimulus Theory For Muscle

Joseph Mastropaolo, Ph.D.*

Abstract

The maximum-power stimulus theory was valid without exception or failure for a variety of sports on land, in the water and in the air, for a range of competencies from quadriplegics to elite athletes of both genders, and in age brackets from childhood to old age. It proved more potent and efficient than rival theories including hormonal stimulation, like anabolic steroids, and permitted achieving national or world ranking status in mere weeks whereas rival methods of training had failed for years. The theory simplified and unified maximal muscle performance and solved enigmas that go back 2500 years to the first Olympic Games.

There are links to physics and chemistry as well as physiological mechanisms known from biochemistry. The theory functions by the arousal

from DNA of unmanifested muscle proteins that provide structural and functional advantages within 24 hours. It permitted mathematical modeling and predicted objectively, accurately and reliably. It illuminated allied theoretical questions like specificity of training, overtraining, and the limits of muscle performance. From the first series of successful experiments in 1967 identifying the hypothesis, there were numerous opportunities to discover exceptions or weaknesses or some conceivable link to "evolution," but none were found. As far as the numerous experiments over a span of 25 years could determine, the theory objectively, validly and reliably explains a complex, quickly reactive design that is universal and the antithesis of "evolution."

Introduction

A muscle subjected to training may enlarge structurally as well as functionally. The new proteins are aroused from the organism's genetic morphological reserves and selectively synthesized (Pette and Staron, 1993). One of the earliest observations on the stimulus for structural enlargement was suggested by Morpurgo in 1897. He compared the muscle enlargement, from propelling the same treadmill, in a small dog and a large dog. The small dog did less than half the work of the large dog, but it displayed greater enlargement of its muscles as indicated by microscopic cross-sectional area determinations. These observations suggested that some other factor, something other than the total work done, was the stimulus for muscle enlargement (Morpurgo, 1897; Mastropaolo, 1991). Petow and Siebert reported that Lange in 1917 associated the stimulus inducing the structural enlargement with causing the muscle to produce an "unaccustomed greatest power from overcoming a high resistance in a short period of time." In 1925, Petow and Siebert stated that the stimulus for structural enlargement was performing more

work per unit of time, that is, more power, whereas the total work done was without importance. Their data showed that the enlargements of the heart and the gastrocnemius were directly proportional to the training power, not the total work done (see Figure 1) (Petow and Siebert, 1925; Siebert, 1928).

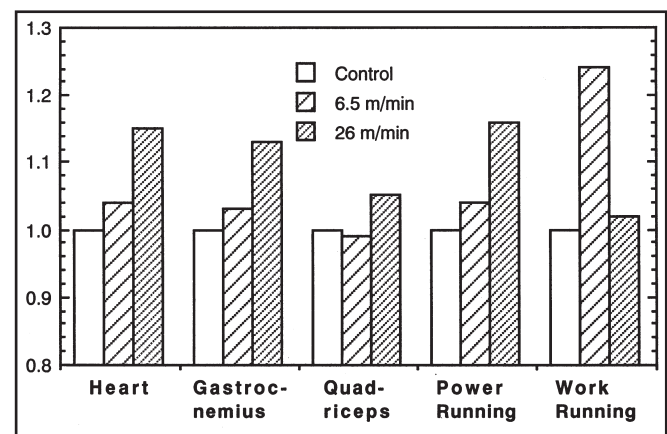


Figure 1. Relative muscle weights, power and work running. In the training of rats, the increases in relative heart and skeletal muscle weights were coupled to the power rather than the work of running (Petow and Siebert, 1925).

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In 1956 and again in 1958, Hellebrandt and Houtz showed that training at the torque force that elicited maximum power for 30 seconds on an ergometer increased muscle performance over the entire load-work rate spectrum (Hellebrandt and Houtz, 1956; 1958). Thus, observations from Morpurgo to Hellebrandt and Houtz, suggested that maximum power was the stimulus for the functional as well as the structural enlargement of muscle. Derived from genetic morphological reserves, those alterations were associated with the synthesis of new proteins in the actin and myosin contractile filaments (Pette and Staron, 1993).

It is well known that muscle also may atrophy in size and function. Therefore, one interpretation of these studies is that the size and the function of a muscle may be changed, positively or negatively, in direct proportion to the change in maximum power demanded in the muscle's spectrum of activities. This conclusion may be called the maximum-power stimulus theory for muscle.

The Enigmas

One of the earliest observations on the functional improvement of muscle comes from the lore of the Ancient Olympics of about 500 B.C. Milo of Crotona, Olympic wrestling champion once as a boy and five times as an adult, carried a steer on his shoulders into the Olympic stadium. When asked how he had become so strong, he replied that he had lifted the steer every day from the day it was born. For many years, this method has been called progressive resistance training. It suggests that the stimulus for the functional improvement of muscle is an increase in the force demanded of it. This led to two enigmas, the first of which was that adding weights to a runner or cyclist for training may result in worse, not better, racing performance. For theorists, this enigma was circumvented by dividing training theory into two mechanisms. One was a "strength" mechanism for which load was the stimulus and the other an "endurance" mechanism for which long duration (time) or total work was the stimulus.

The second enigma concerned the observation that a heavy weight was necessary for training to improve strength, but the heaviest weight did not give the best results. This enigma remained unresolved for more than a decade, possibly because an advance in technology was necessary to test true force (mass times acceleration), rather than merely the static force (mass) (Mastropaolo, 1989a; 1989b; 1992a; Mastropaolo and Takei 1991). That research found that the maximum-power stimulus training resulted in 1.8 times the gain in strength and 1.6 times the gain in power of the progressive resistance (mass) training. The maximum-power stimulus point of view resolved both enigmas while simplifying and unifying training theory.

Whether one movement or many movements, whether with heavy loads or light loads, the maximum-power stimulus seemed to be the trigger which aroused the structural and functional improvement mechanisms (Mastropaolo and Takei 1981; Mastropaolo 1984; 1989a; 1989b; 1992a).

Testing the Maximum-Power Stimulus Theory

That a theory simplifies and unifies is a necessary but not sufficient sign of its validity. Another requirement is universality. The theory ought to work on both genders, all ages, all activities in all environments at all physiological competence levels without exceptions or failures. A valid theory ought to be high in potency and high in efficiency. It ought to compare favorably to training with hormonal stimulation, like anabolic steroids, which although illegal and hazardous to health, have been shown to be high in potency and efficiency. In succeed or fail conditions, it ought to succeed where rival theories have failed. There also ought to be links to known physiological mechanisms as well as more basic science, like chemistry or physics. If it is truly scientific, then it ought to permit mathematical modeling, that is, a definition in the language of science. Like any good theory, it ought to predict objectively, accurately and reliably. If truly valuable, it ought to illuminate allied theoretical questions like specificity of training or overtraining or the limits of performance.

To test the maximum-power stimulus theory, four quadriplegic students were given maximum-power training (Kenyon and Ruel, 1982). They had as little as 15% of the body's major skeletal muscle under voluntary control. Their physicians gave them no hope, because their heart rates could not rise above 90 beats per minute. They were told that they could not achieve target heart rates to reverse the physiological degeneration from the disuse of the denervated parts of their bodies and therefore were doomed to deteriorate progressively and die young. Maximum-power training on a cranking ergometer improved all of them with evidences of marked muscle hypertrophy. This suggested that the mechanisms for morphological modification were stimulated from within the active skeletal muscle, not the heart. Some of the quadriplegic students were then able to achieve qualifying times for wheelchair racing, and they anecdotally reported that new horizons had opened for them. They said they had first-hand evidence of physiological improvement and did not feel doomed to die young.

Conspicuous improvements also were obtained by two cyclists, a runner, a swimmer, a kayaker, and a muscle-powered flyer (Mastropaolo, 1984; 1992b). The muscle-powered flyer won prizes of 85,000 and 220,000 dollars—prizes that had been sought in vain for 18 to 20 years by

teams worldwide. Twenty-two years later, those records still stand (Allen, 1979; Grosser, 1981; Long, 1978; Mastropaolo, 1982). The improvement beyond personal records in these elite athletes was five per cent per month, thereby exceeding in eight weeks the gains from anabolic steroids in eight years, according to the best documented case for training with anabolic steroids (see Figure 2) (Mastropaolo, 1992b). Some of these athletes achieved national or world rankings in weeks whereas rival methods had failed to produce such results in as long as 18 years. Conspicuous results also were obtained with archers, gymnasts, rowers and weight lifters (Mastropaolo, 1984; Mastropaolo and Takei 1991). The subjects included men and women from four to 82 years of age.

In summary, the maximum-power stimulus theory was valid for a variety of sports on land, in the water, and in the air for a range of competencies from quadriplegics to elite athletes of both genders in age brackets from childhood to old age. It proved more efficient than anabolic steroids and permitted achieving national or world ranking status in mere weeks whereas rival methods of training had failed for years. Although the tests did not cover every circumstance, there were numerous opportunities to discover exceptions or weaknesses in this training strategy but none were found.

Possible Linking Mechanisms

Is there a potential link of the maximum power stimulus to known physiological mechanisms? Maximum power requires maximum metabolic rate, maximum energy conversion, and maximum heat release at the site of contraction. This site is also the intracellular area sustaining the greatest consequences from this severest of metabolic storms. The flood of heat, 80 per cent of the energy converted, and the flood of other metabolites, are known to instigate the synthesis of heat-stress proteins, and other new proteins, which configure the cell to withstand these physical and chemical shocks from maximum metabolism (Mastropaolo, 1992a). Other new proteins are known to reconfigure the contractile properties of the actin and myosin filaments themselves, and these new proteins are induced from genetic morphological reserves (Pette and Staron, 1993). The concept that emerges is that the genetic morphological reserves provide new contractile proteins to permit higher maximum metabolic rates while also providing heat-stress and other new proteins to withstand the increased heat and chemical shocks. The stimulus site summoning the coordinated synthesis of the new proteins is probably the area experiencing the full fury of the metabolic storm, the site of contraction.

This maximum-power stimulus theory also needs to address the more passive tissues of the musculoskeletal sys-

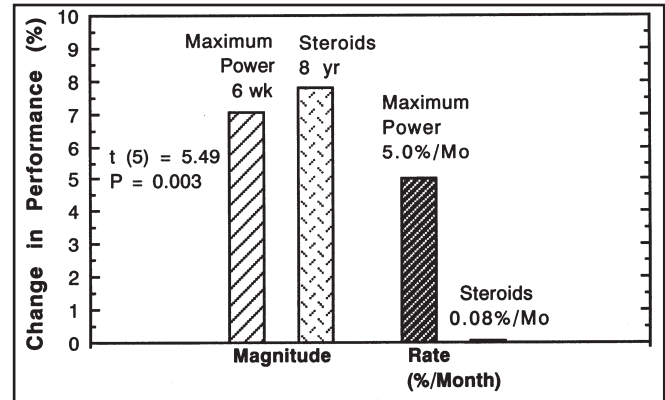


Figure 2. Maximum-power training versus steroids, magnitude and rate of change compared. The cases for steroids (N=1) and maximum-power training (N=6) were compared. The progress made beyond the personal record with steroids in eight years could be exceeded in eight weeks with maximum-power training. The probability, P, that this conclusion is wrong is three chances in 1000 (Mastropaolo, 1992b).

tem, the stroma and bone. The stroma structurally enlarges and toughens permitting enlargement of the muscle cells and the transmission of higher forces without rupture. The cortex of bone thickens and the trabecular network reconfigures to withstand higher forces or velocities or power generated by the muscles. If the triggers for these alterations in stroma and bone are intracellular and responsive to both force and velocity, the components of power, then this would provide punctual changes congruent with those proceeding in muscle and render a consistent overall theory for the entire musculoskeletal system.

Structural Alterations

Morpurgo and others demonstrated that the structural enlargement of muscle is by hypertrophy of the individual cells, rather than by an increase in the number of cells. Morpurgo identified the enlargement as increased sarcoplasm and subsequently Seiden found a significant enlargement of the sarcotubular system (Morpurgo, 1897; Seiden, 1976; Mastropaolo, 1991). In analogous terms, the cellular engine increases size by increasing the water jacket and the ignition system. The water jacket not only serves as a heat sink but also contains the fuel systems, which must enlarge structurally and functionally to permit the maximum energy conversions required for maximum power output. The water jacket also serves as the reservoir where myoglobin may be synthesized de novo to enhance the carburetor, which ultimately supports the maximum energy conversions with oxygen.

Muscle cells may be looked upon as engines converting chemical energy to mechanical energy at variable meta-

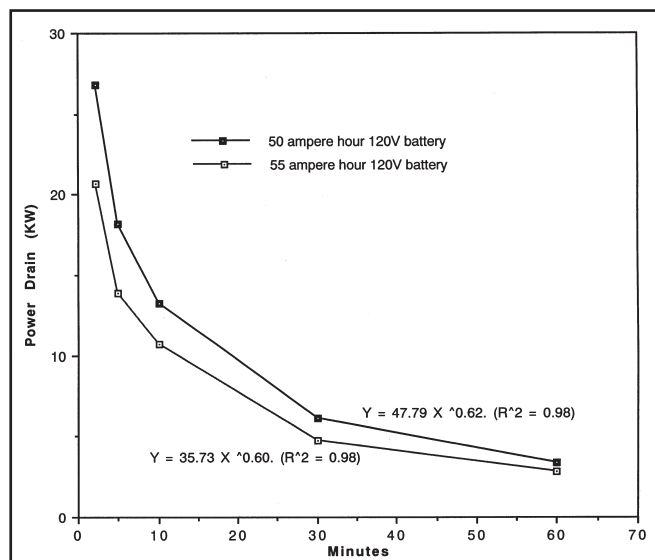


Figure 3. A chemical-electrical analogue of a chemical-mechanical cell. The 55 ampere hour battery was designed for a longer discharge time than the 50 ampere hour battery and discharged at lower power for each time shown. Batteries are chemical-to-electrical energy converters and may be considered analogues of muscle cells, which are chemical-to-mechanical energy converters. Muscle cells designed by the structural modifications of endurance (long discharge) training discharge at lower power levels like batteries. Like muscle, the discharge rates of both batteries are described well by $Y = aX^b$ (Massaro, 1985).

bolic rates, or rates of discharge. Analogously, batteries may be looked upon as devices that convert chemical energy to electrical energy also with variable rates of discharge. A battery designed for a longer discharge time will yield lower power levels than a battery designed for shorter discharge times (see Figure 3). Similarly, muscle cells trained and thereby structurally configured for endurance (long discharge times) also perform at lower power levels (see Figure 4). For muscle cells and for batteries, the same mathematical model may be employed, $Y = aX^b$, where Y is the predicted score, a is the constant, X is the score and b is the exponent.

A Mathematical Model

The mathematical model of choice, appropriately called power equation, takes the form: $Y = aX^b$, and accurately models maximal muscle performance. For example for 1990, the equation for the track records for men from 100 m through 30,000 m is $Y = 0.0597 X^{1.1101}$ [Figure 4] (The Athletics Congress, 1990). The R^2 of 0.9995 shows that the data are modelled with an accuracy of 99.95%. The equa-

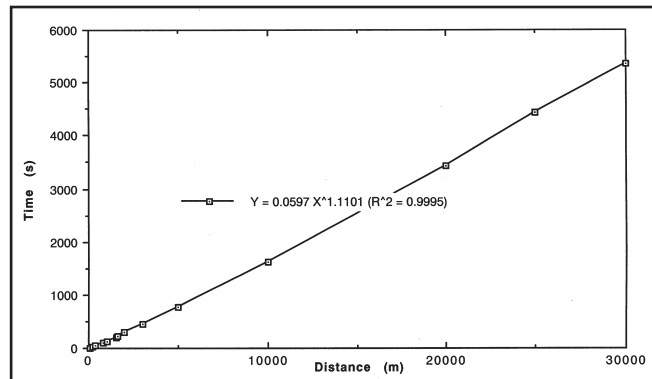


Figure 4. Sprint and running world records 1990. Sprint and running records from 100 m to 30,000 m are described with 99.95% precision by $Y = aX^b$ (The Athletics Congress, 1990).

tion for the more powerful battery in Figure 3 is $Y = 47.79 X^{0.62}$ ($R^2 = 0.98$) and for the battery designed for the longer discharge, $Y = 35.73 X^{0.60}$ ($R^2 = 0.98$) (Massaro, 1985). These high modeling accuracies show that battery power, as well as running power, conform closely to the mathematics of the power equation.

A basic test of the model's predictive accuracy is to confirm that given a longer time a lower power will be predicted. The model passed that test, as is shown by as good a fit for the longer running times at lower power as for the shorter running times at high power (see Figure 4). A step further would be to check the accuracy of those predictions. For that purpose, the model may be constructed with data different from those to be predicted. For example, if all that were known were the records for the 1500 m, the 5,000 m and the 10,000 m, could the model predict the record for 30,000 m? The model would predict a time of 5,370.06 s compared to the actual record of 5,358.80 s for an error of 0.2% (The Athletics Congress, 1990). The model seemed to predict accurately even with the minimum of three data points required for the formulation of the equation and even if the extrapolation was 20,000 m from the last data point.

For another test of predictive accuracy, the data for 100 m through 1000 m were used to formulate the model ($Y = 0.0506 X^{1.1352}$, $R^2 = 0.9982$), extrapolations were made to the 1500 m and the mile (1609.3 m), then the predicted times were compared to the actual records. The predicted times were 204.01 s (7.36 m/s) for the 1500 m and 220.97 s (7.29 m/s) for the mile and these were compared to the actual records of 3:29.46 or 209.46 s for the 1500 m and 3:46.32 or 226.32 s for the mile (The Athletics Congress, 1990). Accordingly, the predicted values were in error 2.6% and 2.4%, respectively. The model predicted reasonably well, but curiously in both cases the model predicted lower times. This raised the question of whether faster records were feasible.

From popular journal accounts, a runner was reported near record times for the 1000, 1500, and 3000 m. The question arose as to whether he could break the 1990 records for the 1500 m and the mile. If the equation is formulated with the 1990 records for the 1000, 1500 and 3000, then the model predicts new records by margins of 1.18 s for the 1500 m and by 1.08 s for the mile. In 1993, the runner broke those records by 0.6 s and 1.93 s, respectively. The model's predictions were in error 0.28% and 0.38%, respectively. The model did seem capable of predicting accurately where effort may be placed to break world records and was used in similar ways in order to obtain the conspicuous results reported above in the wide variety of sports at the elite level for which the investigator had little or no experience as a competitor or coach.

General Versus Specific Power

The question arose as to whether breaking a record in one event would permit breaking records in other events. If a record is broken, that indicates that the system is more powerful and other records may be broken. Yet, the principle of specificity of training argues that records will be broken by some unquantified amount only where the training occurred. Which is correct? The question was investigated by the author with a series of maximum-power tests to establish a baseline, specific training to break one record on the baseline, then retesting. All of the tests showed improvement, with the greatest improvement where the training had taken place. The improvements regressed from the training site according to the same equation, $Y = aX^b$, which in retrospect seems quite logical if the basic premise, the maximum-power stimulus theory, is valid. Therefore, training at one point on the power spectrum does increase the power capacity generally, with the greatest improvement being noted where the training occurred and decreasing from there according to $Y = aX^b$. These results support the maximum-power stimulus theory on the one hand and on the other they describe mathematically what hitherto was a gross unquantified principle, the specificity of training.

Weight Lifting

Repeating the experiment in the weight lifting realm yielded a new observation—that power was lost at the lowest forces as it was progressively gained at higher force levels. The force-velocity curve pivoted at the force that yielded peak power (Figure 5). This was observed with a simple movement, like the bench press, as well as with a more complex movement, such as the press to handstand simulated on a modified weight lifting machine using ex-

perienced gymnasts as subjects (Mastropaolo and Takei, 1991; Mastropaolo, 1992a). This suggests, contrary to conventional wisdom, that weight lifting is not beneficial for all athletes. It would benefit athletes competing in the slow-high-force portion of the force-velocity curve, as in weight lifting competitions. It would be of marginal benefit for those competing in the middle portion of the force-velocity curve, as in long distance events in track, and would be detrimental for those performing in the high-velocity-low-force portion of the curve. In this latter region, we might mention sports like badminton, tennis, table tennis, and baseball.

Speculation on what causes the pivoting of the force-velocity curve must consider likely changes in angle of pull of the muscle with the bone as hypertrophy increases. However, judging from the appearance of the curves in Figure 5, the changes seem to have a more fundamental cause, like a change in leverage at the molecular level of the contractile mechanism. It remains to be seen whether this judgment will be supported by future research.

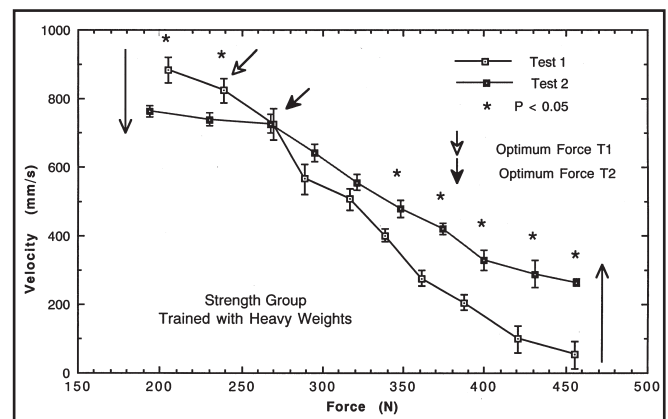


Figure 5. Weight lifting training pivoted the true force ($F = ma$)-velocity curve. Eighteen male university varsity gymnasts were tested and trained in a simulated press to handstand on a modified weight-lifting machine. For the five highest forces, the gymnasts became significantly faster and for the two lowest forces significantly slower ($P < 0.05$). The optimum force, yielding greatest power, increased with training. The pivot was the optimum force on Test 2 (Mastropaolo and Takei, 1991).

The Limits of Muscle Performance

In the course of training that progressively increased power, four series of tests were performed, starting from the lowest force, and power equations were derived from the lowest force to the force that yielded maximum power. The constant, a , decreased from 5.49 to 3.78 to 2.00 to 1.56 whereas the exponent, b , increased from 0.52 to 0.61 to 0.71 to 0.76 and R^2 ranged from 0.96 to 0.99. If the analysis is carried out for the differences from the first test, then the

effect is magnified because the constant, a , decreased from 1.80×10^{-5} to 1.51×10^{-8} to 2.56×10^{-12} and the exponent, b , increased from 2.43 to 3.58 to 5.15 with R^2 of 0.95, 0.87 and 0.95. The constant's approach to zero proceeded from three orders of magnitude to four orders of magnitude suggesting this as the better indicator, with the greater resolution and sensitivity, compared to the exponent, for any athlete's approach to ultimate performance.

Ancillary Applications

An ancillary application of these findings would be to evaluate the range of alterability of a particular athlete's skeletal, muscle and stromal structure given a particular protocol to develop maximum power. Another application might be to compare protocols for the development of maximum power for genders, ages, and levels of physiological competence. Another application is to evaluate the volition of an athlete. A series of power tests has a distinctively high R^2 for an athlete with high volition that is easily distinguished from the low R^2 of an athlete with weak volition. The athlete with weak volition may be provided an objective tool to motivate greater volition.

The maximum-power stimulus theory permits relief from the type of overtraining associated with tissue damage. For weight lifting, textbooks advise no more than two or three training sessions per week, because the subject is expected to use progressive resistance protocols with heavy weights, thereby causing tissue strains that require rest for healing (Fahey, 1994). While training for maximum power, subjects use the medium weight that elicits maximum power with no sign of tissue strain. In this way, they may break power records seven days per week, as was done in the weight lifting experiments, without strains or injuries and thereby progress more efficiently.

Currently for racing even short distances, an athlete is often subjected to vast quantities of work which may cause the type of overtraining associated with chronic overwork and diminished motivation. The maximum-power stimulus theory permits power records to be broken as often as every training day with short, focused training sessions. Athletes breaking power records in this way do not become overtrained, because there is no overwork and the frequent breaking of records is highly motivational. This suggests that the maximum-power stimulus strategy may eliminate the problems of overtraining from injury or overwork.

Training the musculoskeletal system has been used to modify other systems. For example, physical activity may alter total serum cholesterol, which has been considered a risk factor for coronary heart disease. In careful experiments, in which exercise was measured and diet was measured and weighed to control total calories and nutritional composition, total serum cholesterol was decreased by the

high power of the training, not the total work, and the risk of coronary heart disease was thereby diminished (Mastropaolo, 1967). This suggests that the maximum-power stimulus strategy may simplify and unify theories of arousal stimuli for structural and functional alterations elicited from morphological genetic reserves as induced by muscle for muscle and for other cells of the body (Mastropaolo and Takei, 1981).

Without allowing the bone to move, muscular contractions against strain gauges have been observed to train the muscle to produce more force, called isometric strength, and for a longer time, called isometric endurance. The question arose as to whether training in the usual dynamic fashion according to the maximum-power stimulus strategy would increase isometric strength and endurance. It did and there were no statistically significant differences between the maximum-power stimulus method of training and isometric training (Kent, 1982). This suggests another facet of universality for the maximum-power stimulus theory.

It also suggests another analogous attribute for the muscle as an engine. Unlike gasoline engines that have fuel and air mechanically coupled and can be stalled, the myofilaments cannot be stalled. Therefore, increasing the power of the muscle would be reflected in every way the muscle may be used. In turn, this permits another simplification because there is no fundamental need for the categories of contractions called concentric (shortening), isometric (no bone movement) and eccentric (lengthening). If the muscle produces enough power, then the bone moves, the muscle shortens and the load is lifted. If less power is produced, then the lifting stops, the bone stays in place and the muscle maintains its length. If still less power is produced, then the load is lowered under control as the bone returns to the starting position and the muscle lengthens. A more powerful muscle will permit greater competence in these and other uses, even if there is difficulty with the equation for power because there is no discernible movement or movement seems to go negatively. Such a conceptional difficulty from physics ought not to hold back muscle power theory. It ought instead to signal the need for an alternative marker immune to such difficulty, like metabolic rate.

Refinement of the Theory

What is needed is an indicator of the energy converted, like steady-state metabolic rate. In light of this refinement and the other studies reviewed, the definition suggested in the fourth paragraph above may be modified and supplemented as follows. The stimulus for the structural and functional change of muscle, and the alterations induced in other cells, is directly proportional to the maximum rate

of energy converted in the muscle's spectrum of uses. This may be called the maximum-power stimulus theory for muscle.

Design Versus "Evolution"

The maximum-power stimulus aroused the synthesis of new proteins that were not manifestly present in the muscles undergoing alteration. These new proteins were summoned apparently from the genetic morphological reserves in the DNA already present in the individual and did not have to wait for alleged eons of hit-or-miss mutations. Often within 24 hours, the new proteins were synthesized with the unerring precision and punctuality expected from intelligent design, not from some blind, mindless, iterative, failure prone, unpredictable, unobservable speculation like "evolution."

Batteries like those of Figure 3 are not constructed by phantom, chance, physicochemical forces acting selectively and mysteriously on minerals. They do not "evolve." Engineers do not throw battery enclosures into the ocean or any "primeval soup" or any fossil pit and expect "natural forces" to "evolve" batteries. The engineers who constructed the batteries of Figure 3 designed with mathematical precision the chemical, electrical and structural requirements. They strenuously eliminated chance and any possibility for any random "mutation" to their blueprints. As electronic engineers, they knew that if a "mutation" takes place in the circuitry of a television set, for example, then degraded audiovisual reception would result, because chance builds nothing and disintegrates everything. It is also noteworthy that for those meticulously engineered batteries the performance equations are the same type as those for human muscle. That strongly suggests that the human muscle was meticulously nanoengineered by a designer of unimaginable intelligence using mathematics and creative powers for complexities beyond human comprehension.

Billions of observers for thousands of years have witnessed many billions of new individuals arise only from reproduction and never from "evolution." Billions of observers for thousands of years have witnessed many billions of new individuals expressing latent genetic morphological reserves cyclically, as in the fur color changes of the arctic fox, or sequentially, as in the growth and development of flora and fauna, or by arousal, as with muscle hypertrophy, with never a sign of any "evolution." The fanciful manipulation of those expressions of latent genetic morphological reserves by alleging untold generations to change what obviously occurs countless times in each individual's lifetime, in order to conjure a mythical "evolution," is crass superstitious propaganda, not science. To mandate monopolistic, monolithic, "evolution educa-

tion," as California public schools presently do, is to dictatorially protect what is scientifically indefensible. To require students to learn that "evolution" had any role whatsoever in the origin of life or in the structural modifications aroused from latent genetic morphological reserves, is to indoctrinate with occult propaganda, which is irresponsible anti-science (California Department of Education, 1990). "Evolution" and the "origin of life by chance" are "impossible in probability in the same way that a perpetual motion machine is impossible in probability (Yockey, 1992)." The reasonable conclusion from science is that muscle and all other living tissues were designed.

These experiments have brought to the fore the fact that "evolution" is the central most disorganizing, anti-intellectual, anti-science principle that biologists have ever been dictatorially forced to learn to understand the world. In the opinion of this author, it stands as the greatest scandal in science of the last 140 years.

References

- Allen, B. 1979. Winged victory of "Gossamer Albatross." *National Geographic* 156(5):640-651.
- California Department of Education. 1990. *Science framework for California Public Schools*, pp. 116-136. Sacramento.
- Fahey, T.D., P.M. Insel and W.T. Roth. 1994. *Fit and well*, p. 55.. Mayfield Publishing, Mountain View, CA.
- Grosser, M. 1981. *Gossamer odyssey*. Houghton Mifflin, Boston.
- Hellebrandt, F. and S. Houtz. 1956. Mechanisms of muscle training in man: experimental demonstration of the overload principle. *Physical Therapy Review* 36(6): 371-383.
- . 1958. Methods of muscle training: the influence of pacing. *Physical Therapy Review* 38(5):319-322.
- Kent, J.A. 1982. *The effects of power overload versus isometric training on hiking strength and endurance in sailing*. Masters thesis. California State University, Long Beach.
- Kenyon, S. and G. Ruel. 1982. Quadriplegic training. *Sports 'N Spokes*. Sept.-Oct. pp. 17-18.
- Long, M.E. 1978. The flight of the Gossamer Condor. *National Geographic* 153(1):130-140.
- Massaro, K. 1985. Guidelines clarify backup needs in UPS systems. *Computer Design* 24(7):129-133.
- Mastropaolo, J.A. 1967. Exercise, lipids and coagulation. In Karvonen, M. and A. Barry, Editors, *Physical Activity and the Heart*, pp 225-227. Charles C. Thomas, Springfield, IL.
- . 1982. Exercise physiology for the Gossamer manpowered aircraft. In Abbott, A.V., Editor, *The First Human Powered Vehicle Scientific Symposium Proceed-*

- ings, pp. 16–27. International Human Powered Vehicle Association, Idyllwild, CA.
- . 1984. Can the elite, trained, racing human engine be improved significantly? In Abbott A.V., ed. *Second International Human Powered Vehicle Scientific Symposium Proceedings*, pp. 169–174. International Human Powered Vehicle Association, Idyllwild, CA.
- . 1989a. Countering space adaptation with patterns of exercise force, velocity, power, energy and G's. *Countering Space Adaptation With Exercise: Current Issues*, Exercise Countermeasure Project, NASA, Johnson Space Center, Houston, TX.
- . 1989b. A hypothesis for strength and maximum power. *International Journal of Sports Medicine* 10(5):380.
- . 1991. Training-induced muscle enlargement. *Journal of Applied Physiology* 71(1):372–373.
- . 1992a. A test of the maximum-power stimulus theory for strength. *European Journal of Applied Physiology* 65(5):415–420.
- . 1992b. Case study comparison of racing improvement from steroids versus “more power” training. *Sports Medicine, Training and Rehabilitation* 3:235.
- Mastropaolo, J.A. and Y. Takei. 1981. Spectral power changes after power overload training. *Medicine & Science in Sports & Exercise* 13(2):116.
- . 1991. Weight training pivoted the force-velocity curve. *International Journal of Sports Medicine* 12:345.
- Morpurgo, B. 1897. Ueber Activitats-Hypertrophie der willkürlichen Muskeln. *Virchows Archiv für Pathologische Anatomie u. Physiologie* 150:522–554.
- Petow, H. and W. Siebert. 1925. Studien über Arbeitshypertrophie des Muskels. *Zeitschrift für Klinische Medizin* 102:427–433.
- Pette, D. and R.S. Staron. 1993. The molecular diversity of mammalian muscle fibers. *News in Physiological Sciences* 8:153–157.
- Seiden, D. 1976. A quantitative analysis of muscle cell changes in compensatory and work-induced hypertrophy. *American Journal of Anatomy* 145:459–468.
- Siebert, W.W. 1928. Untersuchungen über Hypertrophie des Skelettmuskels. *Zeitschrift für Klinische Medizin* 109:350–359.
- The Athletics Congress of the USA. 1990. *1990 Competition rules for athletics*. TAC/USA Book, Indianapolis.
- Yockey, H. P. 1992. *Information Theory and Molecular Biology*, pp. 255, 257. Cambridge University Press, Cambridge.

Book Reviews

Creation, Time, and Dr. Hugh Ross by Bolton Davidheiser
Self published. 1998, 128 pages, \$5.00

Many readers of the *CRSQ* are familiar with the book on Hugh Ross by Taylor and van Bebber (1994). In that book the authors document Ross's many theological problems. While Davidheiser discusses some of these issues in his book, he goes beyond the arguments of that earlier work to expose some of the scientific blunders of Ross. The author obviously has spent much time examining Ross's audiotapes and pamphlets, for much of the material is drawn from those sources. Judging by the blunders that Davidheiser exposes, Ross is far less cautious in his statements in his live presentations than he is in his books.

Davidheiser has been tracking Hugh Ross's ministry for some time, a fact that has not gone unnoticed by Ross. He recounts that Ross met with him recently in an attempt to win him over. The author states that the meeting was cordial, but that Ross did most of the talking, and Davidheiser opines that Ross seems to believe that winning one over by friendship will dissuade public criticism. Ross also has told Davidheiser that his blunders are a thing of the past, which basically admits that there have been blunders. Unfortu-

nately, some of the audiotapes and pamphlets that contain the blunders are still available. When Davidheiser requested newer tapes from Ross's latest course at Simon Greenleaf University, he was denied further access to those tapes. A letter from Ross stated that after consultation with his board, this decision was made. Ross's letter said, in part, your "reason for wanting the tapes is not to learn more about the latest discoveries proving the existence of the God of the Bible and the accuracy of the words of the Bible, but rather to discover new errors and mistakes (he) might have made while speaking." This is outrageous! These tapes are for general sale. Does this mean that the people who handle orders have a black list of who is forbidden to purchase? Secret organizations have a vested interest in this sort of restriction, but for an organization that supposedly desires to publicize its message this makes no sense. This sounds like paranoia.

What kind of blunders does Davidheiser discuss? One repeated more than once is that DNA is either made of proteins or is itself a protein. Another is the complete botch of

the peppered moths of England. Ross calls them butterflies and has said that they are green in color. It is common for evolutionists to blow the story of the peppered moths, but Ross has exceeded all others. Without any documentation Ross says that average human eyesight is three times better than it was 2,000 years ago. Ross also claims that the Pacific Ocean basin is the scar left from when the moon was formed by separation from the earth. That is a very old idea that was discarded decades ago. Today the Pacific Ocean basin is explained entirely by plate tectonics. These blunders and terribly outdated ideas are inexcusable for a scientist. That is ironic, because Ross often dismisses his critics for supposedly not having the credentials to adequately understand the science. Perhaps this explains the paranoia.

Davidheiser's book is not without faults. While it is referenced, I would have liked to see far more. There are many quotes in quotation marks, but with no reference. Many of these probably are from audio tapes or from correspondence and perhaps difficult for others to check, but these could and should be referenced. As an astronomer, I would have handled a few things differently from Davidheiser, a zoologist. In the discussion of lunar dust and the age of the moon, the paper by Snelling and Rush (1993) should have been mentioned. Moon and Spencer, not Reimann, proposed the hypothesis that light travels through Reimannian space to explain the light travel time problem. Davidheiser apparently does not understand that when Ross (and other astronomers) talk about hydrogen

burning to power stars, thermonuclear reactions rather than combustion is intended.

There are a few minor errors, such as the fact that the Alvarez hypothesis for dinosaur extinction was presented in 1980 rather than in 1984. None of these errors have bearing in the case that Davidheiser makes, and are far less serious than those of Ross. Overall this is a good source on Ross's scientific mistakes. For some time I thought that we should concentrate on Ross's poor Biblical exegesis, because that is the root of his problem. Recently I have concluded that we should change tact and expose his mangling of science instead. After all, church leaders who should know better have given Ross much slack precisely because they have been enamored by his science.

References

- Moon, P., and D.E. Spencer. Binary stars and the velocity of light. *Journal of the Optical Society of America* 43(8): 635.
- Snelling, A., and D.E. Rush. 1993. Moon dust and the age of the solar system. *CEN Technical Journal* 7(1):2
- Taylor, P.S., and M. van Bebbber. 1994. *Creation and time*. Eden Productions, Mesa, AZ.

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Dinosaurs and Creation by Don B. DeYoung Baker Book House, Grand Rapids. 2000, 141 pages, \$10

Ever since I saw the movie classic King Kong (1993) and later an obscure Sci-Fi English B movie The Giant Behe-moth (1958) I have been fascinated with the idea of dinosaurs. And though my family and I haven't seen some of the dinosaur films that have come out of Hollywood recently, the fascination with those creatures has continued to increase through the years. Screenplays, myths, fables, and evolutionary theories have never been able to resolve the mystery behind these grand creatures that roamed the earth. However, God's word the Bible and studies by scientists and educators alike have presented wondrous explanations as to their existence and death from a Biblical Christian worldview.

One such explanation is *Dinosaurs and Creation* by Donald B. DeYoung. If you are familiar with his *Astronomy and the Bible* and *Weather and the Bible* you have a sneak preview into this new exciting book. He uses a question-and-answer format with tables and figures in explaining such questions as: Why were dinosaurs so large? What

was the diet of dinosaurs? Where do dinosaurs fit into biblical history? These are but few of the fifty fascinating questions DeYoung answers. And while written for the advanced student and older readers it is just as informative for the younger audience. The book includes a suggested reading list, glossary, and scripture index.

The author writes with a literal six-day creation perspective, and yet includes references about evolutionary change and time scales to educate the reader, providing fresh insight into the overall creation/evolution issue. This is a must resource for homeschool and Sunday school teachers, Christian teachers, parents, and students.

This book is published by Baker Book House and can be purchased from your favorite book source.

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Abraham Trembley and the Hydra

Arthur Manning*

Abstract

Abraham Trembley studied and experimented with the hydra, a small, fresh water animal, in the eighteenth century. The methods of locomotion used by this simple animal are complex, giving evidence for an intelligent Designer. An overview of Trembley's discoveries and experiments is pre-

sented. Also included is a discussion of his outstanding methodology, as a result of which he is today regarded as the "father of experimental zoology." Trembley's role as an educator is also considered, as well as the influence of his religion on his work.

Hydras

Hydras are small (about .5 to 10 mm. in length) fresh water animals. They can be found in ponds, attached to plant stems and the under side of leaves. They are assigned to phylum Cnidaria (Coelenterata), a group of very simple animals characterized by possessing stinging cells on tentacles. Cnidarians also include the well-known jellyfish, corals, sea anemones, and the Portuguese Man-of-War. The hydra was discovered in 1702 by Anton von Leeuwenhoek, the "father of microbiology." The genus name, *Hydra*, was assigned to this animal in 1758 by Carolus Linnaeus, the scientist who devised our system of classifying organisms. The name *hydra* has as its source a monster from Greek mythology. This imaginary beast had nine extremely poisonous serpent-like heads. If one of the heads was cut off then two more would grow back! Hercules killed the monster by burning the beast where he had cut off each of its heads, so that they would not grow back. Once we understand more about the real hydra, we can appreciate how appropriate its name is.

One remarkable behavior of the hydra is how it moves about. Our Creator has made animals with a great variety of methods of locomotion (moving the whole body from one place to another). Hydras use a number of different strategies to accomplish this. These were studied by Abraham Trembley in the eighteenth century. His care and patience enabled him to observe these behaviors. In his book, *Memoirs Concerning the Natural History of a Type of Freshwater Polyp with Arms Shaped Like Horns* (published in 1744 before the animals were named hydras), he described and illustrated some of these methods (Lenhoff and Lenhoff, 1986, p.44).

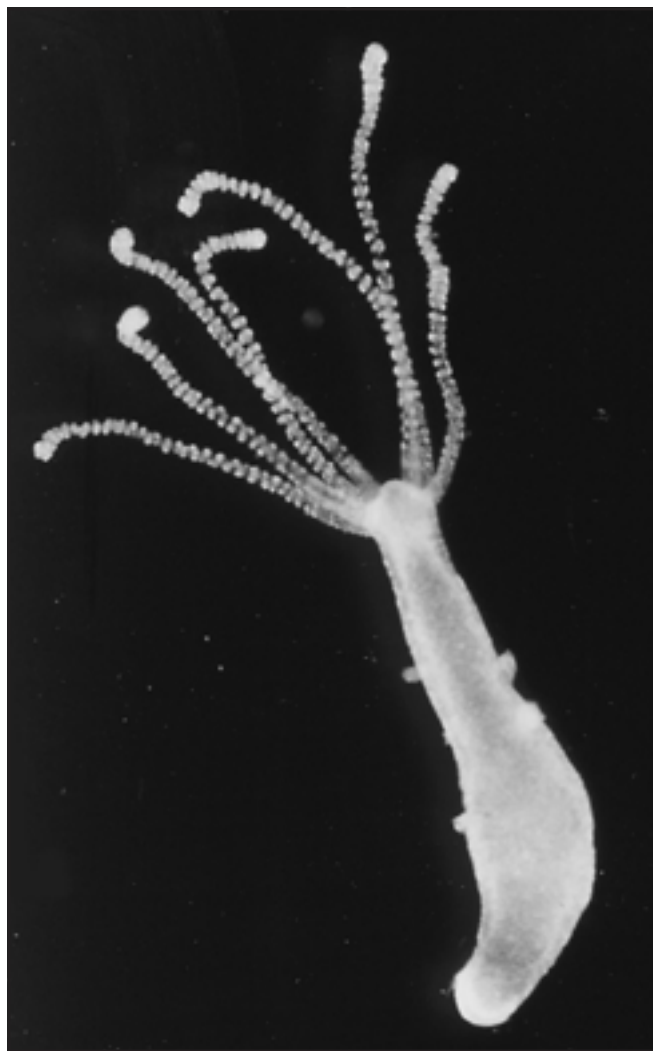


Figure 1. Hydra (*Hydra littoralis*). The small lumps on the sides of the main part of the body are testes and ovaries. Photograph by Runk/Schoenberger of Grant Heilman Photography, Inc.

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The first method consists of bending down the “head” end to the surface, attaching the tentacles, then detaching the base and drawing it to the head end, like an inch worm. Then it detaches the tentacle end and assumes the original position. This is accomplished extremely slowly.

The second method consists of bending down the “head” to the surface, attaching the tentacles, then detaching the base and lifting it above the head so that the animal is upside down, and then lowering the base to the opposite side of the “head” from which it started, attaching the base, detaching the head and moving into its normal position above the base. The animal actually moves by somersaulting! Quite a feat for an animal which does not even have a brain. The credit for this acrobatic performance must rightly go to the Creator. Trembley also describes how the hydra can move itself into position to hang upside down from the surface of the water and then use some of its tentacles to attach itself to the sides of the jar like anchors.

Trembley's Experiments

Abraham Trembley of Geneva, Switzerland, lived from 1710 to 1784. Because of his work with hydras, he has been called the “father of experimental zoology.” He studied samples of water from local ditches. He kept the water samples in jars which enabled him to observe the hydras in their natural environment. This proved to be a relaxing past time from his occupation as a tutor for Count William Bentinck's children at the estate near The Hague, Holland.

Since the hydras were green (from the presence of algae) and were attached to objects by their base, Trembley assumed that they were plants. Then in June, 1740, he noticed them contract and extend. Several days later he actually observed them move from one place to another—very strange behavior for a plant! He decided that they must be animals. After noticing that they seemed to move toward light, he decided to conduct some experiments with them. These experiments confirmed his suspicion that these eyeless creatures actually move toward light. This was the first animal that had ever been seen to behave this way.

After noticing that some hydras had more tentacles than others he was puzzled since this made the organism seem more like a plant than an animal. He decided to see if the hydra could regrow parts that had been cut off. If it could do so to a great degree, this would be strong evidence that it was a plant, since animals are very limited in this ability (e.g., a lizard can regrow its tail). His first such experiment was to cut the hydra completely in half—separating its top from its base. Each half actually grew back the missing other half! Was this organism a plant or an animal? Trembley soon saw a behavior which definitely established that

hydras are animals—he observed one use its tentacles to capture a prey and then proceed to eat it by stuffing it down a mouth located at the base of its tentacles. So Trembley became the first person to show that some animals can be made to reproduce by dividing them in two. This ability is called regeneration. He even split the tentacle end of a hydra only part-way down and each half regenerated the other half, resulting in a two-headed monster. He continued to split the heads and let them regenerate until he had a seven-headed hydra!

Abraham Trembley continued to do more experiments with hydras. He observed a small hydra growing on the side of a larger one. It continued to grow and develop until it finally detached to become an independent organism. He conducted experiments to prove that this type of reproduction did not start from an egg. This is called budding.

Trembley succeeded in turning a hydra inside-out and found that it could still live! He also experimented with grafting. In grafting, scientists remove a branch from one individual plant and attach it to another individual. It then grows out and becomes part of the other plant. But, could this work with an animal as well? Trembley demonstrated that it could with the hydra. He placed one hydra into the mouth of another and observed it attach and become part of the other's body!

John Baker, in his biography of Abraham Trembley, listed his chief discoveries. These were (1) his discoveries about budding in animals; (2) his discoveries about animal regeneration and grafting; (3) his discoveries about protozoan reproduction and his being the first person to observe true cell division; (4) his descriptions of protoplasm; (5) his discoveries about bryozoans.

Baker also mentions a “large number of lesser discoveries...” including work with rotifers and parthenogenesis (Baker, 1952, p.170).

Abraham Trembley—Scientist

Sylvia and Howard Lenhoff, in the preface to their book about Trembley, tell us that “In recognition of his accomplishments, he was elected to the Royal Society of London and in 1743 was awarded its prestigious Copley Medal, considered then to be one of the highest accolades in science”(Lenhoff and Lenhoff, 1986, p.ix).

What attributes made Trembley such an outstanding scientist? Baker mentions several. First, Trembley described processes, rather than merely describing structures. Second, he was flexible; “...when he saw that chance had presented him with a problem of particular interest, he switched over to its investigation, and planned the necessary observations and experiments with thoroughness” (Baker, 1952, p.171). Third, “the accuracy of his observations is perhaps the most striking feature of Trembley's

work” (p.174). Fourth, his desire for his results to be confirmed by others. He “...took every opportunity to show them to others, and to get others to repeat them” (p.179). Fifth, his logical mind. Sixth, giving detailed explanations of how he obtained his results. Baker quotes Trembley as saying, “It is therefore insufficient to say that one has seen a certain thing. That conveys nothing, if one does not at the same time indicate how one saw it and does not put readers in a position to judge the method by which the facts that are related have been observed” (p.180). Seventh, his clear, unequivocal writing. In addition, Howard and Sylvia Lenhoff extol Trembley’s persistence. They quote him as stating, “One should not become disheartened by want of success, but should try anew whatever has failed. It is even good to repeat successful experiments a number of times. All that is possible to see is not discovered, and often cannot be discovered, the first time”(Lenhoff and Lenhoff, 1988, p.113).

Abraham Trembley—Educator

Abraham Trembley was the father of five children which were all born within a seven year time-span. The first was born when Trembley was 49 years old. From their birth until his death at the age of 74 they were the “...absorbing passion of his life...”(Baker, 1952, p.188). Trembley actually wrote much more on education than on science. He thought much about educational methods and developed an original system. He also included moral principles in the education of his children. He used living things in teaching and felt there was much benefit in doing so since they were effective in exciting the children’s curiosity, which he thought was very important. “He also strove to inculcate a sense of wonder or awe at the immense complexity of the universe”(Baker, 1952, p.194).

Trembley was far from wanting merely to stock his pupils’ minds with knowledge. He tried to provide them with opportunities for distinguishing truth from falsehood and certainty from uncertainty; he taught them to weigh the degrees of probability, to suspend judgment, even to moderate their impatience for knowledge; for he regarded it as very important that children should realize the limitations of the human mind, and thought that this realization of man’s ignorance and mental imperfection could become a source of true knowledge.(Baker, 1952, p.193).

Abraham Trembley—Christian

The following information regarding Abraham Trembley’s religion is gleaned from Baker’s biography (1952).

Trembley professed to be a Christian and “...accepted as genuine the prophecies of the Old Testament and the miracles of both Old and New”(p.224). In 1779 he published *Instructions from a Father to His Children Concerning Natural and Revealed Religion*. This large book included a straightforward account of the biblical record. However, it should be mentioned that he was not a member of any sect of Christianity and some of his beliefs would not be considered orthodox.

When he began to undertake the education of his children, Trembley devoted less of his time to science and became progressively more and more absorbed in religion; and this was his dominant interest during the latter part of his life. It permeates all his educational works. The *Instructions from a Father to his Children, Concerning Nature and Religion* (1775) begins and ends with religious teaching, and in the intervening scientific part he turns repeatedly to the same theme (Baker, 1952, p.218).

Trembley taught his children science “...largely because he thought it would direct their minds toward religion” (p.219). He emphasized in his teaching to his children that design in nature requires there to be a God. In addition, he used reason to appeal to his children to accept the Bible as true.

Was Trembley’s religion a hindrance to his science? Baker stated that Trembley’s religion was the very basis of his science (Baker, 1952, p.218). Lenhoff and Lenhoff agree, declaring that, “We suspect that Trembley’s admirable scientific objectivity stemmed in part from his piety. He believed all marvels were possible in God’s magnificent universe”(Lenhoff and Lenhoff, 1988, p.113).

Here is how Abraham Trembley concluded his remarkable scientific book on the hydra:

We still know too few parts of the admirable Whole which is the Work of a Being infinite in all respects. What little we know of the parts in not enough for us to be able to explain all the facts presented to us.

In order to extend our knowledge of natural history, we must put our efforts into discovering as many facts as possible. If we knew all the facts that Nature holds, we would have the explanation of them, and we would see the Whole which these assembled facts fashion. The more we know of them, the more we will be in a position to delve deeply into some parts of this Whole. Thus we cannot work better to explain the facts we know than by trying to discover new ones. Nature must be explained by Nature and not by our own views. These are too limited to envision so grand a Design in all its immensity. The beauty of Nature certainly shines forth all the more when what we know about it is not mixed with our fancies. Seen clearly, Nature inspires within us ideas more worthy of the in-

finite wisdom of its Author and thereby more suitable for shaping our spirits and our hearts. This thought is what we should keep before us in all our researches. (Lenhoff and Lenhoff, 1986, pp.187–188).

So to those who would declare that religion and science should be divorced—that it is impossible for a true scientist to be religious—we must direct your attention to the “father of experimental zoology”, an extraordinary experimental scientist of the first degree, as an outstanding counterexample, more than sufficient to refute such a notion.

References

- Baker, J. 1952. *Abraham Trembley of Geneva*. Edward Arnold, London.
- Lenhoff, H. and S. Lenhoff. 1988. Trembley's polyps. *Scientific American* 258(4):108–113.
- Lenhoff, S. and H. Lenhoff. 1986. *Hydra and the birth of experimental biology—1744*. (This work includes a translation of Trembley's book on hydras). Boxwood Press. Pacific Grove, CA.

Book Reviews

***How Now Shall We Live?* by Charles Colson and Nancy Pearcey
Tyndale House Publishers, Wheaton, IL. 1999, 574 pages, \$23**

The title is derived from a classic earlier book and film series by Francis Schaeffer (1976). Colson and Pearcey trace the negative impact of a secular worldview on Western culture over the last quarter century, where Schaeffer left off. This includes the consequences of Darwinism, sociobiology, New Age nonsense, liberal theology, and the sexual revolution. But there is hope. Many personal stories are related of people who have overcome great odds and succeeded in making a difference with God's help. Included are several prison rehabilitation stories, as expected from Chuck Colson.

Colson and Pearcey see far beyond the need for personal conversion. They believe, with scriptural backing, that Christians need to confront the secular world in all areas of life. They see the need to redeem both the creation and the culture in a gracious yet bold manner (p. 296).

The book contains 45 short chapters. Many of these resemble transcripts from Colson's daily “Breakpoint” radio

program, aired on 1,000 stations. Nancy Pearcey is executive director of this program. The book exposes the weaknesses of evolution and promotes creation. There is an emphasis on the Intelligent Design Movement. One inconsistency is the promotion of the big bang theory (p. 58). The authors apparently have not thought through the many biblical contradictions of a big bang origin and its accompanying long ages.

Charles Colson and Nancy Pearcey are excellent writers with a worldwide audience. It is a blessing to have them promote creation in this book and in their ministries.

Reference

- Schaeffer, Francis. 1976. *How Should We Then Live?* Fleming H. Revell, Old Tappan, NJ.

Don B. DeYoung

***The Mythology of Modern Dating Methods* by John Woodmorappe
Institute of Creation Research, El Cajon, California. 1999, 118 pages, \$13**

Radiometric dating is considered by many creationists and most uniformitarians as the single greatest body of evidence for an old earth. Creationists have critiqued it in a variety of ways, but none has done as thorough and convincing a job as that contained within the pages of this excellent monograph by John Woodmorappe. Woodmorappe takes a decidedly different slant from many other creationists who see inherent structure and organization in the raw data and are searching for a non-chronometric or an alternate chronometric explanation of the perceived organization in the data. The RATE research project, underway at the Institute of Creation Research is an example of

this type of approach. Woodmorappe instead seeks to demonstrate that the elegant conjunction of the numerous data points presented in the literature is an artifact of multiple overlapping subjective factors in data selection and presentation, and a probabilistic agreement that would be statistically expected. The basic premise of this book is sound. If the results of isotopic dating cannot possibly be wrong (due to numerous *ad hoc* explanations), then they cannot possibly be scientifically valid or of evidentiary weight.

As the title advertises, the structure of the work is developed along the presentation of numerous “myths” of isotopic dating, organized into the various chapters, and

followed by irresistible refutation of each myth—often by the exhaustive citation of the technical literature. The most interesting chapter of the book for me was Chapter 9, “How Often Do Dating Methods Agree by Chance? An Exploratory Study.” In this chapter, Mr. Woodmorappe makes a strong statistical case for the non-concordance of isotopic dates. This is a fertile area for any statisticians in the CRS. I would eagerly anticipate additional work in this area, and believe that such research would be of great value to creationism.

This is not an easy book to read, especially if you have no background in the various isotopic methods, but it is rewarding and in my opinion, it stands as the definitive refutation of isotopic dating arguments to date and will proba-

bly remain so until Mr. Woodmorappe decides to put out a second edition! I strongly recommend that serious creationists put this book in their library. If you find it initially intimidating and not an easy read, you will find it an invaluable trove the next time that you face a serious question about isotopic dating. Finally, the book is valuable in its implicit condemnation of those Christians who insist that the “data” demand an old earth—another myth exploded by Mr. Woodmorappe. In light of their persistent refusal to accept God’s Word as their primary historical resource, I hope that they at least have the decency to blush after reading this excellent book.

John K. Reed

Ride to Glory by Warren LeRoi Johns

General Title, PO Box 344, Brookville, MD 20833. 1999, 414 pages, \$28.95

The publication of a book that would set the record straight regarding the public perception of the trial of John Scopes may well have been a goal of many creationists since the biased stage play and movie, *Inherit the Wind*. Warren LeRoi Johns has preempted that goal with his novel, *Ride to Glory*.

The book covers seven days at a fictitious “Mid-Atlantic University,” during which faculty and students stage a campus mock trial of “The People vs. Charles Robert Darwin” and attempt to resolve the question “Is Evolution a Fact?”

The person who hatched the idea for the presentation, Pace Terhune, initially asks a fervent evolutionist, Dr. Karl Striker, to be the main character, a witness for Darwin. When Striker refuses, Terhune settles for Ph D. candidate Joshua Ryan, a firm anti-evolutionist and anti-Darwinist. A major flaw in the story is that no witness is brought forward to take the opposing view. While on the “witness stand” Ryan presents a host of reasons for not believing Darwin’s theory, with a panel of eight people sitting as a jury to decide the outcome.

The author employs a unique method for presenting facts by having Ryan quote from creationists and others opposed to evolution. In almost all of Ryan’s testimony he does not give credit to his sources, although the reader is made aware of the origin of the facts by means of extensive references. The storyline would have been made more ac-

ceptable had Ryan put the quotes into his own words or given credit where it is due.

Touted by the publisher as a novel “wrapped in a fascinating storyline designed to attract readers not otherwise interested in evolution’s flaws,” it is instead a litany of many of evolution’s deficits, eminently acceptable to creationists. However, I fear that the scientific details will prove a barrier to the non-scientifically minded reader. Diehard evolutionists will not accept the extensive criticisms of Darwin and evolutionary theory, even though a well-written, thoroughly enjoyable, romance courses through the pages.

The author is to be commended for the extensive research he has done, using 205 references from publications familiar to members of the Creation Research Society. Creationists owe a debt of thanks to author Johns for bringing the creation/evolution debate to the public stage. People who, heretofore, had not even realized that Darwin had said anything wrong will be astonished at what scientists have said and what research has revealed. Creationists should read this book and give it to their evolutionist friends and then discuss the book’s contents. Creationists have wanted a book such as this with a fictional storyline to keep the interest of people with a limited science background. We hope that this is it.

Clifford L. Lillo

Erratum

CRSQ 37(3), December 2000, page 153. In footnote 1, replace “xzero” with “ x_0 ”.

Lack of Evidence for Subduction Renders Plate Tectonics Unlikely Part II — Extension Dominant at “Convergent Subduction Zones”

Michael J. Oard*

Abstract

Instead of areas of massive convergence, extension predominates at subduction zones. The lack of geological and geophysical evidence for subduction

calls into question the plate tectonics paradigm. The paradigm of vertical tectonics provides an alternative to plate tectonics.

Introduction

In Part I, I discussed the anomalous features of trenches: 1) the absence of sediments in some trenches; 2) the horizontal, undeformed sediments in other trenches; and 3) the lack of pelagic and hemipelagic oceanic sediments in trenches, which are predominantly filled with sediments from off the land. A brief analysis of accretionary prisms on the landward or arcward slope of trenches resulted in the following anomalous features: 1) the lack of accretionary sediments on 44% of the length of trenches, 2) not nearly enough sediments in the accretionary prism of the remaining 56% of the length of trenches, 3) the lack of oceanic sediments in the prism, 4) some prisms subsided instead of uplifted, 5) sediments dated too old and ascribed to a hypothetical process called subduction erosion, and 6) the ad hoc rationalization to account for missing sediment called sediment subduction.

In Part II, I will examine structural features of subduction zones to analyze how well new data line up with expected plate convergence processes advocated by plate tectonics. I will propose an alternative explanation for subduction zones at the end.

Extensional Features Common in Subduction Zones

Plate convergence has been assumed at subduction zones. One would think that copious evidence for such convergence over many millions of years would be obvious. But what if the evidence for convergence is weak? Or worse, what if there is abundant evidence *against* convergence in

the form of its opposite tendency—*extension*? The paradigm of plate tectonics would be greatly weakened.

A subduction zone represents the convergence of two plates over millions of years. It has five main components: 1) the oceanward trench slope; 2) the trench itself; 3) the forearc, which includes basins, ridges, and terraces; 4) the island arc in oceanic systems; and 5) the backarc basin (Figure 1). Evidence for convergence should be widespread and obvious in and surrounding the trench. This process was assumed to occur and was considered a logical prediction of plate tectonics before the extensive exploration of the ocean bottoms by the deep-sea drilling project and geophysical methods. Hatherton (1974, p. 95) notes that:

The development of plate tectonics reversed this process, with ‘a priori’ acceptance of compression at the active margins to force down the new lithosphere created at the ocean ridges.

I shall examine the five components of the subduction zone for evidence of the predicted convergence.

Backarc Basins

Backarc or marginal basins are mainly associated with western Pacific trenches. Some of these marginal basins are considered active and are related to a particular trench. Others are believed inactive. High crustal heat flow occurs in most of these backarc basins (Karig, 1971). A flood of information on backarc basins has overwhelmingly shown that they are *extensional* features, often associated with magnetic anomalies that are similar to mid-ocean spreading ridges but often of lower amplitude and usually not basinwide (Karig, 1971). For instance, the Lau Basin, a backarc basin associated with the Tonga-Kermadec Trench, is believed to be rapidly extending with irregular and discontinuous magnetic lineations that are difficult to interpret (Bevis et al., 1995, also see Karig, 1970; Hawkins,

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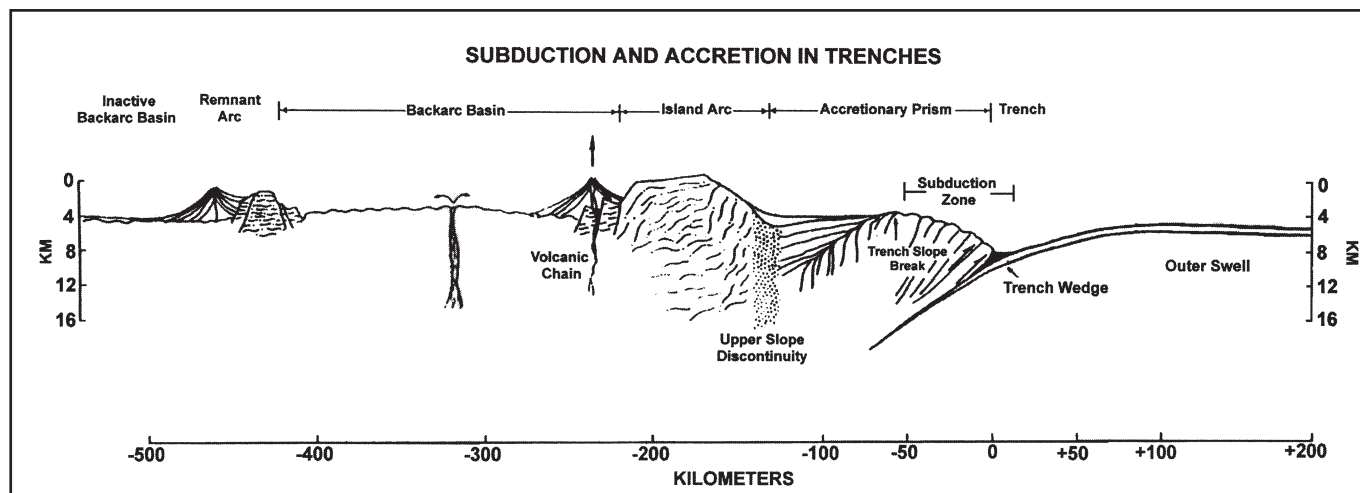


Figure 1. A classic subduction zone-island arc system as envisioned in the 1970s (from Karig and Sharman, 1975; re-drawn by Nathan Oard). Vertical exaggeration is 5:1.

1974; Bloomer and Fisher, 1987; Clift et al., 1998). The Mariana Trough, the backarc basin associated with the Mariana Trench, is an extensional, not a compressive, feature (Mrozowski and Hayes, 1980; Hussong and Uyeda, 1981).

Backarc basins are anomalous within plate tectonics. Uyeda (1982) states that extensional backarc basins with high heat flow are difficult to explain within the plate tectonics paradigm. Karig (1991, p. 477) corroborates and probably best summarizes the extensional nature of backarc basins and their significance to plate tectonics:

The large basins with oceanic characteristics that lie behind many convergent plate margins and separate them from continents have long been a tectonic puzzle, but they became even more controversial with the advent of plate tectonics...Such extension, close to and associated with the focus of plate convergence was seemingly inconsistent with plate mechanics in these early days of plate tectonics and initiated a lively discussion as to why this extension occurs that has not yet been resolved.

Oceanward Trench Slope

Evidence for extension is ubiquitous on the subducting ocean plate close to the trench axis in the form of horsts and grabens with normal faults (see Figure 4 of Part I) (Fisher, 1974; Uyeda, 1974, p. 480; von Huene and Scholl, 1991, p. 291). Rather infrequent earthquakes indicate an extensional mechanism. Grabens as deep as 600–800 m with intervening horsts have been observed by Seabeam profiling oceanward of the Tonga Trench (Lonsdale, 1986, p. 304). Normal faults produce horsts and grabens on the ocean plate that are supposedly converging at the Middle America Trench (Moore, Shipley, and Lonsdale,

1986). The same pattern is seen oceanward of the Peru-Chile Trench (Thornburg and Kulm, 1987). The profile of the oceanic lithosphere descending into the Aleutian Trench shows a rough, sawtooth pattern caused by seaward-dipping normal faults (McCarthy and Scholl, 1985). Grabens lie eastward of the Japan Trench (Ludwig et al., 1966). The Kuril-Kamchatka Trench seems to be the only trench where extensional features are absent oceanward (McCarthy and Scholl, 1985, p. 699).

The conventional explanation of these extensional features on the downgoing plate is that the ocean plate bends due to tension while descending into the subduction zone (Caldwell et al., 1976; Aubouin and von Huene, 1985). There is often a bowing upward of the ocean plate just before reaching the trench (Hatherton, 1974, p. 483). Extensional faulting due to bending is a reasonable interpretation within the plate tectonic paradigm.

There is also evidence that some of the extensional features originated, at least in incipient form, far from the “bending” area. It is believed that horsts and grabens associated with the Middle America Trench were inherited from the East Pacific Rise spreading axis and were enhanced close to the trench (Aubouin, Bourgois, and Azéma, 1984; Aubouin and von Huene, 1985). Furthermore, it is observed that the horst and graben structure west of the Middle America Trench strikes *obliquely* to the trench axis. A similar situation occurs west of the Peru-Chile Trench (Hussong, Reed, and Bartlett, 1988, p. 125). If these horsts and grabens were caused by faulting as the ocean plate approached the trench, the strike of the normal faults, horsts and grabens should be parallel to the trench axis. Therefore, the occurrence of horsts and grabens may not have been caused, or at least not totally caused, by bending of a plate down into a subduction zone.

Island Arcs

Island arcs were once considered mysterious features in that they are curved chains of volcanoes and volcanoclastic sedimentary rocks with a trench lying on the convex side. Since they are depositional features, island arcs are not expected to be either convergent or extensional. However, at least two active island arcs possess evidence of extensional tectonics. The Izu-Bonin Arc lies mostly underwater and is extensively rifted (Taylor, 1992). Some have suggested that several basins on top of the Aleutian Arc are caused by extensional faulting (Geist, Childs, and Scholl, 1988).

Trenches Appear to be Grabens

A number of workers have commented that trenches have the physical characteristics of a downfaulted graben, which is an extensional feature. For instance, Aubouin and von Huene (1985, p. 955) state that along a perpendicular transect across the Middle America Trench off Guatemala, "...the Trench is essentially a graben despite the anticipated dominantly compressional forces from subduction." Scholl et al. (1970, p. 142) commented that the Peru-Chile Trench is generally considered to be a graben-like structure. Hatherton (1974, p. 95) stated that benches along the sides of trenches favor a graben interpretation and "...an extensional mechanism of formation that supersedes the earlier compressional hypothesis." Yoshii (1979) reported normal faults near the axis of the Japan Trench off northeastern Honshu. Although generally undeformed, trench sediments themselves often display normal faults, indicating extension, such as in the Peru-Chili Trench (Malahoff, 1970; Thornburg and Kulm, 1987).

Landward or Arcward Trench Slope

Anyone who has some knowledge of plate tectonics has been taught that the landward or arcward trench slope is the part of the trench where ocean sediments have converged, forming an accretionary wedge. Extension is ubiquitous on the oceanward trench slope and in backarc basins. The trench has the cross-sectional appearance of a graben, and extension is even found where not expected, on the island arc. Therefore, the evidence for plate convergence should be found on the landward or arcward slope, if it is to be found at all.

Paradoxically, much recent evidence indicates that extension is common even on the landward or arcward trench slope! Normal faults dipping seaward were discovered on the landward side of the Middle America Trench off Guatemala (Aubouin, Bourgois, and Azéma, 1984). Furthermore, fault-bounded steps and local downslope failure on the lower trench slope suggest normal faulting and extension on the landward slope of the Middle Amer-

ica Trench (Aubouin and von Huene, 1985, pp. 942, 955). These authors (pp. 954, 955) summarize:

Despite plate convergence, little compressional structure is detected in the rocks cored and in the seismic reflection records along the Guatemalan active margin transect [italics theirs].

The Peru-Chili Trench appears to be similar to the Middle America Trench with landward slope extensional features. Bourgois et al. (1988, p. 111) state:

The Andean margin off Peru is an "extensional active margin" or a "collapsing active margin" developing a subordinated accretionary complex induced by massive collapse of the middle slope area.

A large 20 by 33 km slump block or a detachment fault at mid slope and a large debris flow that has spread down the lower slope and into the trench have been detected landward of the Peru Trench near 5°S (Bourgois et al., 1988; von Huene et al., 1989; Bourgois et al., 1993). (Debris flows and other types of submarine mass flow are discussed in Oard, 1997, pp. 33–39.) Even the Andes Mountains, once thought to be caused by compressional uplift, are now considered by many geologists to be dominated by extensional features (Katz, 1971; Carey, 1988, pp. 176, 177). The toe of the landward slope of the Peru Trench is the only area where compressional features are still claimed to be present.

Extensional normal faults are pervasive on the arcward side of the Mariana Trench. Hussong and Uyeda (1981, p. 921) exclaim: "No compressional deformation (which would be expected from the formation of an accretionary prism) has been found anywhere on the fore-arc." They say elsewhere:

Thus, as noted by Hussong and Fryer (this volume), except for the megashear zone at the contact between the Pacific and Philippine plates, the top of the crust throughout this region of plate convergence is, paradoxically, in tension.

The Japan Trench also has evidence of extensional tectonics. Many normal faults were discovered on the landward slope of the Japan Trench during Legs 56 and 57 of the Deep Sea Drilling Project (Nasu et al., 1980). Cadet et al. (1987, p. 314) state: "The landward slope of the Japan Trench is cut by numerous normal faults trending sub-parallel to the trench axis..." Large slump scars were also seen by submersibles in both the Japan and Kuril Trenches.

Extensional features are also observed in the Tonga forearc (Clift et al., 1998), the Aleutian forearc (Fisher, 1979), the Nankai subduction zone (Leggett, Aoki, and Toba, 1985), and the Izu-Bonin forearc (Renard et al., 1987). The upper landward slope of the Cascadia subduction zone off Washington and Oregon shows ubiquitous normal faulting (McNeill et al., 1997; Parsons et al., 1998). In fact, these are listric normal faults that curve oceanward, indicating large-scale slumping of the conti-

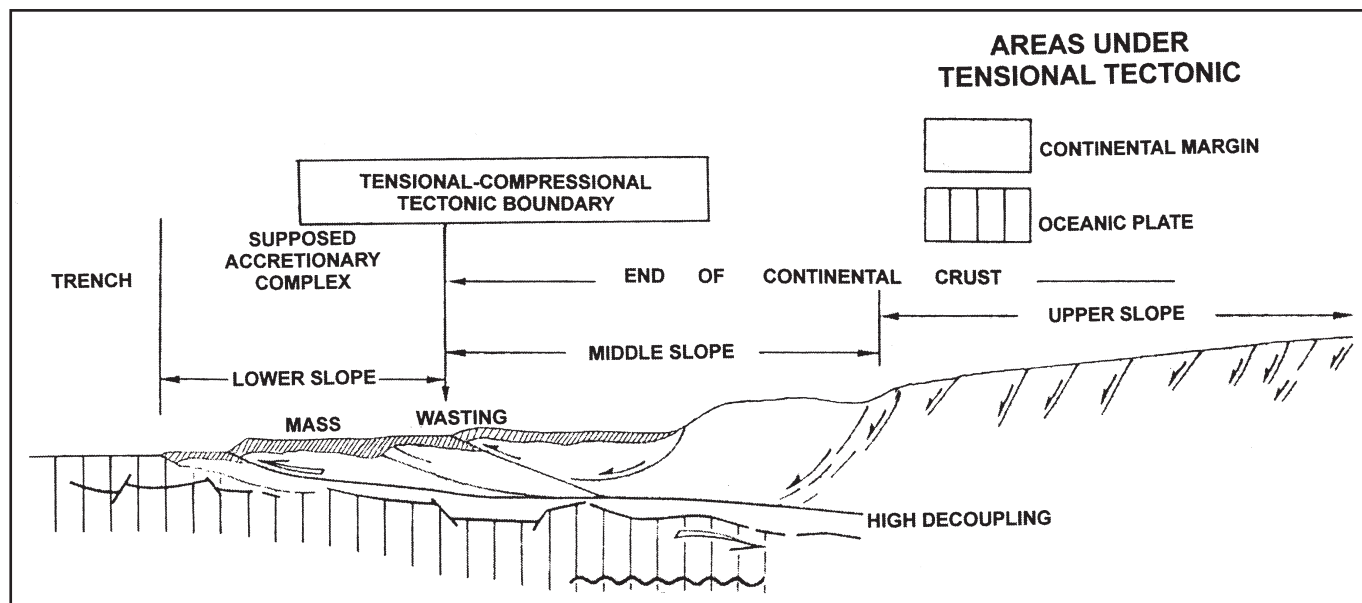


Figure 2. Schematic of the Andean margin of Peru in the Paita area (from Bourgois et al., 1988; redrawn by Nathan Oard).

mental shelf and upper slope sedimentary rocks (McNeill et al., 1997). These authors (pp. 12,123) state that normal faulting and margin subsidence are *common on passive margins and forearcs of convergent margins*:

Listric normal faulting is a common feature of passive margins, where fault movement contributes to crustal thinning and margin subsidence. Extension and normal faulting are also *a fairly common phenomenon on convergent margins throughout the world*...Discovery of these extensional structures requires a reevaluation of structures previously interpreted as folds and faults related to plate convergence [emphasis mine].

A surficial slump containing 32 km³ of debris has also been discovered at the toe of the Cascadia subduction zone (Goldfinger et al., 1992). Von Huene and Scholl (1991, p. 293) corroborate that extensional faults are common on convergent margins. Ryan and Scholl (1989, p. 499) reinforce the new idea that folds and faults cannot simply be interpreted as accretion against a backstop.

Vein structures from deep sea drilling cores are now recognized as caused by extension and are predominantly found on the upper trench slope (Moore, 1986). The lack of compression, especially on the middle and upper slopes, has given rise to the ad hoc model of "convergent-extensional margins," supposedly a *new* type of active margin (Aubouin, Bourgois, and Azéma, 1984). A "convergent-extensional margin" seems like an oxymoron. Regardless, the prediction of plate tectonics for ubiquitous compressive structures on the forearc has not been successful.

The evidence for convergence and imbricate thrusting has been relegated to the lower trench slope where a series of ridges and sediment-filled troughs strike parallel to the trench axis. McNeill et al. (1997) suggested that these folds may not be related to convergence, but instead may be due to large scale subsidence of the continental margin in view of the ubiquitous normal faulting of the upper slope. If the middle and upper slope are areas of normal faulting and slumps, why should the lower slope compressional area not be the lower portion of a slump?

Thrust faults are supposed to be common on the lower trench slope due to convergence, but there is accumulating evidence for normal faulting. For instance, normal faulting has occurred in the Middle America Trench (von Huene, 1986; Moore, Shipley, and Lonsdale, 1986, p. 514) and the so-called Makran accretionary prism off southwest Pakistan (Platt and Leggett, 1986). All this normal faulting on the Middle America forearc has led some to suggest that there is no evidence of compression off Guatemala (von Huene et al., 1980; Aubouin and von Huene, 1985).

Several researchers have even suggested that the middle and lower slopes of at least a few trench segments are caused by slumping and mass wasting. Figure 2 is a schematic of the Andean margin off the Paita area of Peru showing many oceanward-dipping normal faults on the upper slope with a huge slump with mass wasting on the middle and lower slope. Similar features as shown in Figure 2 can also be seen in seismic images from other trenches. Thus, the lower forearc slopes can just as well, if not better, be interpreted as slump and mass wasting features instead of plate convergence.

Summary

In view of the quick acceptance of the plate tectonics paradigm, and the practice of fitting almost any observation into it, I have critically analyzed geological observations of subduction zones. Trenches were envisioned as linear belts of thick sediment accumulated during millions of years of convergence. However, many trench segments are either empty or nearly empty of sediments! The remainder have moderately thick trench fills of *horizontally layered* sediments indicating a lack of convergence during the time of filling. The trenches were presumed to have been filled with oceanic pelagic and hemipelagic sediments from the ocean plate, but instead are predominantly turbidites from the land. These strongly anomalous features of trenches are explained by several ad hoc mechanisms that seem far fetched.

During the initial enthusiastic days of plate tectonics, oceanic and trench sediments were simply assumed to accrete against a continent or island arc—a backstop as it is called. McCarthy and Scholl (1985, p. 691) remind us:

Prior to the investigations of the Deep Sea Drilling Project and to the acquisition of multi-channel seismic reflection profiles, many geologists envisioned that one general mechanism of subduction accretion operated along underthrust continental margins.

This makes theoretical sense, but later observations have shown that this is not the case. Many unexpected complexities and anomalies have been discovered over the years. These include the following: 1) 44% of trenches have no accretionary prism, 2) all accretionary prisms are too small, 3) the sediments in these “accretionary prisms” are predominantly terrigenous, 4) some “accretionary prisms” have subsided instead of uplifted, and 5) large areas of the continental margin have supposedly been subducted. Despite the secondary hypothesis of sediment subduction, one can legitimately ask whether landward and arcward slopes show compelling evidence for plate tectonics at all.

Compressive features associated with trenches should be common and obvious, considering that plates supposedly have been converging in the trench area for millions of years, but they are rare. The landward slope, if anywhere, should show massive evidence for compressive strain, but except for the lower landward slope, extension is ubiquitous. von Huene (1986, p. 3) writes: “At first glance it may seem paradoxical that in a dynamic system dominated by plate convergence, this convergence does not control structural style.” Of course, von Huene argues against the obvious. Early hypotheses on subduction zones predicted abundant and obvious compressional features, and the fact that there is little evidence for compression

should be enough to discredit the hypothesis of plate subduction and hence plate tectonics.

An Alternative Explanation

New geological and geophysical information as outlined above makes subduction unlikely. The significance of this is far reaching and means that other data attributed to subduction would be caused by other mechanisms. For instance, evidence for subduction from geochemistry, tomography, magmatism, and seismology (Wadati-Benioff zones) can be interpreted by another process.

Without subduction, plate tectonics also is not likely, unless the earth expands. There are plenty of anomalies and complexities with other aspects of plate tectonics that makes one question the veracity of the paradigm. Many uniformitarian critics still question plate tectonics (Kahle, 1974; Belousov et al., 1990a,b; Chatterjee and Hotton, 1992). Because of accumulating anomalies and complexities, even believers in plate tectonics are questioning the paradigm. For example, Anita Harris (formerly Anita Epstein) once published much-cited evidence of a match of Ordovician conodonts between the northern Appalachian Mountains and northwest Europe. This was considered strong support for plate tectonics—until she found the *same* conodonts in Nevada (McPhee, 1983, pp. 127–130). Although apparently still a believer in plate tectonics, she has become skeptical of the paradigm:

The geology has refuted plate-tectonic interpretations time and again in the Appalachians. Geology often refutes plate tectonics. So the plate-tectonics boys tend to ignore data. The horror is the ignoring of basic facts, not bothering to be constrained by data (McPhee, 1983, p. 209).

Cliff Ollier, a well-known Australian geomorphologist, has gone on record a number of times criticizing plate tectonics. In 1991, he stated:

The very weakness of plate tectonics [sic] is that the power of explanation is too great. Subduction, for example, may be called upon to create an island arc, a deep sea trench, or a mountain range; it may lead to sediments being scraped off a down-going slab, or subduction of the sediments under the continent...

Most of the input into plate tectonic speculation appears to come from geophysicists, who have models which may be elegant mathematically but do not take landforms into account at all (Ollier, 1991, pp. 208,209).

If subduction and plate tectonics are not true, then catastrophic plate tectonics is unlikely as well as unnecessary. Catastrophic plate tectonics is postulated during the Flood (Wise et al., 1994) and after the Flood during the time of

Peleg (Molén, 1994). Rapid subduction is a necessary component of these models. While catastrophic plate tectonics solves some of the problems of plate tectonics, it creates others, such as a heat problem due to rapid horizontal sliding of plates and the addition of a new basaltic ocean floor (Wise et al., 1994). The resurfacing of the ocean floor with hot basalt that must cool for hundreds of years after the Flood logically leads to the conclusion of copious post-Flood catastrophism. This catastrophism is caused by the sinking of the ocean basins and the tectonic elevation of the continents—all post-Flood! There is copious evidence against such post-Flood catastrophism (Holt, 1996; Oard, 1996, 1998, 1999; Morris, 1996; Woodmorappe, 1996; Froede and Reed, 1999).

Walter Brown's hydroplate model (1995) posits plates rapidly spreading away from the mid-Atlantic ridge and has a number of features that are an improvement over plate tectonics and catastrophic plate tectonics. For instance, subduction zones in his model are not areas where one plate dives below another. They are areas of downbuckling that agrees with the thesis of this paper. However, his model lacks detail that would aid evaluation of his model. I especially question the adequacy of the driving force to propel such huge plates a few thousand kilometers over a spherical earth, even with pockets of water below a 16 kilometer thick granitic crust.

I believe evidence used in support of plate tectonics can support another model, which I call *vertical tectonics*. With proper understanding, I believe mid-ocean ridges, ocean floor magnetic anomalies, and the so-called fit of the continents across the Atlantic, etc. can be explained within the paradigm of *vertical tectonics* during the Flood. I interpret the forearc areas of trenches as caused by rapid sedimentation and *vertical tectonics* during the later stages of the Genesis Flood. This was a time when Flood water was draining off the continents, first as sheet flow and second by more channelized flow, according to the Biblical Flood model of Tas Walker (1994). The continents were uplifted while the ocean basins subsided. At the margins of continents, massive slumping and mass movement of newly deposited, consolidated to semi-consolidated sediments would be expected at many scales. The normal faults on the continental shelves and upper slopes are evidence for this slumping. Thus, the middle and lower slopes would simply be the toe of large slumps or mass movement debris. Forearc ridges and basins would be the topographic expression of these processes.

The evidence against subduction presented here will be expanded elsewhere (Reed, in preparation). Other arguments against plate tectonics will also be developed in that publication.

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References

- Aubouin, J., J. Bourgois, and J. Azéma. 1984. A new type of active margin: The convergent-extensional margin, as exemplified by the Middle America Trench off Guatemala. *Earth and Planetary Science Letters* 67:211–218.
- Aubouin, J., and R. von Huene. 1985. Summary: leg 84, Middle America Trench transect off Guatemala and Costa Rica. In von Huene, R. et al. (editors). *Initial Reports of the Deep Sea Drilling Project, 84*, pp. 939–957. U.S. Government Printing Office, Washington, D.C.
- Belousov, V. et al. (editors). 1990a. *Critical aspects of the plate tectonics theory—Volume I (criticism on the plate tectonics theory)*. Theophrastus Publications, S.A. Athens, Greece.
- Belousov, V. et al. (editors). 1990b. *Critical aspects of the plate tectonics theory—Volume II (alternative theories)*. Theophrastus Publications, S.A. Athens, Greece.
- Bevis, M. et al. 1995. Geodetic observations of very rapid convergence and back-arc extension at the Tonga arc. *Nature* 374:249–251.
- Bloomer, S.H. and R.L. Fisher. 1987. Petrology and geochemistry of igneous rocks from the Tonga Trench—a non-accreting plate boundary. *Journal of Geology* 95: 469–495.
- Bourgois, J. et al. 1988. Seabeam and seismic reflection imaging of the tectonic regime of the Andean continental margin off Peru (4°S to 10°S). *Earth and Planetary Science Letters* 87:111–126.
- Bourgois, J., Y. Lagabriele, P. De Wever, and E. Suess. 1993. Tectonic history of the northern Peru convergent margin during the past 400 ka. *Geology* 21:531–534.
- Brown, W. 1995. *In the Beginning: Compelling evidence for Creation and the Flood*, sixth edition. Center for Scientific Creation. Phoenix, Arizona.
- Cadet, J.P. et al. 1987. Deep seismic dives in the Japan and Kuril Trenches. *Earth and Planetary Science Letters* 83:313–328.
- Caldwell, J.G., W.F. Haxby, D.E. Karig, and D.L. Turcotte. 1976. On the applicability of a universal elastic trench profile. *Earth and Planetary Science Letters* 31:239–246.
- Carey, S.W. 1988. *Theories of the earth and universe—A history of dogma in the earth sciences*. Stanford University Press. Stanford, CA.

- Chatterjee, S. and N. Hotton III (editors). 1992. *New concepts in global tectonics*. Texas Tech University Press. Lubbock, TX.
- Clift, P.D., C.J. MacLeod, D.R. Tappin, D.J. Wright, and S.H. Bloomer. 1998. Tectonic controls on sedimentation and diagenesis in the Tonga Trench and forearc, southwest Pacific. *Geological Society of America Bulletin* 110:483–496.
- Fisher, M.A., 1979. Structure and tectonic setting of continental shelf southwest of Kodiak Island, Alaska. *American Association of Petroleum Geologists Bulletin* 63:301–310.
- Fisher, R.L. 1974. Pacific-type continental margins. In Burk, C.A. and C.L. Drake (editors). *The geology of the continental margins*, pp. 25–41. Springer-Verlag, New York.
- Froede, Jr., C.R. and J.K. Reed. 1999. Assessing creationist stratigraphy with evidence from the Gulf of Mexico. *Creation Research Society Quarterly* 36:51–60.
- Geist, E.L., J.R. Childs, and D.W. Scholl. 1988. The origin of summit basins of the Aleutian ridge: Implications for block rotation of an arc massif. *Tectonics* 7:327–341.
- Goldfinger, C., L.D. Kulm, R.S. Yeats, B. Appelgate, M.E. MacKay, and G.F. Moore. 1992. Transverse structural trends along the Oregon convergent margin: Implications for Cascadia earthquake potential and crustal rotations. *Geology* 20:141–144.
- Hatherton, T. 1974. Active continental margins and island arcs. In Burk, C.A. and C.L. Drake (editors). *The geology of the continental margins*, pp. 93–103. Springer-Verlag, New York.
- Hawkins, Jr., J.W. 1974. Geology of the Lau Basin, a marginal sea behind the Tonga arc. In Burk, C.A. and C.L. Drake (editors). *The geology of the continental margins*, pp. 505–520. Springer-Verlag, New York.
- Holt, R.D. 1996. Evidence for a Late Cainozoic Flood/post-Flood boundary. *Creation Ex Nihilo Technical Journal* 11(1):128–167.
- Hussong, M., T.B. Reed IV, and W.A. Bartlett. 1988. Seamarc II sonar imagery and bathymetry of the Nazca Plate and Peru forearc, ODP leg 112. In Suess, E., von Huene, R., et al. *Proceedings of the Ocean Drilling Project, initial reports* 112, pp. 125–137. College Station, TX.
- Hussong, M., and S. Uyeda. 1981. Tectonic processes and the history of the Mariana arc: A synthesis of the results of Deep Sea Drilling Project Leg 60. In Hussong, D.M., Uyeda, S. et al. *Initial reports of the Deep Sea Drilling Project* 60, pp. 909–929. U.S. Government Printing Office, Washington, D.C.
- Kahle, C.F. (editor). 1974. *Plate tectonics—Assessments and reassessments*. American Association of Petroleum Geologists Memoir 23. Tulsa, OK.
- Karig, D.E. 1970. Ridges and basins of the Tonga-Kermadec island arc system. *Journal of Geophysical Research* 75:239–254.
- . 1971. Origin and development of marginal basins in the Western Pacific. *Journal of Geophysical Research* 76:2542–2561.
- . 1991. Back-arc basins: Origins and evolution of ideas. In Muller, D.W., J.A. McKenzie, and H. Weissert (editors). *Controversies in modern geology—Evolution of geological theories in sedimentology, earth history and tectonics*, p. 477. Academic Press, New York.
- Karig, D.E., and G.F. Sharman. 1975. Subduction and accretion in trenches. *Geological Society of America Bulletin* 86:377–389.
- Katz, H.R. 1971. Continental margin in Chile—is tectonic style compressional or extensional? *American Association of Petroleum Geologists Bulletin* 55:1753–1758.
- Leggett, J., Y. Aoki, and T. Toba. 1985. Transition from frontal accretion to underplating in a part of the Nankai Trough accretionary complex off Shikoku (SW Japan) and extensional features on the lower trench slope. *Marine and Petroleum Geology* 2:131–141.
- Lonsdale, P. 1986. A multibeam reconnaissance of the Tonga Trench axis and its intersection with the Louisville guyot chain. *Marine Geophysical Researches* 8: 295–327.
- Ludwig, W.J., J.I. Ewing, M. Ewing, S. Murauchi, N. Den, S. Asano, H. Hotta, M. Hayakawa, T. Asanuma, K. Ichikawa, and I. Noguchi. 1966. Sediment and structure of the Japan Trench. *Journal of Geophysical Research* 71:2121–2137.
- Malahoff, A. 1970. Some possible mechanisms for gravity and thrust faults under oceanic trenches. *Journal of Geophysical Research* 75:1992–2001.
- McCarthy, J. and D.W. Scholl. 1985. Mechanisms of subduction accretion along the central Aleutian Trench. *Geological Society of America Bulletin* 96:691–701.
- McNeill, L.C., K.A. Piper, C. Goldfinger, L.D. Kulm, and R.S. Yeats. 1997. Listric normal faulting on the Cascadia continental margin. *Journal of Geophysical Research* 102(B6):12,123–129,138.
- McPhee, J. 1983. *In suspect terrain*. Farrar, Straus, and Giroux. New York.
- Molén, M. 1994. Mountain building and continental drift. In Walsh, R.E. (editor). *Proceedings of the Third International Conference on Creationism, technical symposium sessions*, pp. 353–367. Creation Science Fellowship, Pittsburgh, PA.
- Moore, G.F., T.H. Shipley, and P.F. Lonsdale. 1986. Subduction erosion versus sediment offscraping at the toe of the Middle America Trench off Guatemala. *Tectonics* 5:513–523.

- Moore, J.C. (editor). 1986. *Structural fabric in Deep Sea Drilling Project cores from forearcs*. Geological Society of America Memoir 166. Geological Society of America, Boulder, CO.
- Morris, H.M. 1996. The geological column and the Flood of Genesis. *Creation Research Society Quarterly* 33:49–57.
- Mrozowski, C.L. and D.E. Hayes. 1980. A seismic reflection study of faulting in the Mariana fore arc. In Hayes, D.E. (editor). *The tectonics and geological evolution of Southeast Asian seas and islands*. American Geophysical Union Monograph 23. Washington D.C. pp. 223–234.
- Nasu, N., R. von Huene, Y. Ishiwada, M. Langseth, T. Bruns, and E. Honza. 1980. Interpretation of multi-channel seismic reflection data, legs 56 and 57, Japan Trench transect, Deep Sea Drilling Project. In scientific party. *Initial reports of the Deep Sea Drilling Project, part 1*, pp. 489–503. U.S. Government Printing Office, Washington, D.C.
- Oard, M.J. 1996. Where is the Flood/post-Flood boundary in the rock record? *Creation Ex Nihilo Technical Journal* 10(2):258–278.
- . 1997. *Ancient Ice Ages or gigantic submarine landslides?* Creation Research Society Monograph Series: No. 6. Creation Research Society Books, St. Joseph MO.
- . 1998. Dinosaurs in the Flood: A response. *Creation Ex Nihilo Technical Journal* 12(1):69–86.
- . 1999. Letter to the editor. *Origins—The Journal of the Biblical Creation Society* 26:22–24.
- Ollier, C. 1991. *Ancient landforms*. Belhaven Press, New York.
- Parsons, T., A.M. Trehu, J.H. Luetgert, K. Miller, F. Kilbride, R.E. Wells, M.A. Fisher, E. Flueh, U.S. ten Brink, and N.I. Christensen. 1998. A new view into the Cascadia subduction zone and volcanic arc: Implications for earthquake hazards along the Washington margin. *Geology* 26:199–202.
- Platt, J.P. and J.K. Leggett. 1986. Stratal extension in thrust footwalls, Makran accretionary prism: Implications for thrust tectonics. *American Association of Petroleum Geologists Bulletin* 70(2):191–203.
- Reed, J.K. In preparation. Plate tectonics—a different viewpoint. *Creation Research Society Books*.
- Renard, V. et al. 1987. Trench triple junction off Central Japan—preliminary results of French-Japanese 1984 Kaiko cruise, leg 2. *Earth and Planetary Science Letters* 83:243–256.
- Ryan, H.F. and D.W. Scholl. 1989. The evolution of forearc structures along an oblique convergent margin, central Aleutian arc. *Tectonics* 8:497–516.
- Scholl, D.W., M.N. Christensen, R. von Huene, R. and M.S. Marlow. 1970. Peru-Chile Trench sediments and sea-floor spreading. *Geological Society of America Bulletin* 81:1339–1360.
- Taylor, B. 1992. Rifting and the volcanic-tectonic evolution of the Izu-Bonin-Mariana arc. In Taylor, B., K. Fujioka, K., et al. *Proceedings of the Ocean Drilling Program, scientific results* 126, pp. 627–651. College Station, TX.
- Thornburg, T.M. and L.D. Kulm. 1987. Sedimentation in the Chile Trench: Depositional morphologies, lithofacies, and stratigraphy. *Geological Society of America Bulletin* 98:33–52.
- Uyeda, S. 1974. Northwest Pacific trench margins. In Burk, C.A. and C.L. Drake (editors). *The geology of the continental margins*, pp. 473–491. Springer-Verlag, New York.
- . 1982. Subduction zones: an introduction to comparative subductology. *Tectonophysics* 81:133–159.
- von Huene, R. 1986. To accrete or not accrete, that is the question. *Geologische Rundschau* 75(1):1–15.
- Uyeda, S., et al. 1980. Leg 67: The Deep Sea Drilling Project Mid-America Trench transect off Guatemala. *Geological Society of America Bulletin* 91:421–432.
- Uyeda, S., J. Bourgois, J. Miller, G. Pautot. 1989. A large tsunamogenic landslide and debris flow along the Peru Trench. *Journal of Geophysical Research* 94(B2): 1703–1714.
- Uyeda, S., and D.W. Scholl. 1991. Observations at convergent margins concerning sediment subduction, subduction erosion, and the growth of continental crust. *Reviews of Geophysics* 29:279–316.
- Walker, T. 1994. A Biblical geologic model. In Walsh R.E. (editor). *Proceedings of the Third International Conference on Creationism, technical symposium sessions*, pp. 581–592. Creation Science Fellowship, Pittsburgh, PA.
- Wise, K.P., S.A. Austin, J.R. Baumgardner, D.R. Humphreys, A.A. Snelling, and L. Vardiman. 1994. Catastrophic plate tectonics: A global flood model of earth history. In Walsh, R.E. (editor). *Proceedings of the Third International Conferences on Creationism, technical symposium sessions*, pp. 609–621. Creation Science Fellowship, Pittsburgh, PA.
- Woodmorappe, J. 1996. Studies in Flood geology: Clarifications related to the ‘reality’ of the geological column. *Creation Ex Nihilo Technical Journal* 10(2):279–290.
- Yoshii, T. 1979. A detailed cross-section of the deep seismic zone beneath northeastern Honshu, Japan. *Tectonophysics* 55:349–360.

Photographic Essay

Mitchell Caverns: Evidence of Climate Change

Paul W. Lewis*

Mitchell Caverns is unusual in that it does not appear to belong in its present environment. Located in the Providence mountain range of the Mojave desert (Figure 1), at an elevation of approximately 4,300 feet, Mitchell Caverns consists of two main caves, Tecopa and El Pakiva. Both are solution cavities, which could not have formed in the current desert climate (Figure 2).

Solution cavities form under the chemical action of ground water within limestone. (Williams and Herdclotz, 1977, pp. 192–199; Froede, 1994, pp. 189–193). Norris (1999, pp. 12–13) states, “The ground water level stood for a time above the highest part of the caves.” Yet presently this region is very dry.

I suggest this cave formation can be explained within the Global Flood model. As the Flood water subsided, solution cavities were formed within the limestone.

Mitchell caverns contains many well developed calcite formations (Figure 3). Like the caves themselves, these formations cannot have developed within the current desert climate, because they require an ample supply of ground-water in order to form (Williams and Herdclotz, 1977, pp. 192–197). Most are currently dormant, except on occasion when the desert above receives an unusual amount of rainfall. These formations demonstrate that for a period of time after the caves had formed, the area consistently received much more rainfall (likely in a Post Flood ice age). According to Norris (1999, pp. 12–13), “dripstone, as the cave decorations are called, was formed mainly during wetter climates than now prevail in the area.”

Among the many formations of Mitchell Caverns, a number of rare speleothems can be found. By far the most rare are coral pipes (Figure 4), a group of formations said to be found in only two other caves in the United States, and seven caves in the whole world. These form in mud flows or guano (bat droppings) when water saturated with calcium carbonate splashes in the soft material. In the case of a mud-flow inundation, as in Mitchell Caverns, it appears that no further inundation could have occurred while the coral pipes were forming, or the mud would have been washed away, and the nascent calcite with it. The splashing of the mud would also seem to require the mud to remain soft and pliable, at least at the initial stages of formation. Both aspects seem to indicate a rapid formation process.



Figure 1. The road to Mitchell Caverns. The cave entrance is located halfway up the mountains, at center frame. These caves demonstrate that this region had much more rainfall in the past.



Figure 2. View from the cave trail. The cave is at upper right. The entrance faces out on a ravine cutting down the mountain slope. Here, the canyon's micro-climate has preserved an area of deciduous trees. Numerous artifacts found in and around the cave provide evidence that a community of native Americans formerly made their home here (Pinto, 1989).

Mitchell Caverns also contain two other relatively rare kinds of formations; helectites and shields. The helectites bend and curve in apparent defiance of gravity. They are believed to form by the capillary action of water which progressively builds a hollow calcite channel, but their behavior is not completely understood. In the case of a shield, it forms when ground-water flows out of a seam in

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Figure 3. Stalactites and flowstone in the Queen's room. With few exceptions, the formations of Mitchell caverns are dormant, no longer growing. Some damage can be seen here at the tips of the stalactites. This can be due to either natural causes or human intervention.



Figure 4. Coral pipes, an extremely rare cave formation, at lower right and center. They formed on a mud flow, as water saturated with calcium carbonate splashed in the soft material.

the rock, creating a sandwiched pair of horizontal calcite plates.

These many features (Figure 5) make Mitchell Caverns worthy of note in the study of cave formation, but perhaps more importantly, the caves themselves provide evidence for a different climate in the past in the Mojave Desert region.

References

- CRSQ: *Creation Research Society Quarterly*
- Froede, Jr., C.R. 1994. Karst development in the Clayton Formation, Fort Gaines, Georgia. *CRSQ* 31:189–193.
- Norris, Robert M. 1999. *Geologic setting of Mitchell Caverns*. California Dept. of Parks and Recreation. Sacramento.
- Pinto, Diana Gail. 1989. *The archeology of Mitchell Caverns*. California Archeological Reports No. 25. California Dept. of Parks and Recreation, Resource Protection Division, Cultural Heritage Section. Sacramento.
- Williams, E.L., and Herdtklotz, R.J. 1977. Solution and deposition of calcium carbonate in a laboratory situation II. *CRSQ* 13:192–199.



Figure 5. Fallen stalactite or column. Estimated at over a ton, it fell during a time when the cave was still wet, as some stalactite growth has been noted around where it broke off.

A Critique of the Literary Framework View of the Days of Creation

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Abstract

The Literary Framework view of the days of creation is becoming increasingly popular among evangelicals today. Advocates hold to a non-concordist view of Genesis and modern science and attempt to demonstrate that Genesis 1 was never intended to communicate scientific truth or literal history. Although they still affirm that the characters and events of Genesis 1 are historical, they

deny that such events actually occurred in the way Genesis appears to describe them. This paper focuses in particular on the Literary Framework views of Meredith G. Kline and Henri Blocher, and demonstrates that such views have no exegetical or theological basis whatsoever. In addition, a defence of the traditional, literal, historical interpretation is also presented.

Introduction

In the last one hundred years, the question of how Genesis 1 and the days of creation should be interpreted in the light of modern science, has sparked much discussion and debate. The most recent trend among evangelicals is to interpret the days as a literary device. Most commentators have identified an apparent parallelism between days 1–3 and days 4–6, but Henri Blocher and Meredith Kline have taken this a step further by devising a Literary Framework interpretation, which denies the chronological sequence of the days (Blocher, 1984; Kline, 1996). This paper will offer a critique of that view, focusing particularly on Kline's "Two Register Cosmology." A defence of the chronological interpretation will also be presented¹.

Style and Genre of the Creation Account

Advocates of the Literary Framework view consider the *Gap Theory* and the *Day-Age Theory* inadequate, yet they are still convinced that the claims of modern biology, geology and astronomy are true. Therefore, a *non-concordist* view is taken; Genesis 1 is not meant to be harmonized with science. Rather, it is a literary arrangement used to communicate a *theology of the Sabbath* (Blocher, 1984, p. 50), not a literal historical account². Although the days should be understood as ordinary 24-hour days, they form part of a larger figurative whole (Blocher, 1984, p. 50). The advantage of such an approach is that it escapes the

exegetical and scientific problems of interpreting the days as ages, and avoids chronological difficulties in the text such as the occurrence of an "evening" and a "morning" before the creation of the sun, moon and stars on day four. Blocher believes the form of Genesis 1–2 is exactly what would be expected if the author wanted to communicate such a view (Blocher, 1984, p. 51). However, it is presumptuous to assume that a particular author living in a vastly different culture and at a time far removed from the present, would write according to 20th century expectations³. In addition, if this is all Genesis 1 intends to communicate, it leaves an abundance of "spare" data. Why is there so much excess detail? Blocher is also inconsistent in viewing the creation account as merely a vehicle for communicating a theology of the Sabbath, since he later states that the absence of any reference to the days of creation in Deuteronomy 5:12–15, suggests the days referred to in the Sabbath commandments of Exodus 20:11 and 31:17, should not be taken as too close a link to creation (Blocher, 1984, p. 48).

¹Questions of source and authorship will not be considered. It is assumed that other near-eastern creation accounts are perversions of a common source of Genesis 1 (see Price, pp. 129–130). It is also assumed that Moses was at least the redactor, if not the author, of all the content in Genesis.

²Blocher does, however, affirm that the events of creation (i.e. the creation of seas, land, plants, animals and man) were historical.

³Blocher does not even consider what one would expect to read if the creation week was, in fact, a literal chronological record.

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Table I. Proposed parallels between creation days.

Day 1	Let there be light (1:3).	Let there be lights (1:14).	Day 4
Day 2	Let there be an expanse to separate water from water (1:6).	Let the water teem with creatures and let birds fly above the earth (1:20).	Day 5
Day 3	Let dry land appear (1:9). Let the land produce vegetation (1:11).	Let the land produce living creatures (1:24). Let us make man (1:26). I give you every seed bearing plant... and every tree that has fruit with seed in it... for food (1:29).	Day 6

Blocher considers Genesis 1 a “mixed” genre—a mix of history and allegory—and he cites Matthew 21:33–41 for support, claiming that this parable summarizes centuries of history (Blocher, 1984, p. 37). But this Matthean passage is clearly identified as a parable (21:45–46) so communication of history was not its purpose. Therefore, this parable adds no support at all for his view. In addition, Blocher admits elsewhere: “The style of the prologue is amazing for its deliberate simplicity, its ascetic style. It shows not the slightest trace of rhetoric.” (Blocher, 1984, p. 31). He also notes that Genesis 1 contains no rhythms of Hebrew poetry or synonymous parallelism (Blocher, 1984, p. 32). It should also be understood that while Genesis 1 clearly contains some non-narrative and figurative elements, this does not at all imply the whole passage is non-narrative.

Similarly, Bruce Waltke also suggests the days are anthropomorphic (Waltke, 1988). But again, although the account does contain anthropomorphic language (e.g., God “breathed” in Genesis 2:7), this does not mean or imply that the entire account is anthropomorphic. In any case, as E. J. Young pointed out, anthropomorphisms generally take the form of a body part or body movement in order to describe God’s actions. They never take the form of a temporal concept such as a day (Young, 1964, p. 58).

Ronald Youngblood (1991) suggests the occasional literary device appears to indicate the account is literary instead of chronological. But this conclusion does not follow: the presence of clearly defined literary devices in no way implies that the days are literary devices or that they are non-chronological⁴.

Note also that the creation account contains all the usual characteristics one would expect to find in historical narrative. Gesenius’ (1910, pp. 132–133) Hebrew grammar states: “One of the most striking peculiarities in the Hebrew *consecution* of tenses is the phenomenon that, in representing a series of past events, only the first verb stands in the perfect, and the narration is continued in the imperfect.” (Original emphasis). Indeed, this is exactly

what we find in Genesis 1: The first verb, **ברא** (*bara*), is a perfect, which is then followed by a series of imperfections, such as **wayyomer** (*wayyomer*), and **wayehi** (*wayehi*).

The Literary Framework View

Most commentators on Genesis have pointed out that in the creation account there appear to be parallels between the first three days and the second three days. For example, Youngblood (1991, p. 25) proposes the

outline presented in Table I (Blocher [1984, pp. 51–52] presents a similar view).

Kline, on the other hand, goes even further. His “Two Register Cosmology” (see Table II) envisions a heavenly level (upper register) and an earthly level (lower register), where the lower register relates to the upper register as replica to archetype⁵. It is not entirely clear what these two registers or levels are, but it appears they refer to the visible and invisible realms respectively (Kline, 1996, p. 5).

Kline claims that the use of “the heavens and the earth” is the first indication of the two register cosmology: heaven is the invisible realm and earth is the visible realm. Yet he earlier claims that the term is not just a merism (Kline, 1996, p. 4) [A merism (or merismus) is a pair of antonyms, which together, signify a totality], but two *concrete* components that form the physical world. But if “the heavens” are upper register how can they also be concrete?

Table II: Correspondences between Upper Register and Lower Register (reproduced from Kline, 1996).

	v. 1	v. 2	Days 1–6	Day 7
upper register	heaven	Spirit	fiats	God’s Sabbath
lower register	earth	deep	fulfilments	Sabbath ordinance

⁴Young (1964, p. 65) states that even if Genesis 1 is schematic, it does not necessarily follow that it is figurative or not a record of what actually happened. It does not prove that the days are non-chronological.

⁵See Table I in Kline (1996). He also sees the same kind of two register cosmology in Job and Revelation. However, these books are completely different in both form and function to the Genesis prologue. Revelation is apocalyptic and Job is wisdom literature. They are completely different genres and not at all comparable.

These two registers are said to be re-emphasised by the Spirit hovering over the deep, the fiats and fulfilments of the six days, and God's rest on the seventh day. Table III shows how Kline also divides the days into two triads.

The creative acts of the first three days supposedly mirror characteristics of the invisible heaven. For example, the day light created on day one was a replica of the "Glory-light." (Kline never actually defines what he means by "Glory-light."): The expanse of day two was so much like its archetype, they both share the name "heaven." Kline claims the trees and fruit of day three are used in Scripture as a figure for the cosmos. Their high spreading branches are a realm for the birds of heaven, and are comparable to the expanse in which the birds fly (Gen 1:20)—a towering image pointing to the overarching Spirit-heaven above. Daniel 4:10–12 is cited as support, but this is actually part of a prophetic vision concerning King Nebuchadnezzar, which does not speak at all about the cosmos.

The first members of each triad are meant to relate to the heaven (upper level): light on day one, and light sources on day four. However, Kline is again inconsistent. The upper level is supposed to represent the invisible realm, but both light and light sources are physical and very visible! The third members are meant to relate to the earth (lower level): land and vegetation on day three, and the land animals and man on day six. The second members are meant to serve as links between the first and third members. These middle units combine both upper and lower levels: the sky and sea on day two, and birds of the air and fish of the sea on day five. Here again, Kline is inconsistent, since both sky and birds are physical and visible (Although the boundaries of the sky are indeterminate, it is certainly visible in a phenomenological sense).

An even closer analysis of the text shows the so-called parallels and literary devices are far from what is claimed, if they exist at all.

1. Day One and Day Four.

Kline holds that in terms of chronology, day four is contemporaneous with day one, and describes the astral apparatus that accounts for the day and night. He claims the luminaries (kings) of day four rule over the light and dark (kingdoms) of day one, thus regulating the cycle of light and darkness. He thus concludes the narrative sequence is not chronological (Kline, 1996, pp. 7–8).

However, Kline is very selective in his treatment of the text. On day one, God Himself separates light from darkness, and calls the light "day" and the darkness "night." On day four, which is supposedly contemporaneous with day one, God creates light sources (i.e. in the expanse, which, according to his reckoning, did not exist yet!) to separate "day" from "night" (as opposed to "light" and "darkness")

Table III: Triads of creation days (reproduced from Kline, 1996).

First Triad	Level	Second Triad
day one	upper	day four
day two	upper { } lower	day five
day three	lower	day six

and to give "light" to the earth. This implies that "light" pre-existed. The light sources were to govern the "day" and "night," which implies that "day" and "night" also pre-existed. Therefore, day one must have preceded day four.

According to J. P. Lewis, the Rabbinic interpreters held that God created a primeval light not dependent on the sun, which came into existence at God's command but was later withdrawn and stored for the righteous in the messianic future (Lewis, 1989, p. 449) (Hamilton [1990, p. 121] holds a similar view). This is certainly a possibility that should be considered. Gleason Archer, however, claims there is no reference anywhere else in Scripture to light that is not connected with the sun, moon and stars or as a result of combustion (Archer, 1984, pp. 322–323) [Archer also states "there is no scientific evidence for photosynthesis resulting from cosmic light" but this is a moot point, since it is a question of the light *source* not the *kind* of light. The temporary light source would have radiated the same kind of light as the sun does today], but Revelation 21:23 and 22:5 clearly indicate there will be no sun or moon illuminating the New Jerusalem (See also Psalms 104:2, Habbakkuk 3:4 and 1 John 1:5).

However, Kline (1996, p. 9) objects to this line of reasoning:

Why would God create such a vast cosmic order only to discard it three days (or ages) later? Why create a replacement cosmos to perform the very same functions already being performed perfectly well by the original system?

But this dismissal is arbitrary. Nothing at all, not even the basic force framework of the universe, existed prior to creation, so the phenomenon of light would need to be created prior to light-producing bodies. Indeed, creating light sources before creating light would be like making a musical instrument in a universe which has no notion of sound!

Note also that when light was created on day one, God Himself divided it from the darkness. But on day four God created the sun and moon for this purpose, which again suggests that a temporary (possibly supernatural) light source was in use for the first three days. Indeed, this seems

to be the most satisfactory explanation and best represents what the text actually says. Young (1964, p. 95) affirms:

That the heavenly bodies are made on the fourth day and that the earth had received light from a source other than the sun is not a naïve conception, but is a plain and sober statement of the truth.

Indeed, believing the earth was created before the sun is no more unreasonable than believing Christ rose from the dead, since naturalism regards both as impossible.

2. Day Two and Day Five.

Following the principle of “kings” ruling over “kingdoms,” the birds and fish of day five are said to rule over the sky and sea of day two, respectively (Kline, 1996, p. 6). But Kline erroneously identifies the “expanse” and “waters below the expanse” of day three, with the habitats of birds and sea creatures, respectively. This critical error causes his whole framework to collapse. On day two, God creates the expanse and calls it “sky” (שמים). The expanse cannot be equated with the atmosphere, since verse 14 states that the sun, moon and stars are set *in the expanse* (ברקיע). The preposition ב (be) has a similar semantic range to the English preposition “in,” which implies the expanse is where the sun, moon and stars are located—in other words, *interstellar space* (Humphreys, 1994, pp. 58–59). D. R. Humphreys has pointed out that “above the earth across the expanse of the sky” (Gen 1:20, NIV) is an inaccurate translation of על פני רקיע השמים (Humphreys, 1994, p. 60). “Across” is not a possible rendering of the preposition על (“on,” “over”) and פני (“face”) appears to remain untranslated. In verse 2, the same phrase is translated “over the surface,” so verse 20 would be better translated “over the surface of the expanse of the heavens.” This appears to be phenomenological language. An observer on earth looking up at the sky, watching birds fly past, can easily determine the approximate distance to the bird since it is an objective and well defined entity. Yet, the same observer could not determine the distance to the beginning of interstellar space (the expanse) because its beginning is not so well defined. The observer would, however, perceive that its beginning is much further away than the bird. Thus, to the observer looking up at the sky, the bird flies *over the surface* of the expanse (i.e. in Earth’s atmosphere), not *in* the expanse.

In addition, the “waters” (מים) of day two are the same as those of day one. However, on day five the sea creatures were to fill the “water in the seas” (המים בימים), which were created on day three (Gen 1:10). But according to Kline’s schema, day three is contemporaneous with day six, not day five! Furthermore, the sea creatures were commanded to “be fruitful” (פרו), “increase in number” (ורבו) and “fill” (ומלאו) the seas, and the birds were commanded to “increase on the land” (ירב בארץ). Yet there

is no philological or contextual evidence to indicate that God intended them to rule or govern anything, despite Kline’s claim to the contrary.

It should also be noted that the focus of day two is the creation of the *expanse* between the waters, *not the waters themselves*, which were already in existence at the beginning of day two. It should also be asked why the waters *below* the expanse are singled out? Kline makes no mention of the waters *above* the expanse, presumably because they do not fit into his pattern. Indeed, the lack of correspondence between day two and day five completely undermines the entire schema.

3. Day Three and Day Six.

Continuing the “kings” and “kingdoms” theme, Kline notes that humanity has been commissioned by God to rule over the creation (Kline, 1994, p. 6). But Kline is again highly selective in his presentation of the relationship between the two days. Humanity was not commissioned to rule over the land, the seas and the vegetation created on day three, but over the land animals created that same day, and over the fish and birds created the previous day! Humanity was told to “fill the earth and subdue it” but never to “rule” it. Specific vegetation was given for food to humanity and animals with “the breath of life,” yet this also contains no notion of “ruling.” Kline also fails to integrate the many details of both days: Why does God specifically call dry ground “land” and gathered waters “seas”? What is the significance of the commission to increase, fill the earth and subdue it? Why is there no parallel on day three? Why the repetition concerning Man created in the image of God and our task of ruling over the animal world?

4. Does parallelism disprove chronology?

Even if the so-called parallelism is accepted, Young points out that there is still an implicit chronology in the account: day one/day four → day two/day five → day three/day six (Young, 1964, p. 69). The sun and moon are placed in the expanse on day four, which (according to the framework) occurs at the same time as day one. Young notes that this implies the expanse existed before day one/day four, yet this clearly contradicts verses 6–8 which state that the expanse was created on day two!

In regard to the “...evening and morning—day N” pattern, Kline (1996, p. 7) writes:

...when we find that God’s upper level activity of issuing creative fiats from his heavenly throne is pictured as transpiring in a week of earthly days, we readily recognize that, in keeping with the pervasive contextual pattern, this is a literary figure, an earthly, lower register time metaphor for an upper register, heavenly reality.

But this is inconsistent with the rest of his interpretation, where lower register elements such as the “earth” (Gen 1:1), the “deep” (Gen 1:2), and the fulfillments of the six days, are all concrete, not figurative. If Kline views the creation days as figurative, why does he not view the creation of land (day three) and the creation of animals and man (day six) as figurative, since these are all part of the lower register? Kline’s belief that the pattern of days is simply a detail in the creation-week picture (Kline, 1996, p. 10) is far too simplistic and all too convenient.

5. Day Seven

Kline (1996, p. 10) believes that the seventh day exclusively relates to God and the upper register:

It is precisely the (temporary) exclusion of man from this heavenly Sabbath of God that gives rise to the two-register cosmology. At the Consummation, God’s people will enter his royal rest, the seventh day of creation (Heb. 4:4, 9, 10), but until then, the seventh creation day does not belong to the lower register world of human solar day experience. It is heaven time, not earth time.

The unending nature of day seven differentiates it from solar days, which Kline (1996, p. 10) claims is confirmed by the treatment of God’s rest in Hebrews 4. He argues:

If the seventh day were not an unending Sabbath-rest for God but a literal day, would the next day be another work day, introducing another week of work and rest for him, to be followed by an indefinite repetition of this pattern? Are we to replace the Sabbath-Consummation doctrine of biblical eschatology with a mythological concept of cyclic time? In the Genesis prologue the unending nature of God’s Sabbath is signalized by the absence of the evening-morning formula from the account of the seventh day.

But arguing for a long Sabbath based on the missing “and there was evening and there was morning—the Xth day” is an argument from silence, which is a logical fallacy. Its absence does not necessarily imply that it did not happen.

Kline’s appeal to Hebrews 4:3–4 is also misguided, since the “rest” mentioned in this passage is first mentioned in Hebrews 3:11, in a quotation from Psalm 95, which describes the unbelief of the Israelites after they fled Egypt (cf. Heb 3:18). Because of their unbelief, God punished the people by not allowing them to enter His “rest,” which was the Land of Canaan, the Promised Land. In Hebrews 4:1, the author states that the promise of entering God’s rest still stands. However, in verses 2–3a he makes it clear that he is now talking about entering the kingdom of God, rather than possessing the land. Because of this, the “Promised Land” is set up as a *type* of the kingdom, and both may be referred to as “God’s rest.” In Hebrews 4:4, the

author quotes Genesis 2:2 in order to point out that the invitation to enter God’s “rest” has not just been open since the time of the exodus, but has been open ever since the creation of the world, because that is when God ceased His creative work and began resting. Thus Paul Ellingworth suggests the rest is a long period of time *beginning* with the seventh day of creation, not that the Sabbath is the seventh day (Ellingworth, 1993, p. 249).

People who believe will enter God’s rest and cease to do their own work just as God ceased to do His (Heb 4:9–10). This does not mean that God has been idle, since Jesus Himself stated that His Father is working (John 5:17). Rather, the completion of creation marks the end of a magnificent whole. Morris and Burdick (1996, p. 41) write:

There was nothing to add to what God had done, and he entered a rest from creating, a rest marked by the knowledge that everything that he had made was very good (Gen 1:31). So we should think of the rest as something like the satisfaction that comes from accomplishment, from the completion of a task, from the exercise of creativity.

There is also a sense in which entering the kingdom of God implies a ceasing from one’s own work and resting securely on what Christ has done (Morris and Burdick, 1996, p. 43). Indeed, Jesus Himself spoke about rest for the souls of men (Matt 11:28–30). Therefore, contra Kline, the “rest” of Hebrews 4 refers to entering the kingdom of God, not to the seventh day of creation [For a fuller discussion of how Hebrews 4 relates to the Sabbath rest, see Kulikovsky (1999)].

Blocher also argues for a non-literal Sabbath. Based on Jesus’ statement in John 5:19 concerning the Son doing “what He sees the Father doing”, Blocher argues that Jesus’ reasoning is only sound if the Father acts during the Sabbath—only then, would the Son also have the right to act on the Sabbath (Blocher, 1984, p. 57). Therefore, he concludes the Sabbath must be more than a literal day. But Blocher’s argument fails because the sense of שבת on day seven is the ceasing of *creative* work, not the ceasing of all work, so there is no reason why day seven should be understood as anything other than a literal day.

Genesis as Chronological History

1. The structure of Genesis

Traditionally, the book of Genesis has been divided into two sections: Primeval History (Gen 1–11) and Patriarchal History (Gen 12–50) [See for example La Sor et al. (1996) and Edersheim (1995)]. However, D. J. A. Clines (1994, p. 305) has noted:

...it is most significant that there is no clear-cut break at the end of the Babel story. Clearly, Abrahamic ma-

terial begins a new section of the Pentateuch, but the precise beginning of the Abrahamic material—and therewith the conclusion of the pre-Abrahamic material—cannot be determined. In the final form of Genesis, there is at no point a break between primeval and patriarchal history.

Since the Patriarchal History is generally regarded as an accurate literal historical record, there is no reason why the Primeval History should not also be viewed in the same way.

The only clear divisions in the book are the various “accounts” beginning with *אֵלֶּה תּוֹלְדוֹת* (“this is the account of”). There are 11 accounts in total [Gen 2:4, 5:1, 6:9, 10:1, 11:10, 11:27, 25:12, 25:19, 36:1, 37:2.], but the creation account (Gen 1) does not have the said starting formula. Each account builds on the previous one, and several of them cause the story to focus on a particular individual and his family [Shem (11:10), Isaac (25:19), Jacob (37:2)]. This pattern is shown in Figure 1:

Because Genesis 1 does not begin with the usual starting formula, Gordon Wenham (1987, p. 40) considers it separate from the main historical outline of Genesis and that it, therefore, should be interpreted differently. But Wenham has apparently failed to notice that each account carries on the story of a subject mentioned in the *preceding* account. Therefore, since Genesis 1 is the first account, we would not expect to find the same starting formula.

Note also, that the narrative style of Genesis 1 suggests a positive record of things as they actually happened, not a record of mythical suppositions or vague suggestions (Leupold, 1949, p. 25). Derek Kidner (1967, p. 22) also notes the inescapable impression that the characters of Genesis “are people of flesh and blood” and “the events actual and the book itself a unity.” In addition, many other scriptures make allusions to the historicity of the Genesis account⁶.

Waltke (1988, p. 45), citing Charles Hummel, posits that the Genesis account is prescriptive rather than descriptive—it answers the “who,” “why” and “what ought to be,” not the “what,” “how” and “what is.” But Walter Kaiser (1979, p. 147) rightly objects to this idea: “It is often wrongly stated that Genesis 1 tells us who created the universe but not how it was done—an obvious slighting of the phrase repeated ten times, ‘and God said...’” There is no doubt that Genesis makes a theological contribution—its mere presence in the Bible confirms this. But to say that Genesis is primarily theological rather than historical is to set up a false dichotomy: history and theology are *not* mutually exclusive. Given the structure and unity of Genesis, and the clearly historical nature of the later chapters, there would have to be substantial evidence in the text in order to conclude that the early chapters are not equally historical, yet no such evidence can be found. H. C. Leupold

(1949, p. 35) contends that the creation account is complete and satisfactory from every point of view, although it does not answer every curiosity. Indeed, if all Genesis 1–2 communicates is that God is creator of all, then the first verse would be enough (Davis, 1975, p. 75). In any case, one would expect history to precede theology, since God typically works in history through real people and real events.

2. The sequence of the days

Based on the absence of the article before each “day” and before the numerals “one” through “fifth,” David Sterchi (1996, p. 533) argues that the syntax does not necessarily imply or require a chronological sequence, although it is not excluded⁴. He also argues that this allows for the possibility of a random or literary order. However, he fails to consider the presence of the *waw*-consecutive imperfect *וַיֹּאמֶר* (“And God said...”) introducing each new day which, in this context, clearly indicates chronological sequence (*waw*-consecutive also terminate each day: *בֹּקֶר וַיְהיֶה עֶרֶב וַיְהיֶה יוֹם* [“...and then there was evening and then there was morning”]). He also fails to take into account the implicit progression in the creative acts themselves. The initial “deep” is divided by an expanse, and then the waters below are gathered together to form seas so that dry land can appear. Vegetation and animals are then created, and finally, Man. It would make no sense for God to create in any other order. As R. S. Hess (1990, p. 152) states:

Each day accomplishes something new, bringing about a greater completion of the work of creation. Each day begets the next. ...Indeed, it points to a perspective in which each day of creation, as each generation of humanity, progresses in the unfolding of a divine plan.

Leupold suggests Genesis 1 should be viewed as a record of successive creative acts that remove four deficiencies or instances of incompleteness. The account clearly progresses from providing basic essentials for existence to a climax, which is the creation of humanity (Leupold, 1949, p. 38). It is a narrative with sequence (Kidner, 1967, p. 55), a progressive revelation which becomes fuller and clearer (Kidner, 1967, p. 25).

It must also be asked why the author of the creation account would choose a clearly chronological framework (a week) to communicate something that is supposedly non-chronological? Indeed, it is difficult to imagine language which would more clearly communicate that the universe was created in six literal, chronological days.

⁶Cf. Exod 20:9-11, 31:17, Ps 8, 104, Matt 19:4-6, Luke 3:38, 2 Pet 3:5 and Heb 4:4.

Conclusion

The Literary Framework view appears to be based more on presupposition than on the Biblical text. The parallels and relationships are either artificial, stretched or non-existent, and the syntactical relationship between the days are not taken into account. The whole approach appears to be arbitrary and inconsistent, and it completely disregards the historical narrative nature of the account.

In addition, Young (1964, p. 44) notes that the Framework interpretation of Genesis 1 originated with Arie Noordtjiz as late as 1924, so the question must be asked how this rather eccentric interpretation managed to escape thousands of commentators (including the Talmudic writers) over the centuries?

Despite Kline's and Blocher's claims to the contrary, the literary structure of Genesis and the placement of the creation account at the head of the book points to an historical, chronological revelation, which narrows in scope as it progresses. The language, syntax, narrative style and progression of thought, all indicate chronological history.

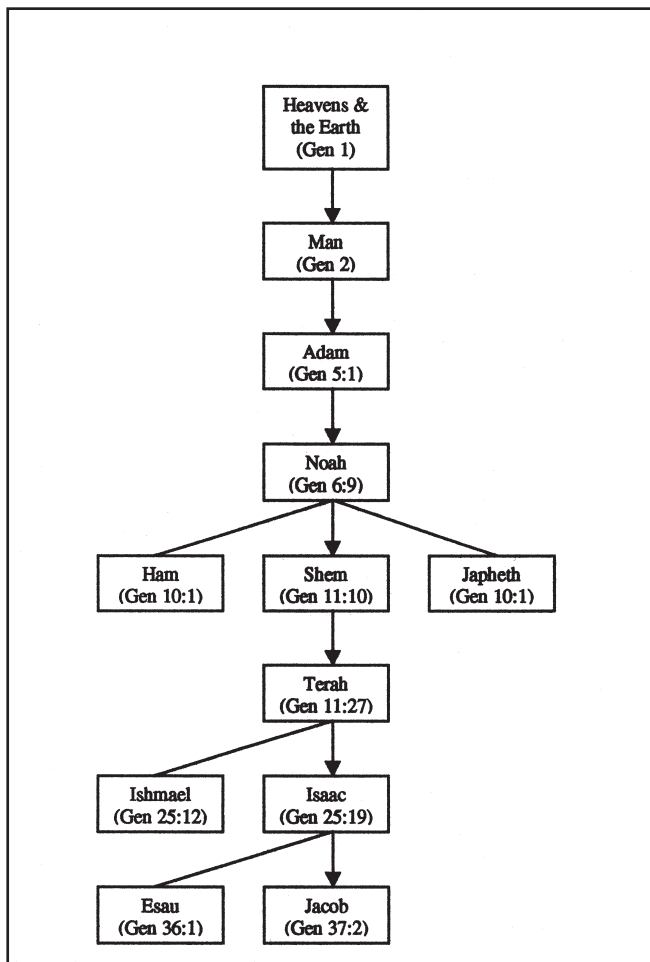


Figure 1: The progression of the Genesis "accounts"

References

- Archer, G. L. 1997. A response to the trustworthiness of Scripture in areas relating to natural science. In Radmacher, E. D. and R. D. Preus (editors) *Hermeneutics, inerrancy and the Bible*, pp. 322–323. Zondervan, Grand Rapids, MI.
- Blocher, H. 1984. *In the beginning*. IVP, Downers Grove, IL.
- Clines, D. J. A. 1994. Theme in Genesis 1–11. In Hess, R. S. and D. T. Tsumura (editors), *I studied inscriptions from before the Flood*. Eisenbrauns, Winona Lake, IN.
- Davis, J. J. 1975. *Paradise to prison*. Baker, Grand Rapids, MI.
- Edersheim, A. 1995. *Bible history: Old Testament*. Hendrickson, Peabody, MA.
- Ellingworth, P. 1993. *The epistle to the Hebrews*. New International Greek Testament Commentary, Eerdmans, Grand Rapids, MI.
- Gesenius, W. and E. Kautzsch (editor). 1910. *Gesenius' Hebrew grammar*, second edition, translated by A. E. Cowley. Oxford University Press, Oxford, Great Britain.
- Hamilton, V. P. 1990. *The book of Genesis: Chapters 1–17*. New International Commentary on the Old Testament, Eerdmans, Grand Rapids, MI.
- Hess, R. S. 1990. Genesis 1–2 in its literary context. *Tyndale Bulletin* 41.
- Humphreys, D. R. 1994. *Starlight and time*. Master Books, Green Forest, AR.
- Kaiser, W. C. 1979. Legitimate hermeneutics. In Geisler, N. L. (editor) *Inerrancy*. Zondervan, Grand Rapids, MI.
- Kidner, D. 1967. *Genesis*. Tyndale Old Testament Commentary, Inter-varsity Press, Leicester, Great Britain.
- Kline, M. G. 1996. Space and time in the Genesis cosmogony. *Perspectives on Science and Christian Faith* 48:2–15.
- Kulikovsky, A. S. 1999. God's rest in Hebrews 4:1–11. *Creation Ex Nihilo Technical Journal* 13 (2):61–62.
- La Sor, W. S., D. A. Hubbard and F. W. Bush. 1996. *Old Testament survey*, second edition, Eerdmans, Grand Rapids, MI.
- Leupold, H. C. 1949. *Exposition of Genesis volume 1*. Baker, Grand Rapids, MI.
- Lewis, J. P. 1989. The days of Creation: An historical survey. *Journal of the Evangelical Theological Society* 32.(4):433–455.
- Morris, L. and D. W. Burdick. 1996. *Hebrews and James*. Expositors Bible Commentary. Zondervan, Grand Rapids, MI.

⁴Also Youngblood (1991, p. 26). Sterchi suggests the article before "sixth" and "seventh" is emphatic.

- Price, I. M. 1925. *The monuments and the Old Testament*. Judson Press, Philadelphia, PA.
- Sterchi, D. A. 1996. Does Genesis 1 provide a chronological sequence? *Journal of the Evangelical Theological Society* 39(3):529–536.
- Waltke, B. K. 1988. The first seven days. *Christianity Today* 32:42–46.

- Wenham, G. H. 1987. *Genesis 1–15*. Word Biblical Commentary. Word Books, Dallas, TX.
- Youngblood, R. F. 1991. *The book of Genesis*, second edition. Baker, Grand Rapids, MI.
- Young, E. J. 1964. *Studies in Genesis One*. Baker, Grand Rapids, MI.

Book Reviews

Noah's Ark and the Ziusudra Epic by Robert Best Enlil Press, Fort Meyers, FL. 1999, 304 pages, \$38

This book is yet another attempt to explain away the Genesis Flood as a local Mesopotamian event. The author, a physical scientist, gathered ideas from many ancient Near Eastern flood legends. Unconstrained by truth, Best's conclusions are amusing:

- Noah was the mayor (king) of his town (p. 31).
- The ark was actually a small commercial barge filled with cattle and beer (p. 79).
- The flood occurred on the Euphrates River around 2900 B.C. when the water level rose slightly due to a six-day storm (p. 29).
- Noah lived to the age of 83, Methuselah to 85, ten times shorter than the biblical values.

The offbeat ideas continue, but you get the idea. Credit must be given to Best for analyzing many ancient texts, some in Akkadian such as the Gilgamesh Epic. The author also suggests a novel construction technique for the ark, somehow tying together 63 separate box-like hulls. This book is the expected result from an author who places the biblical flood account in the same category as Santa Claus (p. 15). The amazing thing is the list of book recommendations from professors at Calvin College and Duke University, quoted on the back cover. There is obviously a current "dumbing down" of biblical scholarship in higher education.

Don B. DeYoung

The Handy Dinosaur Answer Book by Thomas E. Svarney and Patricia Barnes-Svarney Visible Ink Press, Farmington Hills, MI. 2000, 493 pages, \$20

This book is the twelfth in the growing series of *Handy Answers* books. A question-answer format describes the biggest, oldest, fastest, and first discovered dinosaurs. The husband-wife authors cover a wide range of topics, ranging from cladistics to the plasma theory for universe origin. There are some obvious errors when they get out of their field, such as the statement that earthquake P-waves do not pass through solids (p. 15). Figures throughout the book are poorly prepared with duplication (pp. 30, 210), no size scale, and unreadable words (p. 97). Most seem to be pictures taken at museums, through glass partitions.

While not sympathetic to creation, the authors are less hostile than many writers. Creation (p. 70) and theistic evolution (p. 75) are defined without distortion. Life in space is described as "pure speculation" (p. 23). However, there is no mention of the Genesis Flood, vital to the creation view. The possibility of human interaction with dinosaurs is glibly put aside as "no such thing" (p. 284).

The authors mention the living fossil coelacanth, but leave out the recent discovery of additional representatives in Asian waters. The name *dinosaur* is defined as *terrible lizard*, first coined by Richard Owen in 1842. However, it is not explained that Owen's early use of *terrible* meant respected, great, or awesome, as in the "terrible swift sword" in the *Battle Hymn of the Republic*.

Contemporary dinosaur ideas are given a majority of space. These include the possible demise of the dinosaurs from the Yucatan Chicxulub impact (16 pages), and dinosaur-bird evolution (8 pages). The alternate extinction theory of dinosaurs by volcanic activity rates only 4 short sentences (p. 295).

There is a comprehensive index, including museums and internet sites for additional dinosaur information. The book is useful, although boring at times with long lists of obscure dinosaur names. We can be thankful for books which give the exciting creationist alternative for dinosaur history.

Don B. DeYoung

Notes from the Panorama of Science

Slumping at Grand Mesa, Colorado: Slow or Rapid?

Michael Shaver*

An interesting chronologic disagreement between uniformitarians and catastrophists relates to the continuing destruction of the basalt cap on Grand Mesa (Figure 1) in Western Colorado. Grand Mesa is a high elevation mesa capped by basalt with perimeter cliffs ranging from 100 to 500 feet. It forms the dominant landmark in the region due to its elevation (maximum of 11,237 feet) above the adjacent valleys on three sides (Figures 2 and 3) and is a popular recreational site because of its numerous lakes and rich forest.

I proposed that only retreating Floodwater would be capable of forming a valley system of this size in a young earth chronology. In prior articles (Shaver, 1998. Shaver, 1999.) I proposed a linkage of Grand Mesa, Battlement Mesa (north), the Flattops (high, basalt-capped mesas on the White River Uplift), and the Roan Plateau (from just west of DeBeque and Rifle, reaching into Utah) as remnants of the end-of-Flood land surface into which retreating Floodwaters etched canyon systems.

The top of Grand Mesa is roughly 50 square miles, but an adjacent bench exists on three sides. This bench area is also call Grand Mesa connotatively and increases the Mesa area by four to five times, yielding an area of 284 square miles above 10,000 feet elevation.

The bench area is the product of massive slumps with some blocks ("Toreva blocks", Yeend, 1969, p. 31) being as much as 500 feet high and two miles long, rotating as much as 50 degrees back toward the remaining table-top (Figures 4, 5, and 6). The amount of block rotation increases with the distance from the Mesa rim. This slumping process is consuming Grand Mesa, with each slump exposing a previously protected cliff to the same process. The movement of several Toreva blocks on Grand Mesa was measured and the rate is 0.05–0.5 foot per year (Figure 7). Vertical displacements were 5–10 times greater than horizontal displacements. Extrapolation of this rate consti-

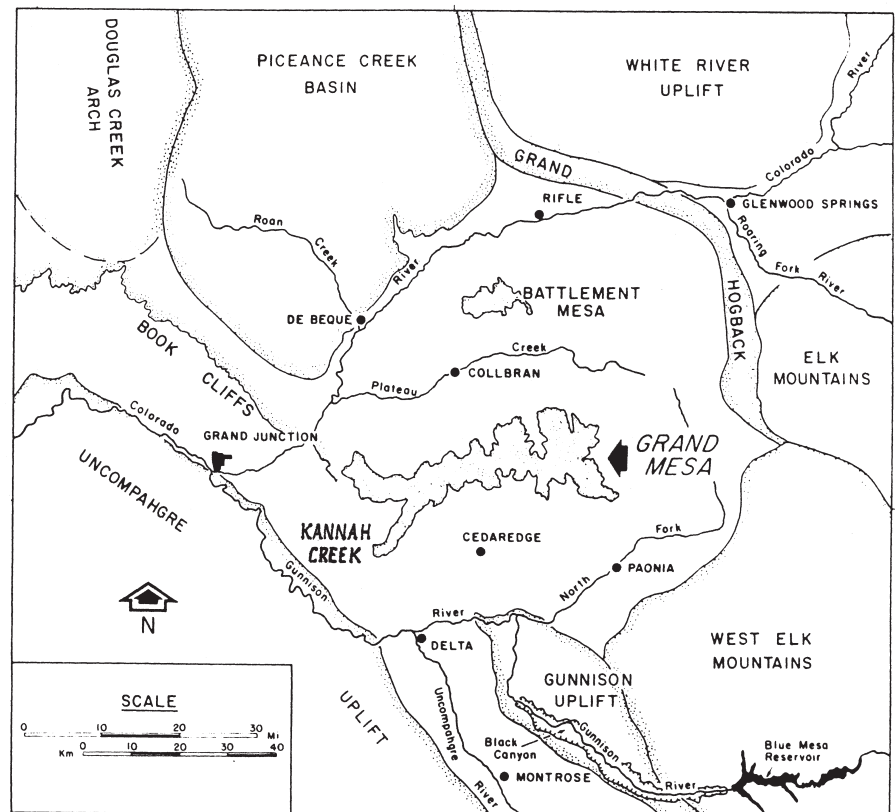


Figure 1. West Central Colorado showing Grand Mesa (tabletop and bench) and related features, after Cole and Sexton (1981, p. 121)

tutes an argument for the old-earth view of the region given uniformitarian assumptions.

However, there are several variables involved in the rate of rotational slumping in the present era which would be different in the past using a Flood model. One such factor is the amount of moisture in the rocks (which would certainly be greater immediately after a global Flood and the ensuing an ice age, as proposed by Shaver, 1999). Another factor is the degree of lithification of the sub-basalt rock (presumed softer soon after the Flood). Another factor may be the degree to which the post-Flood regional uplift was tranquil. Violent quake activity during the uplift of the region might facilitate mass wasting by liquefaction of the

¹Editor's note: This concept has also been discussed by other creationists, see Oard, M. J. 1998. Were the Colorado valleys cut during post-Flood or Flood times? *CRSQ* 35:104–107, and Williams, E. L. 1999. Unaweep Canyon—another visit. *CRSQ* 36:155–156.

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Figure 2. A view of the western edge of Grand Mesa (elevation 10,000 feet) looking northwest over the distant Book Cliffs and Grand Valley at lower elevation, roughly 5000 feet. Note the tabletop is remarkably flat given the topographic relief of the eroded distant background. The dark area left of the distant cliffs is irrigated farmland. Interstate Highway 70 is at the base of the distant (and lower) Book Cliffs.

softer strata, as it did in Alaska during the 1960 quake (Brown, 1995, p. 130). Slumping would not have begun until the adjacent rock was removed during the early stages of Flood retreat, leaving isolated mesas. Lastly, the thickness of the basalt itself could be a factor. It thickens to the east (as does the weak claystone beneath), where slumping seems to be most pronounced and has consumed the tabletop completely, leaving only Leon Peak, the probable source of the basalt.

There is evidence from glacial moraines to indicate that the Mesa's basic features were in place at the time of the ice age. Such a moraine is draped over the perimeter cliff at Kannah Creek (Figure 1) on the west side of the Mesa (Yeend, 1969, p. 21). This demands that the erosion of the Kannah Creek drainage into the Mesa, and the retreat of the cliff, was complete by the end of the ice age, further confining the time available for valley erosion and reduction of the basalt's western edge. The glacial period might have been brief, since on the north side of the Mesa "most of the till plains in the lower parts of the valleys grade into the outwash plains without a topographic break", i.e., without a clear terminal moraine. The "till and crevasse fills are generally distinguishable from older, more widespread till on the basis of topographic sharpness. Lithologically, it is impossible to differentiate the two



Figure 3. Grand Mesa viewed from the west, looking east. The top appears uneven only because the edge is irregular. Note the lower elevation is a steppe with irrigated agriculture, whereas the top of the Mesa is forested except for its wind-swept western edge.

tills..." (Yeend, 1969, p. 25). A long glacial period with dynamic equilibrium along the length of the glacier would be expected to produce a more defined terminal moraine. Since ice reached down the north slope of Grand Mesa to an elevation of 5400 feet near the town of Collbran (Yeend, 1969, p. 22), glaciation was intense. Clearly, the valleys into which the glaciers spread (Plateau Creek to the north, Kannah Creek on the west) existed prior to the post-Flood ice age. My proposal that the entire major valley system developed during Flood retreat accommodates this chronology (Shaver, 1998). I would envision that the slump-bench area on Grand Mesa is contemporaneous with the development of the lower elevation Colorado National Monument canyon system roughly 20 miles to the west (Shaver, 1999) during a period of post-Flood catastrophism.

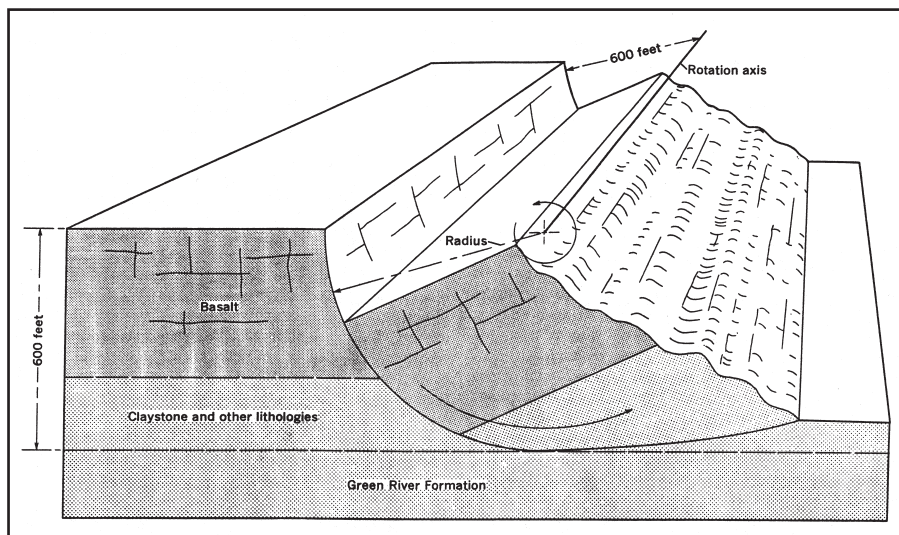


Figure 4. Diagram (Yeend, 1969, p. 32) of Toreva block slumping on Grand Mesa.



Figure 5. A view northwest from the northern edge of Grand Mesa. Ridges in the foreground are crests of tilted Toreva blocks. In the distance is the tabletop of the Mesa on the left side. Conifer trees are dark in color, with lighter color in the foreground being aspen in autumn. The distant strata and horizon are Cenozoic strata into which the canyon system is cut, suggesting the end of the Flood in the late Cenozoic in this area.



Figure 6. A view east across Island Lake (middle of photograph) toward cliffs of Crag Crest from the scenic overlook with interpretive plaque in Figure 7. The tabletop is the higher elevation, the bench area includes the lake. Crag Crest is a ridge remnant of the tabletop, with slumps on both north and south having removed all but the ridge.



Figure 7. U. S. Forest Service plaque at an interpretive site near Island Lake, reading: **SLUMPING at WORK** For the past 10 million years a lava cap has covered Grand Mesa. The major type of natural erosion of this rock has been slumping. Water runs into cracks in the lava rock. Alternating freezing and thawing of the water wedges the blocks off the mesa. Measurements show the present day blocks move from 1/2" to 4" per year.

I conclude that the Flood and its after effects therefore control the chronology of geologic development of Western Colorado. Both the major valley systems and Grand Mesa basalt-cap retreat involve mass wasting processes which are extrapolated by old-age theoreticians to explain

the current physiography in terms of vast age requirements. The active mass wasting phenomena on Grand Mesa cited by uniformitarians as evidence for their chronology requires the present (slow) speed of the processes, as illustrated in this paper. The Flood model contradicts this assumption. More study by creationists would further develop the Creation-Flood model for this region.

References

- CRSQ: *Creation Research Society Quarterly*
- Brown, Walter. 1995. *In the beginning: Compelling evidence for Creation and the Flood*. Center for Scientific Creation, Phoenix, AZ
- Cole, Rex D. and John L. Sexton. 1981. Pleistocene surficial deposits of the Grand Mesa area, Colorado, in Epis, R. C. and J. F. Callender (editors), *West Slope Colorado. New Mexico Geological Society Guidebook, Thirty-Second Field Conference*, pp.121-136. Socorro, NM
- Shaver, Michael 1998. Flood geology sheds light on Unweep Canyon mystery. *CRSQ* 34:218-224.
- Shaver, Michael. 1999. Rapid cliff formation at Colorado National Monument, Mesa County, Colorado. *CRSQ* 36:11-16.
- Yeend, Warren. 1969. *Quaternary geology of the Grand and Battlement Mesas area, Colorado*. United States Geological Survey Professional Paper 617.

The Goblet Cell

Mark H. Armitage*

In a previous Panorama Note (Armitage 2000), micrographs of a typical vertebrate intestinal lining were presented, showing the complexity of the extremely delicate, microscopic “brush-border” or microvillar projections of the small intestine (for a list of definitions, please see that report).

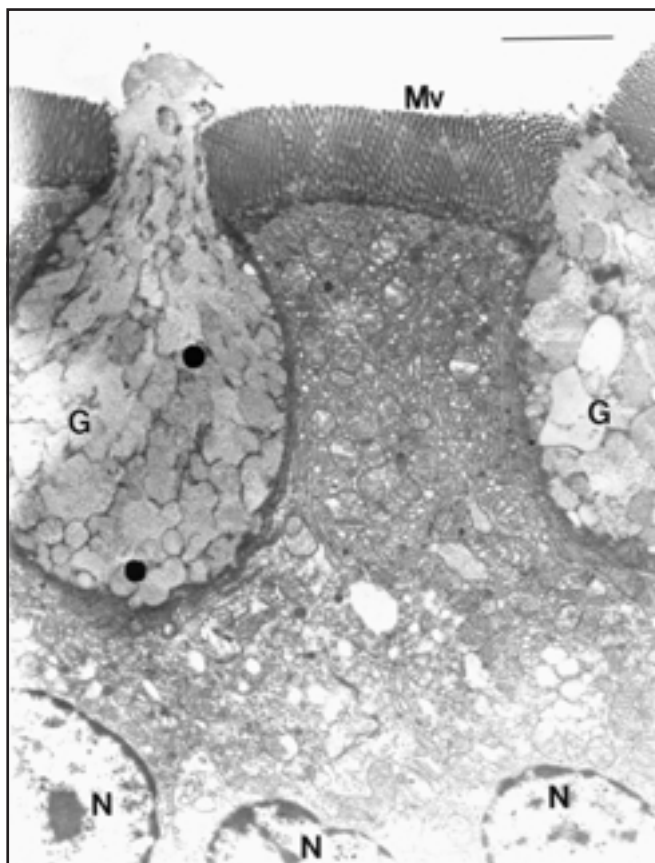


Figure 1. Cross-section of rat small intestine, two mucus secreting goblet cells are seen embedded between absorptive cells that bear many microvilli along the other edge. Legend for all figures: G: goblet cell, Mv: microvilli, N: nucleus, Mi: mitochondria, Go: golgi complex, Mu: mucin. Bar = 2.5 μ

Because this brush-border is exposed to the continuous passage of excretory material, it is subject to mechanical and shear stress abrasion and the influence of possible hazardous or chemically strong products which pass along its surface.

A very important component of the small intestine brush-border lining is the interspersed presence of many mucus-producing cells, called Goblet cells, among the

microvilli (Figures 1–4). These cells produce an abundance of glycoproteins called mucins, which are periodically or continuously released from the open-ended cell and spread entirely over the intestinal lining as a viscous and elastic lubricating gel. Similar goblet cells are found in the vertebrate stomach, salivary glands, and respiratory and genital tracts, and serve to entrap and eliminate microorganisms and particulate matter. They also protect the brush-border surface. These goblet cells are even known to increase in number (hyperplasia) in cases of chronic bronchitis, cystic fibrosis, and other diseases. None of these goblet cells, however, are found along the tegument of flatworm parasites which otherwise mimic the lining of the small intestine within which they live.

The microvilli of the brush-border (Figure 3) actually make up the terminal portion of absorptive cells comprising the epithelial layer of the small intestine whose function is

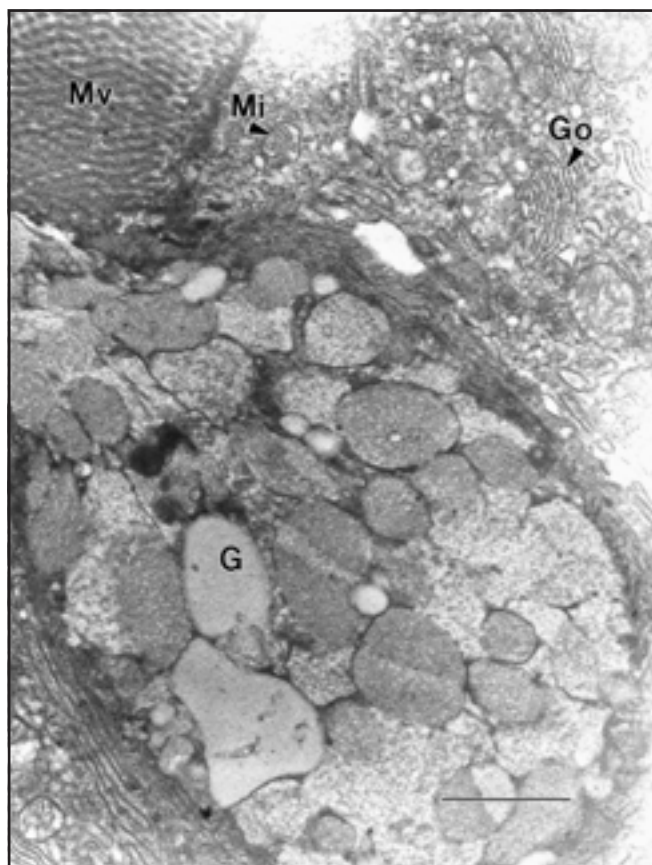


Figure 2. At higher magnification the granular nature of the mucin is evident. The mucin is encapsulated within numerous secretory vesicles. Small organelles such as mitochondria and golgi bodies are closely associated with the high-volume production of mucin for spreading to the microvilli. Bar = 1.25 μ

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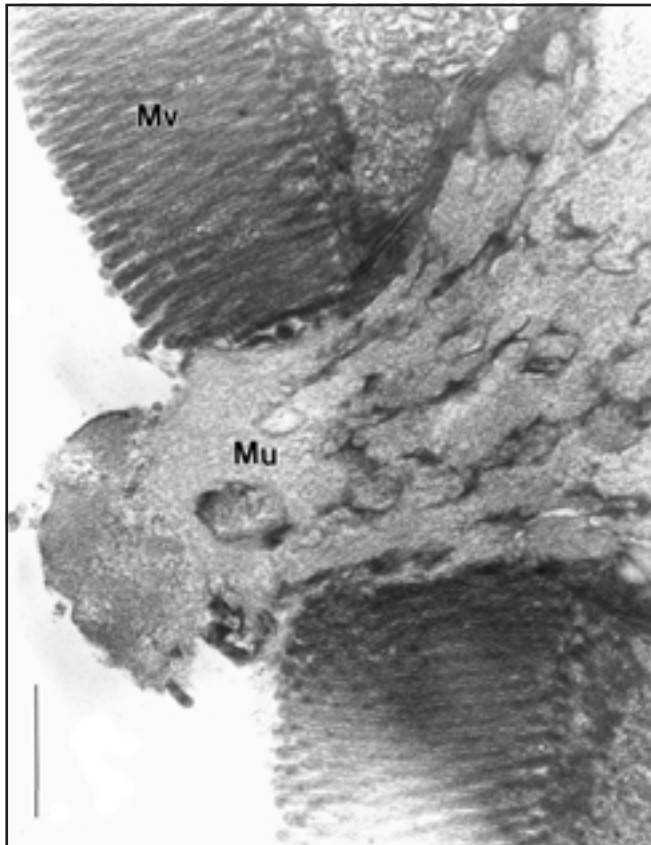


Figure 3. As the mucin is expelled from the goblet cell, the secretory vesicles become elongated and burst open, releasing their contents along the surface of the small intestine. Bar = 1 μ

to complete the digestion of food and absorb metabolites into the bloodstream. Each absorptive cell is estimated to contain about 3000 microvilli, and 200 million of them are found along each square millimeter of intestinal lining, all of which are very delicate and important to the task for which they are designed. With the continual bath of a lubricating gel, these tiny structures are well insulated from harm. At the highest of magnifications, the minutest structures involved in the very process of sustenance from food are seen to be protected by the design of the Creator.

Are Uniformitarians Documenting Earth's Biblical Creation?

Carl R. Froede Jr.*

Uniformitarian geologists explain Earth's age based on the radiometric dating of its oldest crustal rocks. Up until recently this understanding was generally as follows:

Earth was a molten mass, approximately 4.5 billion years ago (Ga), when it first formed in our solar system. As it cooled a thin layer of igneous rock formed on its outer surface (which became Earth's crust). A period of extraterrestrial bombardment occurred from 4.1 to 3.4 Ga (McSween, 1999) which coincided with the continued



Figure 4. At low magnification, the many goblet cells are evident (dark arrows) and the fine brush border is a pencil thin edge along the lining border (white arrows). Bar = 15 μ

Acknowledgments

I thank Charleen Mullen and Zack Luce, my cell biology students for specimen preparation.

Recommended reading

http://arbl.cvmbs.colostate.edu/hbooks/pathphys/misc_topics/goblets.html

Burkitt, H.G., B. Young, and J.W. Heath. 1993. *Wheater's functional histology* (third edition) Churchill Livingstone Publishers, London.

Junqueira, L.C, J. Carneiro, and R.O. Keley. 1992. *Basic histology* (seventh edition) Appleton and Kange, Norwalk, CT.

Reference

Armitage, M.H., and R.D. Lumsden. 2000. Parasitism by design? The surface micromorphology of flatworms. *Creation Research Society Quarterly* 37(2):105–108.

cooling of Earth's crust and the development of the Earth's oceans. The Earth finally cooled enough to allow plant life to evolve on its outer surface approximately 3.4 to 3.5 Ga (Froede, 1999a). Animal life formed on Earth around 2.0 Ga (Froede, 1999b) and life has flourished on the planet since this time.

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The age of the oldest crustal rocks yet discovered on Earth ranges between 3.8 to 4.0 Ga. Age dating these granites and gneisses requires finding constituent minerals that can withstand the changes in heat and pressure experienced over billions of years. Uniformitarian geologists have typically looked to the mineral zircon to satisfy this requirement (Halliday, 2001).

Oldest Rocks on Earth

Recent work in Western Australia by uniformitarian geologists appears to support the Genesis account of Earth's creation. Using zircons taken from within the Narryer Gneiss, a team of scientists has discovered what they believe to be the oldest crustal rocks on Earth (Wilde, Valley, Peck, and Graham, 2001). The age-dating of zircons by these geoscientists suggests that these metamorphic rocks are between 4.3 and 4.4 Ga. Moreover, they are thought to be derived from still older preexisting rock. This places them very near the time of formation of Earth, and significantly changes the way scientists presently view the origin of our planet.

Age of Earth's Oceans

Analysis of the zircons from the Narryer Gneiss has led another group of scientists to report what they believe to be the earliest evidence of liquid water on our planet at 4.3 Ga (Mojzsis, Harrison, and Pidgeon, 2001). Evolutionists have made an important case for the need of liquid water on Earth in order to account for the origin of life on our planet. Accordingly, Harrison (2001) claims that:

There was a source of energy: the sun; a source of raw minerals: complex organic compounds from meteorites or comets; and our inference that liquid water existed at or near the Earth's surface. Within 200 million years of the Earth's formation, all of the conditions for life on Earth appear to have been met.

Additionally, Mojzsis (2001) stated that:

The stage was set 4.3 billion years ago for life to emerge on Earth. There was probably already in place an Earth with an atmosphere, an ocean, and a stable crust within about two hundred million years of the Earth's formation.

These researchers believe that evidence of water on the planet at this time provides the potential for the rapid development of life through spontaneous generation from inert chemicals. However, not all is well for existing uniformitarian models as these new discoveries drastically impact existing concepts regarding Earth's ancient atmosphere, the origin of the Moon, and the rate that Earth cooled, once formed. Many serious questions will now be raised by uniformitarians to challenge this new information as well as older model assumptions.

Discussion

The Genesis account of Earth's creation never places it in an initial molten state. Rather it was created from nothing (see Kelly, 1997) and was covered in water (both liquid and vapor). God separated the liquid and vapor phases, and then He formed basins on Earth's surface to contain the liquid water and expose dry land.

This new uniformitarian information regarding the age of Earth's oldest crustal rocks along with the existence of oceans at a very early date appears to completely support the Genesis account of creation (realizing the differences in young-earth versus old-earth ages). Uniformitarians have found dramatic evidence using zircons for the unbelievably rapid cooling of Earth. Young-Earth Creationists (YECs) should use this information when discussing Earth's origins with uniformitarians. However, I would advise great caution since this work remains preliminary and subject to criticism from those who accept uniformitarian doctrine. These new discoveries hit devastatingly at the core of the uniformitarian model of Earth's origins, and I urge hesitation for YECs who wish to cite this latest information in support of our Biblical framework.

Caution Within the YEC Framework

The YEC framework regarding the age and development of Earth is completely in opposition to that proposed by uniformitarians. Uniformitarians and evolutionists use rocks and fossils to define Earth history, while we start with the Biblical account and then look to the rock and fossil record.

In following the Biblical account, YECs assert that the majority of Earth's sedimentary deposits formed during the Flood. However, there have been differences in defining the underlying basement, composed of igneous and metamorphic rocks. Personally, I believe that many metamorphic and igneous (intrusive and extrusive) rocks formed during the Flood due to the intense heat and pressure experienced by Earth's crust during this global cataclysm (Froede, 1995a; 1997; 2000; Froede, Howe, Reed, and Meyer, 1998). As such, I would propose that we interpret the origin of basement rocks cautiously in attempting to deduce their point of origin either during the Creation Week or Flood Event Timeframes (Froede, 1995b; 1998).

Dr. Don DeYoung and I (along with several others—see references therein) have proposed that Earth's greatest period of bombardment came not during its earliest development, but rather during the Flood of Genesis (Froede and DeYoung, 1996). Uniformitarians who age-date impact structures in basement rocks would assume that many of them relate to the earliest part of Earth history, while YECs would propose that they occurred during the global Flood of Genesis well after Earth's initial creation.

YECs need to investigate the Narryer Gneiss Complex of Western Australia to determine if these crustal rocks formed during the global Flood of Genesis or if they truly reflect some of the oldest crustal rocks on Earth's surface, formed during the first week of Earth's creation (Figure 1).

Conclusion

The identification of rocks 4.4 Ga in age changes the way evolutionary planetary geologists will look at Earth history. The age dates obtained from the zircons from the Narryer Gneiss Complex of Western Australia force a rapid cooling of the planet if the Earth is only 4.5 Ga old. The rocks alleged to be 4.3 Ga in age which contain evidence (i.e., zircons) of liquid water completely change the manner in which uniformitarians will view ancient Earth. This new information promises to perplex uniformitarian planetary scientists as Earth had only 100 million years to cool down and an additional 100 million years for water to form on its surface. Having liquid water on the planet at this extremely early date provides evolutionists with more time to derive life from nothing but chemicals and minerals if the naturalistic view of origins is correct.

YECs should receive this new information with caution as we have not determined the age of the Narryer Gneiss Complex of Western Australia within the Biblical framework. Our age-dating of these metamorphic rocks could show them to be either original to the Creation Week or formed later during the Flood. Additional investigation of these rocks by YECs is warranted.

Uniformitarians now have tremendous pressure upon them to explain how Earth formed and cooled so quickly. YECs could add that if these rocks are indeed related to the Creation Week they reflect the very onset of God's creation of liquid water and dry land. This is exciting news to use in witnessing to uniformitarians.

Acknowledgments

I am grateful for the review and helpful comments provided to me by Emmett Williams. John Reed also provided helpful assistance in getting this document in acceptable shape for publication. I am thankful for the support I continue to receive from my wife Susan. Glory to God in the highest (Prov 3:5–6).

References

- CRSQ: *Creation Research Society Quarterly*
 Froede, C. R., Jr. 1995a. Stone Mountain, Georgia: A creation geologist's perspective. *CRSQ* 31:214–224.
 ———. 1995b. A proposal for a creationist geological timescale. *CRSQ* 32:90–94.



Figure 1. Africa and the Middle East from space. We can plainly see the dry land adjacent to water. This geomorphic state of the planet (i.e., land above water) has occurred twice in its history, once during the Creation Week, and the other following the global Flood. Uniformitarians commonly confuse these two YECs Timeframes (Froede, 1995, 1998) when examining and age-dating basement metamorphic and igneous rocks. It is incumbent on us to set the record straight in understanding Earth's history from a Biblical standpoint. Photograph courtesy of NASA/JPL.

- . 1997. Xenoliths in Stone Mountain Granite: Evidence for rapid emplacement and cooling of the granitic magma. *CRSQ* 34:36–38.
 ———. 1998. *Field studies in catastrophic geology*. Creation Research Society Technical Monograph Series: No. 7. Creation Research Society Books, St. Joseph, MO.
 ———. 1999a. Precambrian plant fossils and the Hakatai Shale controversy. *CRSQ* 36:106–113.
 ———. 1999b. Precambrian metazoans within a young-earth Flood framework. *Creation Ex Nihilo Technical Journal* 13(2):90–95.
 ———. 2000. Submarine volcanism: Part I—Subaqueous basalt eruptions and lava flows. *CRSQ* 37:22–35.
 Froede, C. R., Jr., and D. B. DeYoung. 1996. Impact events within the young-earth Flood model. *CRSQ* 33:23–34.

- Froede, C. R., Jr., G. F. Howe, J. K. Reed, and J. R. Meyer. 1998. An overview of various igneous rock outcrops near the Van Andel Creation Research Center interpreted within a young-earth Flood model. *CRSQ* 35: 126–133.
- Halliday, A. N. 2001. Earth science: In the beginning... *Nature* 409:144–145.
- Harrison, T. M. 2001. *Liquid water at Earth's surface 4.3 billion years ago, scientists discover*. Accessed 01/22/01: Made available from ScienceDaily at [wysiwyg://7/http://www.sciencedaily.com/releases/2001/01/010111074038.htm](http://www.sciencedaily.com/releases/2001/01/010111074038.htm).
- Kelly, D. F. 1997. *Creation and change: Genesis 1.1–2.4 in the light of changing scientific paradigms*. Christian Focus Publications, Ross-shire, Great Britain.
- McSween, H. Y., Jr. 1999. *Meteorites and their parent bodies*. Second edition. Cambridge University Press, New York.
- Mojzsis, S. J. 2001. *Liquid water at Earth's surface 4.3 billion years ago, scientists discover*. Accessed 01/22/01: Made available from ScienceDaily at [wysiwyg://7/http://www.sciencedaily.com/releases/2001/01/010111074038.htm](http://www.sciencedaily.com/releases/2001/01/010111074038.htm).
- Mojzsis, S. J., T. M. Harrison, and R. T. Pidgeon. 2001. Oxygen-isotope evidence from ancient zircons for liquid water at the Earth's surface 4,300 Myr ago. *Nature* 409:178–181.
- Wilde, S. A., J. W. Valley, W. H. Peck, and C. M. Graham. 2001. Evidence from detrital zircons for the existence of continental crust and oceans on the Earth 4.4 Gyr ago. *Nature* 409:175–178.

Book Reviews

How Now Shall We Live By Charles Colson and Nancy Pearcey
Tyndale House, Wheaton, IL. 1999, 574 pages, \$23

As the title implies, this book addresses God's cultural mandate expressed in Genesis 1:28. Personal redemption through the carrying out of Christ's Great Commission is to be followed by the restoration of communities through the work of redeemed individuals. Belief in a Creator God is basic to such work, and loss of this belief has led to much of the cultural decline we see around us today.

Readers should not be put off by the size of this book. The easy narrative style of the authors' vigorous prose makes it more of a page-turner than the latest paperback fiction, telling of lives, families, and communities which have been transformed:

There emerges a common pattern: Christians who understand biblical truth and have the courage to live it out can indeed redeem a culture, or even create one...The Christian worldview is more consistent, more rational, and more workable than any other belief system. It beats out all other contenders in giving credible answers to the great questions that any worldview must answer: Where did we come from? (creation); What is the human dilemma? (fall); and What can we do to solve the dilemma? (redemption). And the way we see the world guides the way we work to change the world (restoration) (p. 477)

These are the four main divisions of the book, each presented in several short chapters. Part Two, entitled "Creation: Where did we come from and Who Are We?" is a logical, well-documented, and very readable discussion of

research findings on randomness and design in the universe and in living systems. The authors conclude:

The core of the (origins) controversy is not science; it is a titanic struggle between opposing world-views between naturalism and theism. Is the universe governed by blind material forces or by a living personal being? (p. 90).

In Chapter 10, entitled "Darwin's Dangerous Idea" the authors point out that, for most people today, the naturalistic viewpoint has caused such a loss of biblical knowledge and belief that evangelism must start not with the New Testament but with Genesis.

Creation is the first element of the Christian world-view, the foundation on which everything else is built. It is the basis of human dignity, for our origin tells us who we are, why we are here, and how we should treat one another (p. 100).

At the end of the book are extensive chapter notes illustrating the authors' very wide reading and research in making this an authoritative work. There is a list of books for recommended reading under various topics, and an index. This is a much needed book for our times, and indeed should help to redeem and restore our culture.

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***Noah's Flood* by William Ryan and Walter Pitman
Simon and Schuster. 1998, 319 pages, \$25**

The book titled *Noah's Flood* is not about the Flood of Noah. The authors have taken the position that a worldwide Flood never happened and that the myth of such a flood arose because the Mediterranean Sea breached the land link at Istanbul and overflowed into a much lower Black Sea about 7600 years ago. The result was a catastrophe for the people who lived there and many may have died. Others presumably rode boats or rafts until they were able to reach the new shoreline.

Ryan and Pitman begin their book by narrating the activities of Henry Rawlinson and George Smith, two scientists who lived in the middle of the 19th century. Rawlinson's goal was to authenticate cities and kings of the Old Testament. His protégé, Smith, deciphered tablets in the Akkadian language from the ancient city of Ninevah and discovered an independent version of the Biblical Deluge. Ryan and Pitman asked, "Might this mean that the Israelites borrowed a narrative they may have heard when held in captivity in Babylon?" (p. 28).

In succeeding chapters, the authors tell how Smith obtained additional tablets that gave even more details than given in the Biblical account. They say,

Smith recovered additional chapters to the story eventually including portions from all twelve tablets of what we now know as the Gilgamesh legend, of which the deluge was the eleventh tablet (p. 48).

Having established for the reader that the Biblical Flood story was nothing more than a myth appropriated from another culture, Ryan and Pitman go on to show scientific reasons why the people of that time may have believed in the Flood story.

By means of core samples taken at many places in the Black Sea, they give valid scientific support for the belief that the Black Sea once had a shoreline drastically lower than the one at present. They attribute this to melting of large ice caps of North America, Europe and Asia following the last ice age. They say this caused a gradual increase in the level of the Atlantic Ocean and the Mediterranean Sea.

Pitman and Ryan have demonstrated great imagination, as well as good science in this book. Particularly striking

is their version of the moment in time when the Mediterranean Sea neared the summit of the land at the Bosphorus Strait.

By 5600 B.C. the ocean had risen to a height where it stood poised to invade the Bosphorus valley, and plunge to the Black Sea five hundred feet below. Driven by the wind and tide, the waters must have repeatedly washed up onto the top of the divide to fall back... until a final surge began to flow continuously across and down the slope toward the lake... (p. 234).

In the Prologue to the book, the authors even theorized what a witness to the rise of the waters must have experienced as he saw his home flooded and, riding a makeshift raft, watched as the waters rose above the level of the treetops. However, the authors found no conclusive evidence that there were humans living on the shore of the former Black Sea. Also, they fail to include in their Prologue what they later reveal, "The level of the lake began to rise six inches a day..." (p. 235). At that rate, any humans or animals could have walked away from the rising waters.

In an article in *Creation Ex Nihilo Technical Journal* Tas Walker commented that Ryan and Pitman did not correct their carbon-14 dates for the increase in the atmospheric ratio of carbon-14 to carbon-12 following the Flood. When this is done, the estimate of 5600 B.C. becomes 1650 B.C., placing the Black Sea flooding well after the Flood of Noah, estimated at 2348 B.C.

This is an entertaining and instructive book but the reader must recognize the evolutionary viewpoint of the writers.

Reference:

Walker, Tas. 2000. "The Black Sea flood: definitely not the Flood of Noah." *CEN Technical Journal* 14(1).

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***Dinosaurs and Creation* by Don B. DeYoung
Baker Books, Grand Rapids. 2000, 141 pages, \$10**

It is not farfetched to say that dinosaurs have been used extensively as an entrance into accepting evolution. Many bookstores and libraries have multiple listings of books and magazines about these creatures from the distant, misty past. Most of these resources place the dinosaurs into an evolutionary framework, and many of these publications

are aimed directly at children. There are coloring books, picture books, and cute stories, hoping the young readers can identify with the age of the dinosaurs, assumed to be at least 65 million years ago.

In more recent years several several creationist books have been published, bringing balance to this subject. One

new offering is *Dinosaurs and Creation* by Don DeYoung. The book is comprised of 50 frequently asked questions about dinosaurs, together with detailed answers.

DeYoung chairs the Natural Science Division at Grace College, Winona Lake, IN. He is also current president of the Creation Research Society. DeYoung lets the reader know in the introduction that this book presents dinosaur material from a creation perspective. "Clearly the creationist view of dinosaurs presented in this book is at odds with the interpretation of most natural history museums (p.12)," he says, followed by several points defining the creation view. He notes that the "creation view...provides many new avenues to explore (p. 13)." While standing firmly on the creation path, DeYoung encourages readers to understand alternative perspectives on dinosaurs.

Dinosaurs and Creation has five parts: Dinosaurs and History, Dinosaurs and Modern Times, The Dinosaur Family, The Biology of Dinosaurs, and the Physics of Di-

nosaurus. In each section DeYoung includes common and technical questions and answers. The book is intended for "advanced students and older readers (p. 10)" who may already be familiar with the younger level of creationist dinosaur books. There are a few graphics and drawings but the book is largely text.

DeYoung, for example, deals with dinosaurs and radioisotope dating. He also looks at various theories about dinosaur physiology and extinction. There is interesting material on dinosaur eyesight and sounds, and bone deterioration. There are lists of scripture references to dinosaur-type creatures, dinosaur names and meanings, and a helpful glossary.

This is generally an easy-to-read book and will be a helpful resource on the fascinating topic of dinosaurs. It is a worthwhile book for anyone's shelf.

Dan Schobert

What's Darwin Got To Do With It
A Friendly Conversation About Evolution by Robert C. Newman and John L. Wrester
 InterVarsity Press, Downers Grove, Il. 2000, 146 pages, \$10

Robert Newman has a Ph.D. from Cornell in astrophysics, and John Wiester a Master's in geology from Stanford. The authors briefly review some of the major problems with macroevolution in a lively, engaging style. To present their case, the authors use a storyline illustrated with cartoons involving an evolutionist professor and his colleague, the latter who questions major aspects of macroevolution. Among the topics covered include the lack of fossil evidence for evolution, and the argument for atheism from poor design. An example of the latter is the allegation that the Panda's thumb is proof of Darwinism because, some conclude, it is not optimally designed to do its job, but is merely an enlarged wrist bone.

Also covered is the origin of life problem, the source of the genome's information, a discussion of logic in origins, and the importance of analyzing arguments. Evolutionists often define their theory as a change in

allele frequency when actually it is a theory of how natural forces can produce new information, something which the authors show has never been demonstrated and which is contradicted by all known evidence.

Although primarily for junior high and high school students, this work is a good introduction to the many problems of macroevolution for adults. The authors effectively state their case, and aside from a few minor typographical errors (such as the *American Biology Teacher* citation on page 140), the information presented is both accurate and objective. Their presentation effectively shows how untenable macroevolution is, and includes an excellent discussion about mutations and intelligent design.

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Unanswerable Questions

Neo-Darwinian language and conceptual structure itself ensures scientific failure: Major questions posed by zoologists cannot be answered from inside the neo-Darwinian straitjacket. Such questions include, for example. "How do new structures arise in evolution?" "Why, given so much environmental change, is stasis so prevalent in evolution as seen in the fossil record?" "How did one group of organ-

isms or set of macromolecules evolve from another?" The importance of these questions is not at issue; it is just that neo-Darwinians, restricted by their presuppositions, cannot answer them."

Lynn Margulis and Dorion Sagan in *Slanted Truths: Essays on Symbiosis and Evolution*, p. 100.



Fifth International Conference on Creationism 2003

Call for Papers

High quality papers for the Fifth International Conference on Creationism (ICC), Summer 2003, Pittsburgh, PA, are now invited for submission. In continuation of the Fourth ICC, the theme of the Fifth ICC is "Developing and Systematizing the Creation Model of Origins," making the Fifth ICC a "working" conference.

The interested author should write a 500 word abstract of his/her paper, categorize it according to the area classification below, and submit a copy *no later than 14 December 2001* to *each* of the following at their addresses provided below: appropriate Area Liaison, Technical Review Committee (TRC) Chairman, and ICC Proceedings Editor. Early submission is highly recommended. (EMAIL submission of abstracts are acceptable)

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Papers dealing with the age of the earth/universe must be from a young-earth perspective. Papers from an old-earth/old-universe perspective will not be considered.

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Letters to the Editor

Obruchevichthys Adds Support For Creation

Brown (1996) contains the stratigraphic position of Devonian fish and amphibians in a table to which the reader should refer when examining this letter. Brown (1999) also contains a reference to *Elginerpeton* as the oldest known amphibian. This creature is dated at between 370 million years (myrs) and 373 myrs before present (b.p.). Two interesting features of *Elginerpeton* were its feet and legs. The legs are strong enough to walk on land, but its feet are better adapted for paddling in water and point to life in the water. If, as evolutionists believe, it first lived in water and later evolved into a land dweller only to return again to water, much time for evolution would have been required. One would also need to add the time necessary for readjusting again to life in water. The evolutionary time required for all of this would easily go back to about 375 myrs b.p. if not earlier.

Elginerpeton is now joined by another amphibian of about the same "age." The fossil *Obruchevichthys* implies that either these two amphibians split from each other or, even worse for the evolutionary scenario, that they both branched off from other amphibians. All of this would have taken up even more time (Ahlberg, Lukševics and Mark Kurik, 2000, p. 533).

From late Givetian and to middle Frasnian (which lasted from about 380 myrs. b.p. to 372 myrs. b.p.) we are told by Ahlberg and co-workers to look for intermediates between fish and amphibians. This is the very time period that was noted previously to be the origins battleground (Brown, 1996 and 1999). This is because the lungfish would have been giving rise to other fish from about 390 myrs b.p. while *Panderichthys* and *Elpistotege* would have come into existence between 385 myrs and 383 myrs b.p. from the evolutionary point of view. It would have been necessary for their supposedly amphibian connections to have been under way from 380 myrs b.p. on down in time. But with the fossil record from 370 myrs to 380 myrs b.p. being the way it is (and the way it surely must be within the events mentioned in this item) it makes more sense to look for amphibians themselves between 380 myrs and 370 myrs b.p. than to look there for intermediates between fish

and amphibians. This picture presented for Devonian fish and amphibians is one in which time and options have run out. The evolution required could not have taken place and the theory of evolution is thus falsified. On the one hand there were amphibians which clearly must go farther back than the time of 370 to 373 myrs b.p., cutting deeply into the time from 372 myrs to 380 myrs b.p. This quite clearly would rule out any evolution within this short geological time and we cannot go back beyond 380 myrs b.p. for the origin of amphibian because we only run into the origin of the *Panderichthys* from the lungfish stem line. On this picture creation wins in principle. If we find fossil amphibians earlier than 372 myrs b.p. creation would also win in practice. Even if no such fossils are found, however, the fact remains that there must have lived amphibians which go back earlier than this 372 myrs b.p. marker. This is undeniable. Even though this clear-cut situation against evolution theory exists in principle, I do not believe this will bring about any changes at present in evolutionary thinking. But some changes may be forthcoming in the future. In any case, stating the truth as I do here is like pointing to the folly of the emperor's new clothes: the theory of evolution is stripped of all credibility regarding the supposed origin of amphibian from fish.

References

- CRSQ: *Creation Research Society Quarterly*.
 Ahlberg, P.E., E. Lukševics and E. Mark-Kurik, 2000. A near tetrapod from the Baltic Middle Devonian. *Palaeontology* 43:533-548.
 Brown, C. 1996. Devonian fish and amphibians and the gene-theme model. *CRSQ* 33:13-15.
 ———. 1999. *Elginerpeton pancheni's* costly walk through time. *CRSQ* 36:161

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Clays and Basalt Clarify Stratigraphy

One perennial impedance to progress in historical geology is the notion that the existence of one seeming plausible explanation for the genesis of a given deposit establishes the veracity of that explanation. It sometimes takes a great deal of contrary evidence to convince geolo-

gists that more than one mechanism may produce a given effect or that another mechanism may be more plausible (Oard, 2000). These questions often arise in stratigraphic debates. Bowden (2000) argues for a hydrothermal origin for clays, and certainly anyone who has familiarity with

many metallic orebodies knows that clays are often found as apparent alteration products in such deposits. However, Froede (1995; 1996) and Williams *et al.* (1998) showed how extensive clay strata may have formed as the result of diluvial volcanic activity. Chemical weathering may also have been much faster during the Deluge. More than one mechanism is probably responsible for the formation of clays. The same is now evident for extrusive forms of basalt.

Froede (2000) has done us a tremendous service in his review of the current state of research on basalt extrusion. It is not surprising that many extrusive forms that have traditionally been explained as diagnostic of subaerial deposition have now been observed to form in subaqueous environments, since we tend to place undue emphasis on what we can most easily observe. As Froede notes, it has only been in recent years that data from the oceans have been obtainable to determine the veracity of the traditional views of basalt forms. This new knowledge has great implications for stratigraphy, inferred rates of extrusion, and environment of deposition. This paper is labeled "Part I"—I hope there follows a Part II! I see at least a few important areas of research: welded tuffs and similar rocks (Froede, 2000, p.23), extension to andesitic and rhyolitic extrusives, and joint propagation in columnar flows.

References

- Bowden, Malcolm. 2000. Assessing creationist stratigraphy (CRSQ 36:51-60) and the formation of clay. *Creation Research Society Quarterly* 37:22-35.
- Froede, Carl R., Jr. 1995. A post-Flood (early ice age?) paleoenvironment in Mississippi. *Creation Research Society Quarterly* 31:182-186.
- _____. 1996. A theory for the volcanic origin of radioactive shales and clays: examples from the southeastern United States. *Creation Research Society Quarterly* 33: 160-168.
- _____. 2000. Submarine volcanism: Part I—subaqueous basalt eruptions and lava flows. *Creation Research Society Quarterly* 37:22-35.
- Oard, Michael J. 2000. Beware of paleoenvironmental deductions. *Creation Ex Nihilo Technical Journal* 13:13.
- Williams, Emmett L., Robert L. Goette, William G. Stark and George T. Matzko. 1998. Fossil wood from Big Bend National Park, Texas (Dawson Creek region), Part V—origin and diagenesis of clays. *Creation Research Society Quarterly* 35:31-38.

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Questions about Clay-Size Particles Formed During the Flood: A Reply to Mr. Bowden

In a recent article in the *Creation Research Society Quarterly*, Mr. Bowden (2000) stated that existing creationist geologic models suffer serious flaws in defining the source of clay-size particles. He stated that the formation of these particles could not have been derived from the grinding of rocks and I would agree with him to a certain extent - it depends on the types of minerals composing those "rocks." For example, the grinding and weathering of feldspars from both igneous intrusive (granite) and/or extrusive (rhyolite) sources would readily and rapidly yield clay minerals (i.e., kaolins, montmorillonites, smectites, etc.) which would contribute abundant clay-size particles into an aqueous environment. Clearly we have evidence that there was volcanic activity during and following the global Flood which would have contributed significant volumes of feldspar-derived clay-size particles in many areas.

Hydrothermal Origin of Clays

Mr. Bowden offered his idea (which he cited as originating from "Stanton") whereby hydrothermal activity (which actually is one type of volcanic setting) would provide the best and most likely singular source of clay-size particles in the global stratigraphic record. Mr. Bowden stated:

I am convinced that the vast majority of both pre and post-Flood deposits of clay and granular materials was the result of hydrothermal water (HTW - or super-critical water) bringing up vast quantities of the various dissolved minerals which then spread out over the ocean floor, engulfing the various sea creatures and eventually land animals that it overcame. The extremely fine clay particles are the result of chemical reactions between the sea water and the HTW, and cannot be of erosion.

He further stated:

HTW is the only source that can provide anywhere near an adequate explanation of the many problems that face geologists, particularly creationists, who must deposit vast quantities of very fine material in a very short period of time.

Resolving the Clay-Size Particle Issue

As a young-earth creation geologist I was not aware that the formation and/or occurrence of clay-size particles was such an important and unresolved problem in creation geology. I appreciate Mr. Bowden bringing this to my attention. I believe that the answer is very simple. Most of the

clay-size particles found in the global stratigraphic record were derived from pre-existing clay size particles originally formed during the Creation Week. While Mr. Bowden's HTW theory could explain some of the marine clays found in mostly deepwater settings, it cannot explain all of them.

Particulates derived from hydrothermal vents on the seafloor typically include more than just clays, they also include metals and silicates. In fact, most of the world's precious-metal ore bodies are believed to have been formed in a hydrothermal setting (this fits very well into our Flood model!). So, to invoke this setting without the associated precious metals raises serious questions as to whether this was the original setting or merely a contrivance intended to address a unique stratigraphic situation within the uniformitarian framework.

I suggest that Stanton is addressing this "clay problem" within the context of uniformitarianism as most clays would slowly settle out of water, lithify, and not be available for widespread dispersion over the purported millions of years of earth history. It is the uniformitarian model that has a problem with an abundance of clay-size particles, especially where clay-size particles are believed to have rapidly buried paleocommunities in either deep or shallow water.

In deep-water oceanic settings which are common sites for hydrothermal vent activity, clay-size particles derived from the continents would be rare to nonexistent. The main particles settling to the seafloor in this environment would be the siliceous and calcareous shells of microorganisms. Stanton must account for clastic clay-size particles instead of the diatom and foram tests which would be expected in this deep water setting. As it takes clay-size particles hundreds to thousands of years to settle out of water in their model of earth history, this does not readily lend clay-size particles as agents for rapidly burying anything! So, Stanton must invoke this special type of setting to explain the rapid burial of a past community using clay minerals and clay-size particles.

Conclusion

The Flood was a period of high-energy geologic processes and while there likely is a role for the formation of clay-size

particles from hydrothermal sources, I believe that most of these particles were derived from pre-existing sources. God created antediluvian environments that would have contained clay-size particles which later became suspended with the onset of the high-energy global Flood. Young-earth creationists thus have a tremendous source of clay-size particles - the antediluvian earth. The sudden flocculation of these water-suspended particles could rapidly bury and smother any paleocommunities lying beneath them.

Uniformitarians must explain how clay-size particles which settle out of water over extremely long periods of time could *rapidly* bury any paleocommunity. This is not viewed as possible or straight forward in their present version of earth history. So, they must create elaborate settings and conditions whereby they can explain what they find in the stratigraphic record. I would be very interested in knowing where the hydrothermal vent was located in relation to the paleocommunity that was buried by clay size particles as this may not be sound reasoning, be technically probable, or even possible. What is the evidence for this elaborate setting? (I readily admit that I am unfamiliar with Stanton's work on this subject.)

Young-earth creationists must be very careful how we invoke uniformitarian concepts and models to explain our Bible-based framework. Many times the "problems" invoked by uniformitarians are specific to their own worldview and not our own. I believe that this is the case for what Mr. Bowden perceives as a problem with clay-size particles in the young-earth Flood model. I thank Mr. Bowden for bringing this Flood related clay-size particle issue to my attention.

References

- CRSQ: *Creation Research Society Quarterly*
 Bowden, M. 2000. Assessing creationist stratigraphy (CRSQ 36:51-60) and the formation of clay. *CRSQ* 37:59.

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More Musings on the Key Largo Limestone

I have followed with interest the exchange between Froede (1999; 2000) and Oard (1999) regarding the formation of the Key Largo Limestone as a coral reef. Some of these differences appear to result, as Froede put it, from "model-driven assertions" (Froede, 2000, p. 68). It may be that the data are insufficient to disprove some of the various natural history scenarios¹. Since science deals with the observable, measurable and testable, it cannot concoct stories

about the past, but it can be useful in disproving them (Klevberg, 1999; Reed 1996). It may be that these data can be generated with additional research.

Froede asserts that the Key Largo represents a coral reef deposit, not an accumulation of coral debris. He cites coral he observed in growth position (Froede, 1999). Begging his patience with this Rocky Mountain landlubber, is this evidence adequate? In a large mass of coral debris, particu-

larly if deposited violently, would not some corals be in the "growth position"? Perhaps the evidence is overwhelming for *in situ* growth. If so, I can be easily educated on this matter.

It is clear from Froede's reply to Oard (Froede, 2000) that considerable uncertainty remains over coral growth rates. Inferred coral growth rates appear to have motivated Froede to lengthen his previous estimates of the time required for modern sea level to be reached after the Deluge (Froede, 1994; 1995; 1997), though as he notes (2000, p. 70), much uncertainty remains. If these rates were known, additional information would be available to disprove some of the natural history scenarios proposed for the formation of the Key Largo Limestone. Which corals are most important? Efforts should be made to pursue Froede's suggested research on "growth rings" from "Pleistocene" corals. Coral growth under controlled conditions should be observed to determine the maximum growth rate. This would enable researchers to place a lower limit on time of formation.

Rucker (1999) and Froede (Rucker and Froede, 1998) provided fascinating information on submerged forest and archaeological sites off the west coast of Florida. Froede explains these as due to eustasy (lowstand during glacial maximum). However, even a slight change in bed attitudes or vertical tectonic motion of the Florida Peninsula could have significantly impacted not only the archaeological sites but also the Key Largo Limestone reef. A tilting from east to west of only 1:10,000 could produce immersion of Key Largo Limestone and exposure of the west coast forest and archaeological sites or vice versa. In previous work in the Florida Panhandle area, Rucker and Froede (1997) documented geologic structures indicative of regional tectonism. If eustasy produced a lower sea level during the time the early postdiluvian settlers made the archaeological sites, then such sites might also exist off the east coast of Florida (assuming it is not precipitously steep). If tectonic subsidence resulted in the submergence of these sites, it may be that the subsidence was not even. Failure to find sites off the east coast of the peninsula disproves neither scenario, though eustasy might be favored by the existence of similar forest or archaeological sites at similar elevations off the east coast. The answer to the tectonics question may be obvious to Froede, but he has not made it obvious to those of us far removed from Florida.

Both Froede and Oard have made important points relative to eustasy and formation of the Key Largo Limestone; however, the role of tectonics has not been addressed, and until the above issues are resolved, an interpretation of the

environment of deposition as comprehensive as Froede's appears premature. It is very likely that research aimed at answering these questions raised by historical speculations about the genesis of the Key Largo Limestone will be useful in answering similar questions from other limestone (and dolostone) formations elsewhere in the world. Coral growth rate experiments, in particular, should be pursued.

References

- Froede, Carl R., Jr. 1994. Sequence stratigraphy and creation geology. *Creation Research Society Quarterly* 31: 138-147.
- . 1995. A post-Flood (early ice age?) paleoenvironment in Mississippi. *Creation Research Society Quarterly* 31:182-186.
- . 1997. The Flood event/ice age stratigraphic boundary on the United States southeastern coastal plain. *Creation Research Society Quarterly* 34:75-83.
- . 1999. The Florida Keys: Evidence in support of slow Floodwater retreat—Part I: the upper keys. *Creation Research Society Quarterly* 35:186-192.
- . 2000. The Key Largo Limestone: correlating physical information to models. *Creation Research Society Quarterly* 37:68-73.
- Klevberg, Peter. 1999. The philosophy of sequence stratigraphy—Part I: philosophic background. *Creation Research Society Quarterly* 36:72-80.
- Oard, Michael J. 1999. A commentary on coral growth in south Florida after the Flood. *Creation Research Society Quarterly* 36:101-102.
- Reed, John K. 1996. A biblical Christian framework for earth history research—Part I: critique of the naturalist-uniformitarian system. *Creation Research Society Quarterly* 33:6-12.
- Rucker, Brian R. 1998. Archaeological and geological evidence of a recent and rapid sea-level rise. *Creation Research Society Quarterly* 35:54-65.
- . 1999. Tree stumps in Santa Rosa Sound. *Creation Research Society Quarterly* 36:71.
- Rucker, Brian R., and Carl R. Froede, Jr. 1997. Archaeological and geological features at Falling Waters State Recreation Area, Florida: A young-earth Flood model perspective. *Creation Research Society Quarterly* 33: 273-284.

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The Speed of Genetic Variation

Recent findings involving work on fruit flies and sockeye salmon have shown that reproductive isolation can occur in fewer than 13 generations (Marchant, 2000, p. 11). What was even more interesting is that these groups of creatures were rapidly diverging, even when they lived together in the same place. It was thought that creatures would usually need to be isolated by some form of geographical barrier before reproductive isolation could occur (allopatric speciation).

A few years ago another view was dispelled when it was shown that population bottlenecks enhance a species' genetic resources (Lewin, 1990, p.32). A large part of variation is made up of a change in color, size and shape. Examples of this can be seen in the many forms of antelopes, gnu, and indeed many other life forms. Just three genetic changes separate the two species of monkey flowers found in North America. One species is pollinated by bumblebees and the other by humming birds (O'Brian, 1995, p. 17)

To show just how close certain life forms are and how reproductively isolated others can be, the following examples are offered. The lion with the tiger, the one-humped with the two-humped camel and the North American bison with domestic cattle can all produce fertile offspring (Altman and Dittmer, 1962, p. 127). The dromedary camel has been successfully crossed with the llama (Ingham, 1998, p.15). And yet mere subspecies or races of leopard frogs have produced no offspring at all (*Joy of Knowledge* 1990, p. 599). All of these data show that it is quite possible all the variation we see of in land life kinds

could have arisen since the time from Noah. It may not be possible to prove this time element outright, because a water canopy, for example, must have played some part in affecting the carbon 14 which would give false ages and therefore a wrong slant on the speed of variation involved.

As our knowledge of genetic change grows it seems to bring with it a change in views that were previously held before. It is clear that we still have a lot to find out yet about the speed of genetic change. Things are more in our favor as creationists, however, than anyone had once realized.

References

- Altman, P. and D. Dittmer, 1962. Growth including reproduction and morphological development. *Biological Handbooks*. Federation of American Societies for Experimental Biology, Washington, D.C.
- Joy of Knowledge*, 1990. Oriole Publishing, Griffin House, London.
- Lewin, R. 1990. Population "bottlenecks" enhance a species' genetic resources. *New Scientist* 125(1703):32.
- Marchant, J. 2000. Darwin strikes back. *New Scientist* 168 (2262):11.
- O'Brian, C. 1994. From bees to birds in three steps. *New Scientist* 147 (1994):17.
- Ingham, J. 1998. I'm a cama... part camel, part llama. *The Express* January 21, London.

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An Exhortation for the Correct Use of Words

Through sufficiently frequent misuse, words may actually change their meaning and become accepted in this new meaning. An example of this is the word "determine." We do not determine the distances to various galaxies. They already are determined. We try to find out or ascertain the distances.

An example that is grating upon the sensitive ear is the very common substitution of "like" for "as." Example: "We don't think about the creation-evolution issue like most people do."

An inexcusable error is using the word "phenomena" as singular. It is plural. The singular is "phenomenon."

Probably even more common is using "data" as singular. It also is plural. The singular is "datum."

Too many people who should know better write of the "five senses." There are seven physical senses. The other two are the sense of temperature and the muscular sense. Example: The closed boxes are identical, but one is empty and the other is filled with rocks. How tell them apart? Push or lift them.

Speaking of physical senses, there is an anecdote about a famous English writer—I don't remember which one—who was a stickler for accuracy. When a woman said to him, "Oh, Mr. _____, you smell!" He corrected her, "Madam, you smell; I stink."

Bolton Davidheiser

The CCC Model and its Geologic Implications by Robert E. Gentet

Gentet's article on the CCC model in the June 2000 edition of the Creation Research Society Quarterly is based on the belief that Flood geologists have "that pre-Flood geologic activity was insignificant" [abstract] and "that much happened geologically during Creation Week." (p. 29)

I find that premise hard to believe for the following reasons.

The creation days we believe are 24 hour days. In each day God is producing something, i.e., He is building something up. The CCC Model has erosion that produced strata at the same time God is building up the earth. Those two operations certainly cannot happen at the same time. And with the days only 24 hours long, erosion would be impossible, especially when we are told that "God had not caused it to rain on the earth" (Gen. 2:5)

Genesis 2:10 has an amazing statement. "Now a river went out of Eden to water the garden." I don't think the implications of that statement have ever been appreciated. How can a river water the whole garden? While the verse mentions the garden, this method of watering must have

extended over the whole earth. It's inconceivable that the whole earth would be watered from above and just Eden would be watered from underground. Therefore millions of rivers must have been placed around the earth to water the whole earth.

To water the whole earth from underground there would have been worldwide deep reservoirs which had to be the Bible's "Fountains of the great Deep" (Gen. 7:11) which were broken up to start the Flood.

The creation when done was pronounced "Very Good". (Gen. 1:31) It does seem strange that God made something that deteriorated while God was making it. There was no rain until the Flood and if no rain, no erosion, no new strata.

I need these objections cleared before I can embrace the CCC Model.

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Response from Robert Gentet

Mr. Peterson raised some questions regarding my CCC (Creation/Curse/Catastrophe) model paper (CRSQ 37:10–21). First was my mention of "strata present that had been formed during Creation Week." My paper did not state how God formed such strata. It may have been supernaturally or it may have been thorough "natural" processes. We know from Scripture that the earth was covered by water until God caused dry land to suddenly appear on the third day (Gen. 1:9–10).

Also, St. Peter was inspired to tell us that other portions of Scripture say "the heavens existed and *the earth was formed out of water and by water* (II Pet 3:5)." Building up the earth with various layers is a very positive event. Such layers are building blocks for future use, just as surely as any other resource God placed within the earth during Creation Week or later. From an economic point of view, sedimentary rocks are extremely important, such as sand and gravel for construction, building stone, clay for bricks and ceramics, etc.

Although much of the Precambrian rocks seem to have been greatly altered since their beginning, others still appear relatively untouched by earth processes. (Remember that some of the Precambrian rocks seem to date after the Curse begins, although most seem to date from Creation Week.)

For example, some Precambrian rocks present an interesting picture for my CCC model. Alt and Hyndman (1989, p. 52) note:

The Precambrian sedimentary rocks of northern Idaho... superficially... look like ordinary sandstones, mudstones, and limestones... But, ...a longer and more thoughtful look at the Belt formations reveals all sorts of peculiarities. For example, Belt sedimentary rocks contain much less clay in proportion to silt and sand than do most younger rocks. Did minerals not weather into clay a billion years ago? Evidently not. The silt and sand show little or no evidence of having moved before the wind. Did no wind blow a billion years ago? if so, the rocks contain no evidence of it, Belt rocks contain no animal fossils. Were there no animals a billion years ago? Apparently not.

This sounds as one would expect for strata created during Creation Week. They are at the bottom of the heap and what we would expect in the lifeless Earth of the early Creation Week.

Arid then there is the matter of Genesis 2:5. My understanding of this verse (and the ones that follow) gives me ample reason to say they speak of the beginning of the rain cycle. The Bible indeed says that God had not caused it to rain upon the Earth, but also quickly adds, "there was no man to till the ground."

This would limit the time of no rain from the third day until sometime just before man's arrival on the sixth day—not the entire pre-Flood era. I see the sense of the verse as follows: "For the LORD God had not [yet] caused it to rain on the earth, and there was no man to till the ground [but

one was soon created to do so]; but a mist *went up* from the earth and watered [that is, through rainfall] the whole face of the ground.”

Some confusion has arisen over the exact meaning of the Hebrew word *ed* translated “mist” in Genesis 2:5 by the KJV, RSV, and others. The NIV, for example, translates the Hebrew here as “streams.” It is true that Genesis 2:10 speaks of “a river [that] flowed out of Eden to water the garden, and there it divided and became four rivers” [not “millions,” I might add].

There can be no doubt that this river, as well as present day rivers, irrigated nearby plants. But, a river ultimately has its source through rainfall! We should not suppose that the earth would sustain plant [and hence, animal] life if it did not rain and all the earth depended upon rivers which somehow flowed without rainfall.

The parallel verse to Genesis 2:5 using the same Hebrew word *ed* (translated “mist”) is Job 36:27. It is interesting to notice that this companion verse in Job leaves little room for doubt as to the meaning of this Hebrew word: “For He draws up drops of water, which distill as rain from the mist [*ed*].” Water evaporates from the oceans [“goes up”] and the clouds [composed of mist] give us rain. Rain forms and falls from the clouds (composed of “mist” [*ed*]). Thus, Genesis 2:5 would be significant in telling us the beginning of the hydrologic or water cycle. And that beginning is before man’s creation. Noah (nor anyone else of the pre-Flood earth) appears not to have had any difficulty in understanding rainfall. The problem was with repentance and a change of life.

The hydrologic cycle is also aptly described in Ecclesiastes 1:7: “All the waters run into the sea, yet the sea is not full; to the place from which the rivers came, there they re-

turn again.” If it did not rain before the Deluge, as some believe, where did the water come from for all the rivers of that pre-Flood time and why did the oceans not “fill up”?

In addition, the geologic record supplies us with evidence that rain has been common on the Earth from its earliest times. Raindrop imprints are found in geologic sequences of strata in all areas of the earth. This witnesses the longevity of rainfall on the earth since Creation Week when Genesis One indicates that God began the hydrologic cycle shortly before Man’s creation to insure a continuous source of water for the land, the rivers and the lakes.

None of this, of course, overlooks underground reservoirs of water, but once again, how did such reservoirs originate? Or, perhaps better yet, how are they recharged? Certainly today in the rechargeable aquifers it is through rainfall. When it rains the levels go up, when there is drought (as we have in various areas now), the levels go down.

There also seemed to be the implication that only rainfall can cause erosion. Such is not the case. Great erosion can take place under other circumstances, apart from rainfall, such as is witnessed by the phenomenon of underwater turbidity currents, to use only one example.

Reference

Alt, David D. and Donald W. Hyndman. 1989. Roadside geology of Idaho. Mountain Press Publishing, Missoula, MT.

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Book Review

Jonathan Park and the Secret of the Hidden Cave by Sandy and Pat Roy
Master Books, Green Forest, AR. 1999, 110 pages, \$9

Jonathan Park and the Secret of the Hidden Cave is an exciting adventure. The authors, Sandy and Pat Roy, both work at the Institute for Creation Research. Sandy is a receptionist, and her husband Pat is Radio Director. This is the first book in a planned series. The title character is 10 years old, and the book is written for children about that age. It is designed to give them a creationary perspective rather than an evolutionary view.

I am 11 years old and I love this book! I have read many books and I would rate this in my top ten. In this story, Jonathan and his father are forced off the road by a fallen tree, and they take refuge in a cave. Some other people soon join them in the cave. One of them, Jessica, goes off with

Jonathan and makes an exciting discovery. I won’t spoil the surprise; you will have to read it yourself. They later return and find that someone is trying to destroy what they found and them as well.

Along the way I learned how dinosaurs are related to the Bible, how the Flood could have made fossils and caves, and how dragon legends show that people lived with dinosaurs. But of course evolutionists think that dinosaurs died 65 million years before people existed. I highly recommend this book for all ages.

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Creation Research Society

History—The Creation Research Society was organized in 1963, with Dr. Walter E. Lammerts as first president and editor of a quarterly publication. Initially started as an informal committee of 10 scientists, it has grown rapidly, evidently filling a need for an association devoted to research and publication in the field of scientific creation, with a current membership of over 600 voting members (graduate degrees in science) and about 1000 non-voting members. The *Creation Research Society Quarterly* has been gradually enlarged and improved and now is recognized as the outstanding publication in the field. In 1996 the CRSQ was joined by the newsletter *Creation Matters* as a source of information of interest to creationists.

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2. All basic types of living things, including humans, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.

3. The Great Flood described in Genesis, commonly referred to as the Noachian Flood, was a historical event worldwide in its extent and effect.

4. We are an organization of Christian men and women of science who accept Jesus Christ as our Lord and Savior. The act of the special creation of Adam and Eve as one man and woman and their subsequent fall into sin is the basis for our belief in the necessity of a Savior for all people. Therefore, salvation can come only through accepting Jesus Christ as our Savior.