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WHAT ABOUT THE ZONATION THEORY?

CLIFFORD L. BURDICK *

Some creationists, taking it for granted that the existence of a geological column in the fossil record is well established, have proposed the theory of zonation as a way in which such a column could have been established in a relatively short time. The author proposes, however, that it is not necessary to account for the universal existence of a geological column, for it does not exist universally. Thus Creationist Geology may be relieved of the job of trying to account for a phenomenon which in fact does not exist in any world-wide or universal way.

Since the theme for this issue is "Creationist Thinking in 1976", this may be also a good time to do some re-thinking–about things which creationists have perhaps been taking for granted. May I suggest that one topic on which some re-thinking may be in order is the notion of zonation?

As readers will recall, zonation has been considered an alternative to or corroboration of the geological column. The geological column was the (often assumed) order of occurrence of fossils in the rocks; and according to uniformitarianists represented the historical order of the evolution of the creatures which produced the fossils.

Those who have held the theory of zonation have allowed the evolutionists' order of fossils for the most part, but differ in the interpretation. They believe that the fossil record covers, at most, a few thousand years, rather than 500 million or more years. Moreover, and most important of all, the order does not represent that in which the creatures evolved, for they did not evolve at all. Rather, the order is the order of burial.

Marine life was buried first, as mud flowed into the oceans; and the resulting rocks are those called Paleozoic. Later, as flooding continued, lowlands and swamps were flooded, and creatures, such as dinosaurs, living in such places were buried. The resulting deposits are those called Mesozoic. Still later, the uplands, inhabited by mammals, were flooded; and the deposits from them are those called Cenozoic. Thus the (supposed) order of fossils was explained in terms of Flood geology.

It is quite likely that there has been some zonation, in some places and in some cases. But may I suggest that recent discoveries make it appear that zonation was by no means universal, and that it is not needed to explain the order of fossils generally?

Recent studies of fossil spores, in rocks from the Grand Canyon and elsewhere, have shown that Conifers, belonging to Gymnosperms, have been dominant back to the Permian, and even back to the Precambrian Proterozoic, which is often alleged to be more than a billion years old.[1]

The geological column is also commonly interpreted to include a gap of 80 million years between the extinction of the dinosaurs at the close of the Cretaceous and the appearance of man within the last million years or so. The theory of zonation will likely include such a gap in the rocks, although not such a long period of time. But there is now evidence to indicate that man co-existed with the dinosaurs, as well as with the sabre-toothed tigers or other giant felines.[2]

Galully, a leader in geology, has remarked that a theory can be wiped out by one sound line of evidence which contradicts it. I firmly believe that the dominance by the geological column is becoming a thing of the past. The theory of zonation, then, if too closely tied to the geological column, might go down with it. For there is other evidence, too.

Not only have fossil conifers been found in the Precambrian, but also Angiosperms, the flowering plants, claimed by evolutionists to have evolved in the Cretaceous. The U. S. Geological Survey** has discovered fossil arthropods in Sierra Ancha Mountains, of Arizona, in rocks considered to be Precambrian, and over a billion years old. According to conventional views, this is about half a billion years too early for such fossils. Other fossil arthropods have been found in rocks, of the Keweenewan formation, ascribed to Precambrian, Proterozoic, times, on the south shore of Lake Superior.***

Moreover, it is only by alleging that rocks have been thrusted one over the other, in formations such as the Lewis or the Glarus, that uniformitarianists are able to continue to hold the notion of the geological column at all. But there is no independent evidence that these formations are overthrusts; in fact, the evidence shows otherwise. So to depend on this allegation of overthrusting is to indulge in a circular argument.[3]

What can be concluded from all of this? I suggest that the following are in order:

(1) The complete geological column does not exist in the rocks; it exists, if at all, in the geologists' minds, in textbooks, and in museums.

(2) There is no necessary connection between the assigned age of a rock and the kinds of fossils found in it.

(3) Hence all of the creatures represented by fossils could have lived at the same time, or at not very different times.

(4) Likewise, much of the rock which geologists study must have been laid down at about the same time, and that in a relatively short time, certainly not a billion years.

(5) And this is just what one would expect to find, granted that there was a world-destroying Flood a few thousand years ago.

(6) Thus, while zonation likely occurred here and there, and we may study cases in which it seems to have occurred, there is no need to invoke it as a general explanation of the nature of the rocks.

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**Dr. Don Elston of the United States Geological Survey presented this evidence in a lecture at the University of Arizona. Also, I have a tape of a lecture Dr. Elston delivered at California Institute of Technology on this data.

***Date from Dr. Anderson of Texas (Midland).

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THE PRECISION OF NUCLEAR DECAY RATES†

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It is commonly supposed that radioactive isotopes decay in a strictly exponential way, so that the process can be characterized by a half-life; and that the half-life depends only on the isotope, not being influenced at all by surroundings. Now both of these assumptions are challenged: it is questioned whether the decay is always strictly exponential, and there is evidence to show that in some cases at least the decay may be influenced by the surroundings, or by something else external to the nuclei. The importance of this possibility in trying to establish ages with the use of carbon 14 is obvious; and the question is of first-rate importance for physics generally.

Introduction

Each of the 1600 known radioactive isotopes has a characteristic rate of decay measured in terms of half-life, $t_{1/2}$. This $t_{1/2}$ is defined as the time required for the decay of one-half of the original excited nuclei.

The precision of nuclear decay rates refers to the exactness and constancy of these measured lifetimes. Such precision is a basic assumption of all radiometric dating techniques. In addition this assumption of constant $t_{1/2}$ is stated as fact in nearly every text book which has treated radioactivity since its discovery by Becquerel in 1896.

The high energies involved in nuclear interactions are thought to make nuclear parameters entirely independent of external conditions. However there is growing evidence and awareness that nuclear half-lives are variables rather than constants. Journal editorials[1] and articles[2,3] are mute evidence that nuclear physics remains an experimental science.

The implications of variation of nuclear decay rates in the past and their possible control in the future are great. First, all experimental $t_{1/2}$ measurements must recognize the added parameter of nuclear environment. Much $t_{1/2}$ literature is incomplete because the chemical matrix of the nuclei and the laboratory conditions are not specified. All past and future half-life analysis must take into account variation of results depending on extranuclear conditions.

Second, a re-evaluation of radiometric dating and geochronology is needed. There is strong resistance to this specific challenge because radiometric dating results are much publicized.

Third, the control of the time dimension of radioactivity provides a potential energy source. Short nuclear half-lives could conceivably be lenghtened and long lives telescoped to provide controlled energy release from decaying nuclei. Also the telescoping of long half-lives could rapidly decontaminate radioactive wastes, thus eliminating one of nuclear energy's major drawbacks.

Fourth, in view of the variability of half-life values a study of other physical constants, laws, and assumptions is in order.

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Theory

(1) Half-Life Values: The half-life used to catalog radioactive isotopes may be defined in several ways. In completely random decay events the usual decay equation holds,

$$N = N_0 e^{-\lambda t}. \quad (1)$$

Here N_0 and N are respectively the number of radioactive atoms initially and at a time t. The parameter λ represents the individual decay probability per unit time.

This equation is an approximation since the decay process under perturbation conditions is not random and is not properly described by the Poisson distribution assumed in Equation 1.[4] In the perturbation case λ depends on the nuclear environment, the subject of this paper. Half-life varies inversely with λ,

$$t_{1/2} = \frac{\ln 2}{\lambda}. \quad (2)$$

The nuclear half-life also appears in the Heisenberg uncertainty principle relating energy and time,

$$t_{1/2} \geqslant \frac{h \ln 2}{\Gamma 2\pi} \quad (3)$$

The energy uncertainty Γ is the width of the excited nuclear state before decay. The time uncertainty is just the half-life, related inversely to the linewidth Γ through Planck's constant h. Note that as uncertainty in nuclear decay energy increases due to broadening by extranuclear interactions, the half-life necessarily decreases.

The inequality sign in Equation 3 is needed when the nucleus is perturbed by its environment, the usual case. Thus the equal sign is invalid along with the long-standing assumption that nuclear events are independent of all external considerations. The equal sign only applies in the case of a free isolated nucleus.

Either definition above shows that $t_{1/2}$ cannot be calculated from theory or from other data such as decay energy. It must be measured experimentally and cannot be known exactly.

The neutron is a good illustration of the profound mystery surrounding nuclear decay. Free neutrons have a $t_{1/2}$ of about 12 minutes. However neutrons bound within a stable atomic nucleus become entirely secure and unradioactive. Thus the lifetime of bound neutrons is entirely unrelated to that of free neutrons.