BRISTLECONE PINES AND TREE-RING DATING: A CRITIQUE

HERBERT C. SORENSEN*

While the notion of telling the age of trees by counting rings is an old one, the method has recently come into much prominence through application to the old bristlecone pines in the south-west. Some have claimed, for instance, that the results would serve to settle problems in chronology, and to provide an independent calibration for attempts to find ages from carbon 14. While the method certainly has much promise, the author shows that, at the present, there are very pertinent questions which have not been answered. Thus it would be premature, at the least, to say that results supposed to be obtained from tree rings have to be accepted, particularly if they should conflict with Biblical evidence.

Introduction

The curious ways in which ideas become a part of scientific dogma have been discussed frequently. What I want to note here is that the actual introduction is usually by one or a few persons and usually involves a very narrow deductive idea. Intuitive reasoning by the introducers or others rapidly increases the broadness of the idea, i.e., expands the usefulness of the idea. The usefulness of the idea ultimately determines acceptance or rejection.

Scientific pragmatism demands acceptance of a broadly useful idea even if there are known weaknesses in its origin. In this sense much of what I have to say is irrelevant to the validity of tree-ring dating. That is, irrelevant to scientific chronologists who find dendrochronology of the bristlecone pines very useful in buttressing other chronological theories (radiocarbon, etc.). However, a serious examination of the foundations of the bristlecone pine chronology is justified for those who are curious, critical or confused.

For centuries the rings of trees have been counted as an indication of age.[1] Although this first basic principle of dendrochronology is valid, certain difficulties are known. For example, if several wet and dry seasons alternate in a single year, several rings may become apparent. On the other hand, very dry years may result in missing rings or partial rings (not completely encircling the tree).

There are cases known where as many as 30 percent of the rings are extra rings and other cases where as many as 10 percent of the rings are missing. However, inaccurate counting of rings is not the major problem in dendrochronology.[2]

Obviously a 9,000 year chronology is not established by counting the rings of a single tree. Rather a composite of many trees is formed and the count is based on the composite. Formation of the composite is then the critical problem in dendrochronology. The composite is possible because the *pattern of ring widths* may be distinctive (a signature). If the same distinctive pattern is found in two specimens it is presumed that the similar sections grew simultaneously.

If one of the specimens has rings older than the common pattern and the other has rings younger than the common pattern, combining the two specimens by overlapping the common pattern results in a composite specimen longer than either of the single specimens. Adding a third specimen may allow further extension of the composite.[3] The bristlecone pine chronology was developed by this method and includes very old dead wood samples, as well as living trees.[4]

Validity of cross matching signatures has been well established in specific applications. It has *not* been established in the bristlecone pine chronology. Major difficulties of the bristlecone pine chronology will be discussed in order of significance:

1. ***Cross matching is subjective*** and largely depends on visual inspection and comparison; with statistical analysis *after* a cross match has been identified. The whole thing depends on the judgement of a highly skilled, trained but fallible investigator.

The magnitude of this problem can be assessed by considering the difficulty of matching a specimen with several hundred rings against a composite of several thousand rings. So great is the difficulty in finding cross matches that the wood is *first* radiocarbon dated to determine its approximate location in the chronology.[5]

I have these facts in writing from the original investigators who cite the bristlecone pines dates as being in excellent agreement with radiocarbon dates.[6,7] Of couse they agree. Since the bristlecone pine dates are at least partially determined by radiocarbon dates it is essentially a case of circular reasoning.

A colleague and I, under the auspices of the Geoscience Research Institute, have attempted to circumvent the subjectiveness of cross dating by developing a method for systematically searching for cross matches by computer. Our results have been encouraging and have shown the feasibility of eliminating the subjective element.

2. ***The rings width patterns in the bristlecone pines are not sufficiently distinctive.*** The rings are extremely thin (as many as 100 per cm) with a high percentage missing. (See reference 4). The most distinctive rings are the thinnest and these are of course the ones most likely to be missing. If the very thin rings are removed from any specimen the result is a non-distinctive pattern termed complacent. Complacent specimens are unsuitable for cross matching.

In the case of pine alpha, one of the more famous members of the bristlecone pine chronology, if the nine missing rings are left out the result is a complacent specimen.[8] In fact, nearly half of the components of the bristlecone pine chronology are insensitive and relatively complacent, even with "missing" rings included.[9]

3. ***The entire chronology is the work of one laboratory, the director of which has refused to allow critical study of the raw data.*** It is a fortunate scientist who finds his work of such interest to a colleague that much time and effort is spent in critical appraisal of the work. Because of the far-reaching implications of the bristlecone pine chronology to radiocarbon dating, archaeology, climatology, etc., it is essential that every facet be critically appraised.

I have dedicated a substantial amount of time to such an endeavor but have been considerably hampered by the lack of available data. Refusal by the original investigators to make such data available seems inexplicable. Surely the cause of science cannot suffer by focusing opposing viewpoints on raw data.

Questions

In conclusion, the bristlecone pine chronology is flawed through lack of adequate documentation. Answers to the

*Herbert C. Sorensen, Ph.D., is a biochemist and president of Columbia Laboratories, Inc., Box 45, Corbett, Oregon 97019. He is also a Research Fellow of the Geoscience Research Institute, Berrien Springs, Michigan 49104.

following five questions would substantially clarify the issue:

a. How can a chronology be constructed with a high percentage of complacent specimens?

b. How can specimens with up to 10 percent of their rings missing be cross matched under any circumstances?

c. How can this chronology be used to "calibrate" radiocarbon dating when radiocarbon dating is used in construction of the chronology?

d. If a ring is missing how can it be found, especially when a high percentage of rings are missing?

e. Why is only the final chronology published, with refusal to release the data upon which it is based?

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A CRITIQUE AND MODIFICATION OF VELIKOVSKY'S CATASTROPHIC THEORY OF THE SOLAR SYSTEM

J. C. KEISTER*

Velikovsky's catastrophic theory of the Solar System is briefly reviewed. One of the most serious physical problems of his theory (i.e., that of determining a mechanism for disposing of tremendous orbital energies) is discussed. Specifically, gravitational interaction, electrical interaction and magnetic interaction are each considered, and found to be inadequate to dispose of the required amount of orbital energy.

A modification to Velikovsky's theory is then proposed, which would permit gravitational interaction (electrical and magnetic interactions are still far too weak) to dispose of a far less amount of orbital energy, and still fulfill the ***appearance*** *of what Velikovsky's theory proposes.*

Some theological aspects of Velikovsky's theory are discussed and it is pointed out that whenever the theory and Scripture truly disagree, the theory obviously must be modified. Analyses of such a theory are worthwhile means for developing analytical tools for handling other catastrophic theories.

Background

Velikovsky's theory of the Solar System (which is discussed in his book *Worlds in Collision*) centers around the catastrophes related to the Exodus, the Battle of Jericho, the battle at Beth-Horon, and the seige of Jerusalem by Sennacherib. A brief summary of the theory (described more extensively in *Pensee*)[1] is as follows:

1. Some time before 1500 B. C., Venus was expelled from Jupiter.

2. Venus passed close to the Earth during the time of the Exodus. When Venus first approached the Earth, the fine red dust in its cometary tail gave a bloody hue to the land and sea, which Velikovsky used to "explain" water being turned into blood as the first of the plagues in Egypt. Velikovsky uses other similar phenomena to "explain" the other plagues and happenings of the Exodus.

3. Venus then retreated from the Earth and completed an orbit. About forty years later, when Joshua attacked Jericho, or a little later, at the battle of Beth-Horon, Venus approached again. Great stones were cast on the Earth and the Sun stood still as was recorded in Joshua 10:11. According to Velikovsky, men worshipped Venus to a far greater extent thereafter than they did before these catastrophes took place. For centuries, there was the menace to these people of the close passage of Venus to the Earth.

4. Venus then took an irregular path, and had a near-collision with Mars in the days of Uzziah, king of Jerusalem. Prophesies in Amos are then quoted by Velikovsky as predictions of dire consequences from the close passage of Mars. The first passage of Mars is associated datewise with the founding of Rome in 747 or 753 B. C. A new calendar was formed. Mars and Venus then competed for the allegiance of men. Prophets (Joel, for example) spoke of evil consequences to come.

5. In or about 687 B. C., Mars made a close pass to Earth, and a giant thunderbolt charred the bodies of the army of Sennacherib. The Sun retreated several degrees due to the change in the rotation in the Earth.

6. Finally, after many passes of Venus and Mars, and of Mars and Earth, Venus emerged a tame planet as Velikovsky asserts is the meaning of Isaiah 14:12-17.

A brief summary: Venus was expelled from Jupiter about 1500 B. C. Venus had near-collisions with the Earth and continued to make near-passes until about the 8th century B. C. when it nearly collided with Mars. A period of time lapsed when encounters of the Earth and Mars and of Venus and Mars were observed. Mars then had its final encounter with Venus, stabilizing the orbit of Venus.

Because of the success of predictions based on Velikovsky's theory, (which are outlined in detail in *Pensee*[2]) this theory warrants a serious examination from the physical, historical and Biblical viewpoints. In the present article the physical problems associated with the planetary orbital energy changes are examined. Examination of the physics of the expulsion of Venus from Jupiter (the largest and most severe energy problem) is being considered by the author in a separate study.

The orbital energy problem is basically one of disposing of enough kinetic energy to bring Venus down from its expulsion orbit to its present orbit. In the three sections that follow, the mechanisms of gravitation, electrostatic interaction, and magnetic interaction are respectively considered as means for permitting the various planets (i.e., Mars, Earth and Jupiter) to dispose of the required amount of kinetic energy for Venus.

*J. C. Keister, Ph.D., teaches at Covenant College, Lookout Mountain, Tennessee 37350.