

I am sure there is material in Jonathan Sarfati's article which will be helpful in giving my primary school students a reasonable answer, although it might not be appropriate to give them Jonathan's article to read.

May I be permitted to express Jonathan Sarfati's article a little differently?

There are three possibilities :-

- (1) God, Who created the Universe, has always existed, as the Bible says.
- (2) The Universe itself has always existed, although it may change within itself over time.
- (3) The Universe sprang into existence from nothing (for example, quote 24 in **The Revised Quoted Book**).

If we choose the second of these alternatives, we are denying the inescapable conclusion from the laws of thermodynamics that the Universe is not infinitely old. We thus have to ignore what Eddington said was one of the most certain conclusions of science.

If we pick the third alternative, we are choosing something we know is unreasonable, as Jonathan Sarfati has said, because: *'Everything which has a beginning has a cause'*. Indeed, denying this is very serious. Consider this: According to Dr Kurt Wise as quoted in the article 'A philosophical attempt to define science',¹ one of the important presuppositions of science (number 5, in his list) is that we live in a cause and effect world. It is necessary to believe this, to gain any scientific knowledge. If we deny it, **all** established scientific results are in doubt, as Jonathan Sarfati pointed out.

Therefore the first alternative seems entirely reasonable; and philosophers of science had better be very wary about trying to rule such a possibility out of court with a definition of science that precludes the supernatural.

David Malcolm,
Maryland, New South Wales,
AUSTRALIA.

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REFERENCE

1. Malcolm, D., 1997. A philosophical attempt to define science. **CEN Tech. J.**, **11(2)**: 167-180.

EROSION RATES OF ROCK

Dear Editor,

I read with enthusiasm Christopher Chui's article, 'An experiment on the erosion rates of rocks' in CEN Tech. J., 11(3). This is the first time I have seen anything written by Dr Chui, and I hope it will not be the last. This is a field in need of quantitative data, and Dr Chui's thesis that an imbalance exists between erosion and uplift is an important concept. Unfortunately, he fails to establish his thesis.

Dr Chui states that

'erosion rates determined by laboratory and uniformitarian-based field measurements do not agree' (p. 335).

In reading the article, the only 'laboratory' data provided appear to be his own, which I shall address shortly. Field **measurements** should not be affected by uniformitarian bias (though they may); perhaps he means **estimates**. One glaring problem with the research presented is a failure to understand that **erosion** refers to more than abrasion. **Erosion** refers to the combination of weathering and transport that results in removal of earth materials from their *in situ* state. It therefore includes both physical and chemical weathering of rock and unconsolidated sediments, whereby particles are freed from surrounding earth materials and transported by air, water or ice (including mass wasting) away from the point of origin. Dr Chui states that his objective was to determine how long it would take various rocks to 'erode' to 'sand, silt, or mud' (p. 336). He seems to equate erosion with abrasion.

The citations do indicate that evolutionists have seen that a disparity exists between observed rates of

erosion and inferred rates of uplift. Dr Chui has made a good contribution in bringing these citations to our attention.

The experimental method was well documented. Unfortunately, it was crude at best. From my knowledge of Southern California, the 'granites' may not all have been granite, since the Southern California batholith is granodiorite. And what, pray tell, is 'Mexican beach rock'? From Dr Chui's statement that it is metamorphic, from its relative resistance to abrasion and its smooth, dark appearance in the photograph, I guess that it might be a hornfels. One group of pebbles is simply called 'sandstone'. Dramatic differences in resistance to abrasion exist between a lime-cemented argillaceous sandstone and a silica-cemented quartz arenite. Not only were the lithologies not identified, but some of the samples were acquired from lumber yards! This seriously compromises the usefulness of the data. Nor were these lithologies matched to those in areas of Northern California mentioned in the article. The assumption that these pebbles are representative of fluvial sediments in Northern California appears tenuous. Even the abrasion method itself left much to be desired. No theoretical justification for the amount or type of fines and water added was provided. Dr Chui did compare the maximum linear speed of the particles with stream current speeds, but the differences between the rotating motion of the concrete mixer and particle transport in modern rivers were not addressed. There are several other sources of error in his experimental method, but they are not as glaring as these disparities in analogy.

This is not to say this method cannot provide a measure of relative resistance to abrasion. Such experiments have been conducted almost daily for decades in many laboratories, for where there is economic incentive, there are data. Resistance of aggregate to abrasion (typically pavements) is important in

the construction industry. Hence, methods have been devised to test relative resistance to abrasion (for example, the Los Angeles Abrasion Test) and to other physical weathering processes (for example, freeze-thaw cycles) and chemical weathering processes (for example, sulphate solutions). Use of these standard methods allows a great wealth of data to be compared, usually from known borrowed sources where specific lithologies can be identified. The text for the Los Angeles Abrasion Test (ASTM C131) specifically denies a direct quantitative relationship between abrasion in nature and abrasion as measured in the test. This is substantiated by Dr Chui's data, from which one might incorrectly infer that all coarse stream sediments exposed to typical current speeds should disappear within 300 hours!

Dr Chui states (p. 342):

'It is reasonable to assume that the rock types of typical river beds are similar to those under study in this experiment.'

Nowhere has he substantiated this, nor does it appear reasonable to me. He goes on:

'It could also be assumed that the rate of abrasion inside the cement mixer is similar to that found in the upper sections of streams and rivers.'

It **could** be assumed, but it **should not** be!

What Dr Chui seems to be addressing is decrease in stream sediment size due to abrasion. This has been the topic of much study, and it should not be difficult for one to find references under 'fluvial sedimentology' or 'Sternberg's Law'. If incision of stream channels is his area of interest, there are many sedimentology and geomorphology references, as well as areas for field observation and experimentation that could be recommended.

I commend Dr Chui for his enthusiasm and efforts, and encourage him to continue studying this topic. If he wishes to address the reported erosion/uplift imbalance, he will have

to address the entire erosion topic: physical and chemical weathering of *in situ* earth materials, removal via various transport mechanisms, development of drainage systems, erosion of drainage systems, and erosion of interfluves. Differences between headward erosion and downcutting must be addressed, as well as vertical erosion versus lateral corrosion, and the effects of armouring or fine sediment buildup and bedforms. Erosion, like most things in life, is a bit more complicated than it first appears. I encourage Dr Chui and others to pursue this investigation by reviewing existing data and methods, observing extant geologic processes, conducting carefully devised experiments, and working with other Christian researchers in a team effort.

Peter Klevberg,

Great Falls, Montana,

UNITED STATES OF AMERICA.

The Author Replies ...

I appreciate Peter Klevberg's constructive critique of my paper on 'An experiment on the erosion rates of rocks'. However, I would like to make the following comments:

- (1) It is obvious that my experiment is an estimate. It is an estimate for the rapid erosion of various types of rocks. It is true that erosion implies more than abrasion. But in my experiment, abrasion is tantamount to erosion.
- (2) In studying historical science, such as geology, archaeology or astronomy, one must begin with some reasonable assumptions. Without assumptions, one cannot go too far.
- (3) I still stand behind my assumptions. The first assumption is that the rock samples I collected are somewhat similar to those one expects to find on river shores or in strata, ranging from soft rock to very hard rock. My second assumption is that the rotational motion of the cement mixer

approximately simulates fast running water as a result of torrential rain.

- (4) In fact, I predict that, even if I get actual rock samples from the field, the results I will obtain in future experiments will not be very much different from what I have got in my abrasion experiment. As a matter of fact, I plan to obtain rock samples from Northern California or other localities and perform the abrasion experiment again.
- (5) My second assumption is valid because fast-running currents will definitely carry loose rocks on the bottom of fast-running water. This explains why all rock pebbles are somewhat rounded. The time it takes to become sand or mud should be interpreted at the time of torrential rainfall. Since rainfalls are measured in mm/hr, there may be many degrees of torrential rainfall. However, measurements done by other investigators indicate that for stream velocities greater than 100 cm/sec, erosion will occur for rock size diameters between 10 mm and 100 mm. That means that these rocks will roll and abrade each other at the bottom of the river. A moderate rainfall will give stream velocities of about 500 cm/sec. The heaviest rainfall can generate stream velocities of about 1000 cm/sec. Now 1000 cm/sec is equivalent to about 22 miles per hour, which is well below what most cars travel in city streets. Twenty-two miles per hour is illegal highway speed.
- (6) However, large embedded rocks will not move. They are anchored at the bottom or at the side of riverbeds. For this reason, I performed a follow-up experiment. The experiment depicts a column of water of about 1 cm in diameter falling from a height of about 2 metres to create a 500 cm/sec velocity at the point of contact with the rock samples. The results show that the hardest rock samples I had only take about 32 years to

disintegrate into mud or sand, if linear extrapolation is used. If exponential decay curve fitting is applied, then the time to disintegrate is about four times 32 years, or 128 years. It is obvious that nature has never experienced 128 years of continuous torrential rainfall. We must apply some assumptions to understand this figure. If it rains one month a year, then the number of years to disintegrate will be $12 \times 128 = 1536$ years. If it rains one week a year, then the number of years to disintegrate will be $52 \times 128 = 6656$ years. These numbers are very conservative and reasonable. Furthermore, these numbers fall far short of what evolutionists would like to assume.

- (7) Peter Klevberg mentioned that: *'The text for the Los Angeles Abrasion Test specifically denies a direct quantitative relationship between abrasion in nature and abrasion as measured in the test'*. This statement appears self-contradictory. If laboratory data do not have a direct quantitative relationship to field data, then why would anybody waste the time and resources to do the experiments anyway! Another way to interpret the statement is that since evolution cannot tolerate short time-spans for erosion, just toss out all data that indicate young ages. This is exactly what evolutionists have been doing all these years! They cannot face the data contrary to millions of years. They must explain them away.

That is why God has placed us here, to show forth the ways of creation. One of His ways was to use a very short time-span.

Christopher Chui,
Canoga Park, California,
UNITED STATES OF AMERICA.

CAINAN

Dear Editor,

I would point out to Jonathan Sarfati (CEN Tech. J., 12(1):39-40) that my letter (CEN Tech. J., 11(3):328) no more *'blatantly contradicts the inspiration and inerrancy of Scripture'* than does Henry Morris in The Genesis Flood, page 281, which says of Cainan:

'This name is found in some manuscripts of the Septuagint, and Luke may have used them in the compilation of his own record'.

My statement that *'presumably, Luke recorded [Cainan] in Christ's ancestry'* agrees with Morris' suggestion above, allowing for his alternative suggestion that Cainan's presence was due to a scribal error (as illustrated by Sarfati).

I do agree that evangelicals should be concerned with my letter, though take notice of what I say. I will qualify my suggestion that 'Luke's' Cainan is the Kainam of Jubilees, with the concession that it is only a possibility that he leaked in via the Septuagint. Just leave him out of future debates on chronology!

Derel Briarley,
Newcastle-upon-Tyne, England,
UNITED KINGDOM.

The Author Replies ...

There are two possibilities for evangelicals, that is, those who believe in the inerrancy of the 66 books of the Bible in their original autographs:-

- (1) Cainan was in the original and was preserved in some Septuagint manuscripts, but lost from the extant Masoretic manuscripts of the Genesis and Chronicles. Therefore the Holy Spirit, the Spirit of Truth (John 16:13), inspired Luke to copy from it.
- (2) Cainan was **not** in the original just as the Masoretic Text indicates. Therefore the Spirit of Truth would not have inspired Luke to insert a false name. Therefore the

name must have been inserted by an early copyist, so appears in all extant manuscripts of the Gospel as well as some Septuagint manuscripts.

The Morris quote pointed out that (1) was an option (although not the option Morris favours) for an evangelical **provided he believes that Cainan is correct**. This is quite different from Briarley's suggestion that Cainan is an error but was included by Luke all the same. This is not logically possible for any writing inspired by the Spirit of Truth.

Jonathan D. Sarfati,
Brisbane, Queensland,
AUSTRALIA.

DINOSAURS AND THE FLOOD

Dear Editor,

I am quoted in the paper 'Dinosaurs in the Oardic Flood' (CEN Tech. J., 12(1):56).

May I therefore make a couple of corrections. This table of Karl Popper's five stages for scientific progress was summarised by Bryan Magee, one of Karl Popper's advocates, not by myself as stated in Robinson's paper. I merely quoted from Magee. Furthermore, I quoted this summary of Popper's five stages for scientific progress because I wanted to express disagreement with it, not because I wanted to endorse it. I think that these facts were expressed adequately in my paper, and the point needs to be made that authors ought to take proper care in referencing other material.

David Malcolm,
Maryland, New South Wales,
AUSTRALIA.