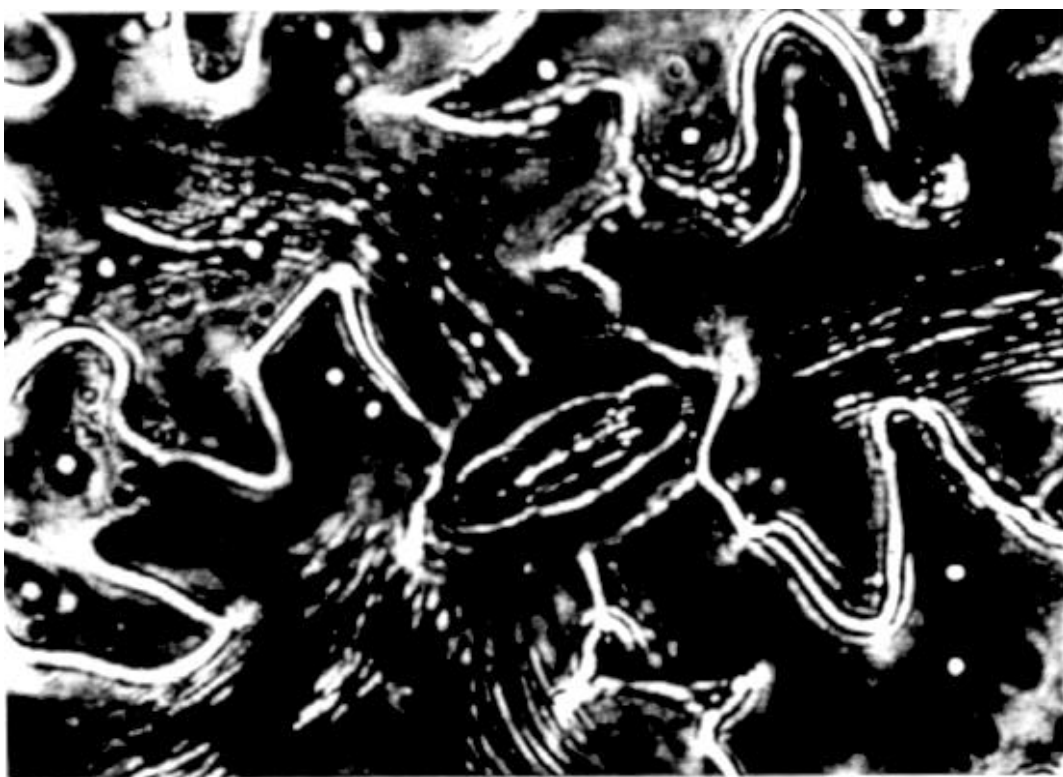


CREATION RESEARCH SOCIETY QUARTERLY



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

CREATION RESEARCH SOCIETY QUARTERLY

VOLUME 9

DECEMBER, 1972

NUMBER 3

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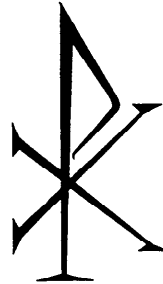


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CREATION RESEARCH SOCIETY

History The Creation Research Society was first 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 real need for an association devoted to research and publication in the field of scientific creationism, with a current membership of about 400 voting members (with graduate degrees in science) and over 1300 non-voting members. The *Creation Research Society Quarterly* has been gradually enlarged and improved and is now recognized as probably the outstanding publication in its field.

Activities The Society is solely a research and publication society. It does not hold meetings or engage in other promotional activities, and has no affiliation with any other scientific or religious organizations. Its members conduct research on problems related to its purposes, and a research fund is maintained to assist in such projects. Contributions to the research fund for these purposes are tax deductible.

COVER ILLUSTRATION

Guard cell pair of Western Sword fern, *Polystichum munitum*. Approx. 800 power. By Willis E. Keithley.

One of the most singular of the devices associated with photosynthetic activity in leaves is the intricate array of stomata, or pores through which gas exchange and water loss take place. These stomate systems are the tiniest and most precise servo-mechanisms ever formed. On the foliage of most plants, countless numbers of these minute "valves" carefully regulate the exchange of carbon dioxide and oxygen by the expansion and contraction of the guard cells surrounding each pore. Each of these stoma is so delicate that six million of these microscopic marvels can be found on a leaf the size of a human hand. These marvels and various problems involved in trying to explain their appearance at all are discussed by Willis Keithley in an essay elsewhere in this issue.

GUARD CELLS, STOMATA, AND DESIGN IN PLANTS

WILLIS E. KEITHLEY*



Figure 1. Guard cell pair and stoma of *Rhododendron californicum*. Approx. 800 power. Willis E. Keithley.

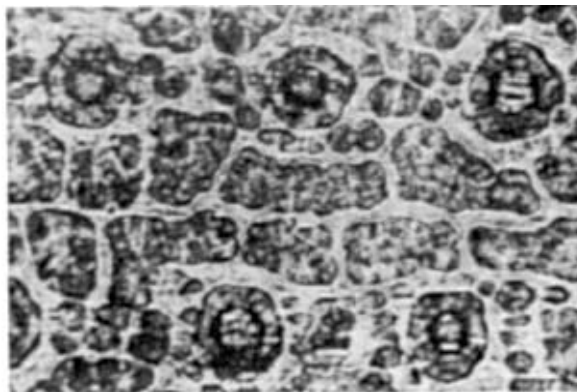


Figure 2. Guard cell apparatus and view of epidermis, *Taxus brevifolia*. Approx. 800 power. Willis E. Keithley.

The enigma of the photosynthetic process has long interested biologists, and though many new avenues of this chemical complexity have been discovered, the plant leaf still retains many secrets. But even if we could understand all the complications of chlorophyll, it still would not minimize the prime puzzle of how such a chemical reaction could have developed. That it could have arisen gradually by progressive expedient and refinement defies all reason.

What a multiplicity of factors would have to be involved in such an adventitious accident to spawn such a contrivance! And as we look at some of the apparatus used by the plant to achieve this photosynthetic miracle, the complex is compounded.

One of the most singular of these devices is the intricate array of stomata, or pores through which gas exchange and water loss take place. These stomate systems are the tiniest and most precise servo-mechanisms ever formed. On the foliage of most plants, countless numbers of these minute "valves" carefully regulate the exchange of carbon dioxide and oxygen by the expansion and contraction of the guard cells surrounding each pore. (See cover illustration and Figures 1 and 2.) Each of these stomata is so delicate that six million of these microscopic marvels can be found on a leaf the size of a human hand.

Several theories have been proposed for guard cell action. No one of them has been fully verified but a classical one includes the following:

a. As light stimulates the photosynthetic activity in the guard cells, it amplifies the sugar content, which increases the osmotic concentration.

b. Use of carbon dioxide during photosynthesis lowers the pH of the cell which enhances the enzymatic conversion of stored starch to

glucose and this also increases the osmotic pressure. Several other chemical trigger systems may be involved also.

c. Water then enters and supplies the pressure which expands the guard cell and opens the stoma. Thus the pores are open in the daytime, allowing the leaf to take advantage of the necessary radiant energy, and at night the process reverses to close them.

One is fascinated by the artistic configuration of these miniature miracles as each kind of leaf has its own distinctive motif of epidermal cells as seen in the accompanying illustrations. But while there is an almost infinite diversity of patterns, there is a resolute consistency of design.

As one contemplates the process by which these vital valves could have developed, several questions demand consideration. How did photosynthesis in the palisade cells occur before the stomata were formed? Since a stoma apparently operates in coordination with that same photosynthetic method, which came first, palisade or guard cell? Was one the product of the other? Did this flawless organization of elements "evolve" through some ephemeral "super-ordinated system" or "psychic pressure"? If so, what evidence is there of prototypes, or discarded experimental forms so necessary to the evolutionary succession of any structural hierarchy?

It would be asking almost too much to assume that any trial and error development or "molecular selection" could have devised such an orderly operation the very first time. Yet this is precisely what would have to happen for any of the leaf's activities to become operative.

Although microscopic in size, these scrupulous stomata point up very distinctly the enormity of the well-known predicament encountered in attempting to trace the progression of evolution through the plant kingdom. But just as distinctly, the precision and functional unanimity of these astute cells affirm the veracity of fiat creation.

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A STATISTICAL ANALYSIS OF FLOOD LEGENDS

JAMES E. STRICKLING*

Many flood legends have survived from all parts of the world. Nearly all of them are variations of the theme in the Biblical account; however, in none of them is there a purity of this theme. They all diverge from the Biblical account in one or more aspects.

Most of the legends fall into one of two general classifications. In one of these a favored family is saved, and in the other the survivors vary in number and relationship. Four of the aspects central to the Biblical account occur in varying combinations throughout the legends in both classifications. Because of the varying combinations, the individual legends cannot be categorized as one specific type or another. However, a statistical analysis indicates the purity of the Biblical account and reveals evidence of subsequent upheavals having corrupted in varying degrees all other accounts.

Introduction

In his book *The Deluge Story in Stone*,¹ Mr. Byron Nelson indicated variations in flood stories from around the world. In Nelson's study and the work of others² certain features of these flood legends may be tabulated and then compared to the Bible record of the Flood. A short statistical treatment of the historical data may yield instructive correlations between certain aspects of the legends—correlations that may shed some light on the origin of the legends and their possible relationship to the central Biblical account.

Consider now a few of these aspects as found in the legends indicated:

1. In thirty-two stories a favored family is saved.
2. In fifteen stories a remnant† survives.
3. In twenty-one stories, a survival is due to a boat.
4. In sixteen stories, other means are responsible (mountain tops, for instance).
5. In thirty-four stories only the flood is mentioned.
6. In fourteen stories other upheavals accompany the flood (Celestial events, trembling earth, fire, etc.)

Of the thirty-two legends in which a family was saved: (a) Eighteen describe survival in a boat (56%), (b) Ten describe other means of survival (31%), (c) Ten indicate a preservation of other seeds of life (31%), (d) In twelve, the family is forewarned (38%), and (e) In seven, there are upheavals in addition to the flood (22%).

Of the fifteen legends in which a remnant survived: (a) Four describe survival in a boat (27%), (b) Seven describe other means of survival (47%), (c) None indicates a preservation of other seeds of life, (d) In two, the remnant is

forewarned (13%), and (e) In nine, there are upheavals in addition to the flood (60%).

These aspects are tabulated to facilitate comparison:

Table I

	Means of Survival: Boat/Other Means	Other Seeds of Life Preserved	Survivors Fore- warned	Other Upheavals
Family				
Saved	56%/31%	31%	38%	22%
Remnant				
Survived	27%/47%	0	13%	60%

A hypothesis can be proposed based upon the above information and a statistical test applied to determine its acceptability. The test employed here will be the Chi-Square Test³. This will by no means be conclusive; the primary shortcoming will be the limited amount of data available. However, even with extensive data, conclusions based on statistical analyses must necessarily be qualified by a statement regarding the probability of error. Additional data would serve to reduce this probability.

The attributes displayed in Table I will be considered individually, and a general conclusion will subsequently be suggested.

Means of Survival Analyzed

Looking first to the means of survival, we will attempt to show that survival by boat is contingent upon the family concept—as opposed to the remnant surviving by other means. In this case we are wondering if those stories which show survival of one family also tend to link this with survival by boat (as opposed to other means). This will be done somewhat negatively, as can be seen in the following hypothesis, the starting point for the test.

HYPOTHESIS: There is no indication of contingency in the available data between the favored family and survival by boat concepts.

First we tabulate the observed frequencies of occurrences from the data.

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†Remnant, as used here, means an unspecified number of people not necessarily related.

Table II
Observed Frequencies of Means of Survival

	Boat	Other	Unknown	Total
Family	18	10	4*	32
Remnant	4*	7	4*	15
Total	22	17	8	47

If the proposed hypothesis were true, i.e., no contingency between family and boat, the expected frequencies would be proportional to the total number of observations. Instead of 18 for family-boat, there would be $22(32/47) = 14.98$. Instead of 7 for remnant-other, there would be $17(15/47) = 5.43$, etc. This operation is performed for each observation in Table II.

Now the frequencies expected under the proposed hypothesis are tabulated.

Table III
Expected Frequencies of Means of Survival under Proposed Hypothesis

	Boat	Other	Unknown	Total
Family	14.98	11.57	5.45	32
Remnant	7.02	5.43	2.55	15
Total	22	17	8	47

From these tables we calculate what is known as the Chi-Square statistic (χ^2).

$$\chi^2 = \sum \frac{(\text{Observed Frequency} - \text{Expected Frequency})^2}{\text{Expected Frequency}}$$

$$= \frac{(18-14.98)^2}{14.98} + \frac{(4-7.02)^2}{7.02} + \frac{(10-11.57)^2}{11.57}$$

$$+ \frac{(7-5.43)^2}{5.43} + \frac{(4-5.45)^2}{5.45} + \frac{(4-2.55)^2}{2.55}$$

$$= 3.78$$

Associated with this variable is a concept known as "degrees of freedom." This will be one less than the number of columns in Table III, i.e., 2.

Consulting a standard Chi-Square Table⁴, we look for the first Chi-Square value with two degrees of freedom that is just exceeded by the above value of 3.78. This value is 3.22. Also from the table we find that associated with this value is a probability expression equal to 80%.

Simply stated: On the basis of this evidence, we can reject the proposed hypothesis with a better than 80% probability that re-

jection is the correct decision. We could also say there is nearly a 20% chance of error.[#]

An alternate hypothesis cannot normally be accepted on the strength of rejecting the original. However, in view of the limited alternatives in this case, we can be reasonably sure that survival in a boat is contingent upon the family concept as opposed to remnant. Those stories which indicate survival of a remnant have a greater than expected correlation to survival by other means than in a boat.

Subsequent tabulations will be shown with no explanations repeated for the calculations involved.

Preservation of Seeds of Life

Turning to the characteristic of preservation of other seeds of life, we find no instance of this being done by the remnant in order to save the species. This attribute is associated solely with the favored family.

Looking now to the "forewarning" we may again state a negative hypothesis.

HYPOTHESIS: There is no indication of contingency in the available data between the favored family and "forewarning."

Table IV
Observed Frequencies of Forewarning

	Forewarned	Unwarned	Total
Family	12	20	32
Remnant	2	13	15
Total	14	33	47

Table V
Expected Frequencies of Forewarning If Hypothesis Is True

	Forewarned	Unwarned	Total
Family	9.53	22.47	32
Remnant	4.47	10.53	15
Total	14	33	47

Results: $\chi^2 = 2.90$. Degrees of Freedom = 1. Next smaller value of χ^2 in table = 2.71. Also from the table this value yields a probability = 90%.

We therefore reject the proposed hypothesis with a 90% probability that rejection is the correct decision, i.e., we can be reasonably sure that a forewarning is contingent upon the family concept as opposed to remnant. The idea of a family correlates closely with a forewarning.

Upheavals Besides the Flood

Now consider the upheavals besides the flood. We may assume that an occupant of the ark

*The limited amount of information to which reference has been made is reflected in these tables, in that the frequencies should actually be greater than five for this test.

*Greek Sigma, indicating a summing process.

#As will be seen in the succeeding operations, this is the worst case of those being considered. The implication in this will be made clear when the conclusion is presented.

would probably have been unaware of much of the surrounding turmoil. Again, a negative hypothesis is proposed:

HYPOTHESIS: There is no indication of contingency in the available data between the favored family and the concept of a single flood without other upheavals.

Table VI
Observed Frequencies of Other Upheavals

	Flood Only	Other Upheavals	Total
Family	25	7	32
Remnant	6	9	15
Total	31	16	47

Table VII
Expected Frequencies of Other Upheavals If Hypothesis Is True

	Flood Only	Other Upheavals	Total
Family	21.11	10.89	32
Remnant	9.89	5.11	15
Total	31	16	47

Results: $\chi^2 = 6.60$. Degrees of Freedom = 1. Next smaller value of χ^2 in table = 5.41. Also from the table this value yields a probability = 98%.

We therefore reject the proposed hypothesis with a 98% probability that rejection is the correct decision, i.e., we can be reasonably sure that other upheavals are contingent upon the remnant concept as opposed to the family. Where one family is seen, the stories generally also speak of one flood only, without other upheavals.

Looking again at these same classifications (i.e., Family and Remnant) in light of their geographical distribution reveals the following:

Europe: In six instances where the survivors are described, there are four cases of a family and two of a remnant.

Middle East and Africa: In seven instances where the survivors are described, there are six cases of a family and one of a remnant.

Asia and Pacific Islands: In six instances where the survivors are described, there are four cases of a family and one of a remnant.

The Americas: In twenty-two instances where the survivors are described, there are twelve cases of a family and ten of a remnant.

Again tabulating, an interesting picture is obtained. (See Table VIII)

Upon first deciding to examine the geographic distributions, I expected the classification ratio (family:remnant) of each area to approximate that of the whole. As it is, the ratio decreases in proportion to the distance from the center of dispersion following the Great Deluge, i.e., the Middle East. At any rate it would not seem reason-

Table VIII

	Europe	Middle East Africa	Asia Pacific Islands	The Americas	World Wide
Family	67%	86%	67%	55%	63%
Remnant	33%	14%	33%	45%	37%
Approximate Ratio	2:1	6:1	2:1	1.2:1	1.7:1

able to ascribe such distributions to localized disasters. In both classifications there are too many world-wide similarities.

Conclusions

It has been said that statistics can prove both sides of the same argument. No proof of anything is claimed to exist within these figures; however, based upon the information presented, we can suggest that the flood legends considered as a whole embody two or more world-wide catastrophes.

One of these was the Great Deluge described in Genesis, prior to which Noah was forewarned and told to build a boat, in which he and his family escaped death. In this he carried the seeds of other life (i.e., plants and animals) to preserve the species. Further, he was probably unable to observe much action other than rain, thereby precluding the association of the Great Deluge with other upheavals.

The other catastrophe(s) proposed would have also involved flooding, but various other upheavals were witnessed simultaneously in those instances. The flooding came suddenly, without warning. People used any means available in an attempt to survive, with no regard for life other than their own and their loved ones. The worst-case indication of contingency (family-boat) is to be expected. A boat would be a natural means of escaping flood conditions for any members of the remnant having access to one if they were not completely overwhelmed. Widespread use of boats by the remnant would tend to reduce the indication of family-boat contingency. The existing evidence of contingency, however, probably indicates that for the most part the population was overwhelmed; the remnant owing its survival to a favorable geographical location.

Although many people were probably killed during this (these) later event(s), remnants of people remained scattered and survived. These survivors undoubtedly also possessed oral traditions of the Great Deluge which were subsequently overlaid and intertwined by their descendants with accounts of more recent events.

Prior to its being confused with other upheavals, distortions in the account of the original Deluge would result from transmission through time only, since it was observed from only one vantage point. This provided a basic "plot" around which many other legends were woven.

Accounts of subsequent flooding suffered additionally from intermingling subjective interpretations of upheavals that varied according to their geographical location. Only in God's Word do we have a coherent account of what actually happened during the first catastrophe when the world was certainly "overflowed with water."

Following the confusion of tongues at the Tower of Babel, the Old Testament deals primarily with the Jewish Nation. An account of world events (subsequent catastrophes), other than their effect on the Jews, must come from elsewhere.

Yet it is instructive that when there is purity of one element in a group of flood legends, there is correlation with other Biblical facets of the story. As we have seen, more often than would be expected to occur naturally by chance, there is a correlation between a favored family with (1) survival by boat, (2) a forewarning, (3) one flood only, and (4) preservation of other seeds of life. Such correlations are instructive and they certainly support the authority of the Scriptural Flood record.

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²Books used in one way or another to secure data upon which this statistical analysis rests include the following:

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³For a detailed discussion of this test, see Hoel, P. G. 1947. Introduction to mathematical statistics. John Wiley and Sons, N. Y.

⁴*Ibid.*

RADIO CARBON DATING*

A. J. 'MONTY' WHITE**

Introduction

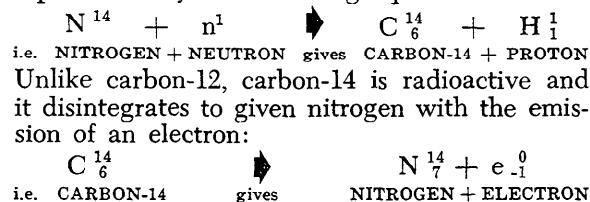
It is popularly supposed that science has unequivocally established that men have been on earth for a million years or more. Such a view cannot be readily harmonized with the origin and early history of man as recorded in the first few chapters of the book of Genesis. Accordingly, it is advisable to examine the methods by which supposedly accurate dates have been obtained.

One method used to estimate the age of materials of biological origin is radio carbon or carbon-14 dating. This method, which is claimed to be able to date materials up to 50,000 years old, has obtained widespread use in archeology and geology. It was developed in the mid 1940's at the University of Chicago by Professor Willard F. Libby, who was subsequently awarded the Nobel prize for Chemistry in 1960 for this work.

In this article, the principles upon which carbon-14 dating is based will be explained, the assumptions inherent in this method of dating will

be considered, and the extent to which this method has been checked against historically dated materials will be viewed.

The basic theory¹ behind carbon-14 dating is as follows. In the upper atmosphere, nitrogen is transmuted into a rare form of carbon, known as carbon-14. This is due to the bombardment of atmospheric nitrogen by atomic particles called neutrons, which occur in cosmic rays. "Ordinary" carbon is carbon-12, which has 6 protons and 6 neutrons in its atomic nucleus. Carbon-14 is, however, a different "kind" (or isotope) of carbon with 8 neutrons and 6 protons in its nucleus. The formation of carbon-14 from nitrogen can be represented by the following equation:



This disintegration process is relatively slow. Carbon-14 is said to have a half-life of about 5,600 years. This means that starting with 1 gram of carbon-14, after 5,600 years one half of it (i.e. ½ gram) will have disintegrated into

*This article was first published in Bible Impact 4, Sept., 1971. It is reproduced in this issue by express permission of the author. Copies may be obtained from Dr. White.

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nitrogen and $\frac{1}{2}$ gram will be left. After a further 5,600 years, half of this $\frac{1}{2}$ gram (i.e. $\frac{1}{4}$ gram) will have disintegrated and only $\frac{1}{4}$ gram of carbon-14 will be left. After another equally long period only $\frac{1}{8}$ gram of carbon-14 will be left, and so on.

Since the newly formed carbon-14 in the atmosphere has the same chemical properties as ordinary carbon, it can combine with the oxygen in the air to form carbon dioxide. This diffuses and it is thought to be distributed evenly in the atmosphere and the oceans. The amount of carbon-14 in the carbon dioxide of our present atmosphere is very low. There is, on average, only ONE carbon atom with the atomic weight of 14 for every 10^{12} (i.e. 1,000,000,000,000) with the atomic weight of 12. This ratio, $1:10^{12}$ has been determined because as the carbon-14 disintegrates, it emits an electron which is detected using very sensitive equipment.

The carbon dioxide, with its radioactive carbon-14 component, is assimilated by plants during photosynthesis, and finally also by animals, which live on plants. Hence at any given time, the ratio between active and non-active carbon in all living organisms is the same as that in the air. (This has been shown to be true in our present environment¹).

Now when an organism dies, it is unable to take up further carbon-14 and that which is already present diminishes due to radioactive decay. Because the activity (i.e. the measurement of the electron emission) of the carbon-14 in a sample decreases at what is assumed to be a constant rate, it is possible by measuring the present activity of the sample to determine the time elapsed since death. Providing that all the assumptions inherent in the method are valid, the technique may be applied to samples which are between 500 and 50,000 years old.

Examination of Assumptions

This method is, no doubt, very ingenious and powerful providing that ALL the following assumptions^{2, 3} are valid:

1. That the amount of cosmic radiation, and hence the amount of neutron bombardment in the upper atmosphere has been essentially constant over the last 50,000 years.
2. That the concentration of carbon-14 in the carbon dioxide of the atmosphere has been constant over the last 50,000 years.
3. That the carbon dioxide content of the ocean and atmosphere has been constant over the same period of time.
4. That dead organic matter is not later altered with respect to its carbon content by any biological or any other activity.
5. That the huge reservoir of oceanic carbon has not changed in size during the same period of time.

6. That the rate of decay of carbon-14 is a constant and does not vary with time.

7. Finally, that the rate of formation and the rate of decay of carbon-14 have been in equilibrium during the last 50,000 years.

These seven assumptions, all of which must be valid if radio carbon dating is to be accurate, must be critically examined from a scientific viewpoint:

Assumptions 1 - 3: These assumptions are contrary to the arguments advanced as causes of the ice-ages, the last of which is thought to have begun about 100,000 years ago⁴ and finished about 11,000 years ago.⁵ Of the several theories⁶ which have been advanced to account for the onset of the ice-ages, the ones most favored by the geologists are (a) variation in the sun's radiation and (b) an increase in the amount of carbon dioxide present in the atmosphere. (Note: The ice-ages are a theory rather than a proven fact!)

Now if reason (a) is correct, then assumption 1 is not true and hence assumption 2 is also invalid, for the ratio of carbon-14 to ordinary carbon depends on how many neutrons bombard the upper atmosphere. This, in turn, depends on the amount or intensity of cosmic radiation. If, on the other hand, reason (b) is correct, then assumption 3 is untrue because the carbon dioxide content of the atmosphere and subsequently the oceans would have changed considerably over the last 50,000 years.

There is also the problem of contamination of atmospheric carbon dioxide by the burning of fossil fuels (i.e. oil and coal) containing no active carbon and which dilute the active carbon dioxide in the atmosphere. During the past century (i.e. since 1870) a considerable proportion (about 3 per cent⁷) of inactive carbon dioxide has been added to the carbon cycle. This means that in carbon-14 dating, the standard used, i.e. the present carbon-14 content of carbon dioxide, on which radio-carbon age calculations are based, is incorrect. This standard, however, could be modified so as to make it correct for the time immediately before the Industrial Revolution.

It has, however, also been found "that the activity of radio carbon in the atmosphere was going up and down before the Industrial Revolution."⁸ Moreover, to complicate matters even further the radio carbon content has been steadily increasing since 1954 with the advent of atomic devices which have released neutrons into the atmosphere.¹ These neutrons combine with atmospheric nitrogen to produce carbon-14. The position is so bad that the scientists who work on radio carbon datings disagree with one another as to the position and magnitude of these so called "short term" fluctuations of the carbon-14 content in our present atmosphere.⁹ Each group of workers has its own particular standard

on which it bases the age of a particular sample and so each group will give a different age for the same sample!

Assumption 4: This assumption is very important. C. B. Hunt¹⁰ lays special emphasis on the danger of contamination of the sample by external sources of carbon, especially in damp locations. At a conference on radio carbon dating held in 1956 the following remarks¹¹ were made concerning this assumption:

The most significant problem is that of biological alteration of materials in the soil. This effect grows more serious with greater age. To produce an error of 50 per cent, in the age of a 10,000 year old specimen would require the replacement of more than 25 per cent, of the carbon atoms. For a 40,000 year old sample, the figure is only 5 percent, while an error of 5,000 years can be produced by about 1 per cent, of modern materials.

C. B. Hunt¹⁰ has proclaimed, "We do not know which dates are in error, or by what amounts, or why."

Assumption 5: Scientists are in no position to assert or deny that the huge reservoir of oceanic carbon has not changed in size during the last 50,000 years, for there is no method for determining this at present.

Assumptions 6 and 7: There is no way of making sure that the rate of decay of carbon-14 has not varied in the last 50,000 years. Who can positively assert that the rate of decay of carbon-14 measured today is the same as it was 50,000 years ago? Concerning the final assumption, Libby has shown¹ that the rate of formation and the rate of decay of carbon-14 were in equilibrium in the late 1940s, but this does not constitute proof that this has been so during the last 50,000 years.

In spite of these highly questionable assumptions it is usually maintained that radio carbon dating has been verified beyond any shadow of doubt by numerous correlations with samples of known age determined by such methods as dendrochronology or other archeological dating methods. THIS IS NOT SO! Professor Libby has said,¹

The first shock Dr. Arnold and I had was when our advisors informed us that history extended back only to 5,000 years. We had thought initially that we would be able to get samples all along the curve back to 30,000 years, put the points in, and then our work would be finished. You read statements in books that such and such a society or archaeological site is 20,000 years old. We learned rather abruptly that these numbers, these ancient ages, are not known accurately; in fact, it is at about the time of the First Dynasty in

Egypt that the first historical date of any real certainty has been established.

It is pretty obvious that any **genuine** correlation between definitely verified historical dates and the age found by the radio carbon method of dating can be limited only to the last 5,000 years or so, the period covered by Biblical history!

Radio Carbon Dating and the Flood

From these arguments, it can be seen that carbon-14 dating applied to the last 50,000 years is highly suspect because of the invalid and often questionable assumptions which have to be made. There is, however, fairly good agreement between radio carbon dates for the last 4-5,000 years and historically verified chronology,¹ although there are numerous discrepancies and there is a very large margin of error the further back in time that comparisons are made. Carbon-14 dating is therefore quite useful back to 4-5,000 years ago, but it cannot be applied to prehistoric periods when there is no way of calibrating the method.

Moreover, the assumptions inherent in the method are unlikely to be valid for periods distant in prehistory, because of the universal cataclysmic Flood as described in the book of Genesis, and because of the different terrestrial and atmospheric conditions which prevailed before the Flood as described in the first few chapters of the Bible.

Before the Flood, the ratio of radio carbon to ordinary carbon in carbon dioxide would have been much lower than at present due to the different environment which then existed. There was a global semi-tropical climate with vast amounts of plant life all over the world. Furthermore the atmosphere was protected from cosmic radiation by a water canopy which surrounded the earth (Genesis 1 vvs 6-8). Hence the formation of carbon-14 would have been inhibited.

Since the proportion of carbon-14 in the carbon dioxide was smaller at this time, all living organisms assimilating this carbon dioxide would have contained very little or no active carbon. Hence a radio carbon dating of their remains could quite easily put their apparent age as 50,000 years or older (based on today's ratio of carbon-14 in carbon dioxide), when their true age is only 6,000 years.

After the flood, the disappearance of the water vapor canopy would have resulted in an increase in the carbon-14 content of the atmosphere. It would have still taken many centuries to reach the equilibrium condition between the rate of formation and the rate of decay of carbon-14, which was observed by Libby.¹ Hence organisms living in the early centuries after the flood would still have little active carbon in them, and so a radio carbon dating on their remains would still put their age too high. Eventually,

however, the present day equilibrium was reached and radio carbon dating became applicable even though the errors are great.

The Biblical teaching concerning the Genesis Flood thus implies that many of the radio carbon dates given for samples older than about 5,000 years, are much too high. It may be objected, however, that there is little scientific evidence for a universal flood, or for a water vapor canopy previous to the Flood. This is not so. The following quotes show that the hypothesis of a water vapor canopy is involved in the most reasonable explanations of the present high concentration of the Helium-3 isotope in our present atmosphere:

In addition to the formation of Carbon-14 from nitrogen in the atmosphere by cosmic-ray neutrons, these neutrons also react with deuterium (heavy hydrogen, the hydrogen isotope in heavy water), which would undoubtedly have been present in substantial amounts in such a canopy, to form tritium, a still heavier isotope of hydrogen. Tritium is unstable and decays rapidly by beta decay to an isotope of helium. He 3. But it turns out that there is too much He 3 in the atmosphere to be accounted for by this process operating at present rates during geologic time. (References 3 p. 375)

An authority on cosmic radiation, Korff has suggested¹² two factors which would account for these observations:

One of these is that the intensity of cosmic radiation, and hence the rate of production of neutrons might have been higher at some time in the geologic past . . . The second possibility invoking action in the past assumes that a time when the earth was warmer the atmosphere contained much more water vapour.

Conclusion

In conclusion, some of the assumptions inherent in radio carbon dating are invalid and others are highly questionable. In spite of this, there is fairly good agreement between radio carbon dates for the last 4-5,000 years and historically verified chronology, although there are numerous discrepancies and there is often a large margin of error. Ages of 6,000 years old or more obtained by this method are incorrect. The Flood and the Biblical account of the conditions existing prior to this event, not only adequately explain all the anomalies of radio carbon dating, but also explain the high concentration of Helium-3 in our atmosphere.

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ON CHROMOSOMES, MUTATIONS, AND PHYLOGENY

JOHN N. MOORE*

Introduction

A great diversity of living things in both animal and plant forms is evident immediately to both the casual observer and the scientifically trained observer. Certain surface similarities among animals and among plants are evident also to both the casual and scientifically trained observer.

How did this variety of living forms come into being? How are the apparent and real similarities between and among animals and plants explained? If we accept the usual dictionary meaning for the term "phylogeny," as the racial history or evolutionary development of any plant or animal species, we start to formulate the commonly accepted explanation to answer both these questions.

Without a doubt, the majority of informed scientists accept today the monophyletic theoretical explanation for the variety of living forms and for the similarities among and between living forms.

A proponent of the majority monophyletic explanation, which is the amoeba to man thesis for animals, would state that all animals in the world have arisen from a single source that came from an inorganic beginning. Thus, according to the monophyletic explanation of relationships of living things, the first living cell changed into complex multicellular forms of life; these gave rise to all forms of invertebrates; in turn, invertebrates changed into vertebrates; fish into amphibians, amphibians into reptiles, reptiles into birds and mammals, early mammals into primates, and finally primates changed into man. Unmistakably this is the basic meaning for most people of the term "evolution."

If the great diversity of living forms is explained by a manifestly complicated monophyletic pattern of relationship, what possible link or links may the scientifically trained observer study in trying to verify an *empirical* basis for the monophyletic explanation? After 70 years of investigation geneticists have shown quite conclusively that many relationships may be understood on a *genetic* basis. As Dobzhansky writes in his 1970 book:

Perhaps the most impressive demonstration of the unity of life is that in all organisms the genetic information is coded in two related

groups of substances—the deoxyribonucleic (DNA) and ribonucleic (RNA) acids.¹

The link or links between organisms is therefore sought in the singular "protoplasmic bridge" between generations: i.e., the sex cells that unite in sexually reproducing organisms; or the protoplasmic portion of the adult individual, in asexually reproducing organisms, from which new individuals come into existence.

And, of course, *chromosomes* are the essential "packages" into which the genetic material of DNA of each species of animal and each species of plant is divided. Thus chromosomes are essentially important aspects of any consideration of relationships, or phylogeny, among animals and among plants.

In addition to attention to chromosomes as carriers or packages of DNA material, so important as geneticists have shown for the appearance of physical characteristics, mention must be made of *mutations*. Monophyleticists, in attempting to meet the previous questions of how the variety and how the evident similarities of living forms came to exist, depend very importantly upon the phenomena of mutations. A brief synopsis of the kinds of mutations may be itemized under the following headings:

1. Gene mutations
2. Structural chromosomal changes
 - A. Loss or duplication
 - B. Alterations in the arrangement of chromosome parts:
 - a. Translocation
 - b. Inversion
 - c. Transposition
3. Numerical changes, affecting the number of chromosomes
 - A. Aneuploidy
 - B. Haploidy
 - C. Polyploidy

The purpose of this paper is to accomplish a careful, but necessarily brief, examination as to how close a "fit" may be drawn between the commonly accepted theoretical monophyletic explanation of relationships of animals and of plants and known empirical data at this point in time at the end of 1971, after over 70 years of genetic and cytological research.

The examination is five-fold according to application of the following tests of "fit" between empirical data and theoretical explanation: (1) Protein Phylogenies Test, (2) Structural and Numerical Mutations Test, (3) Gene Mutations Test, (4) Chromosome Number and DNA Quantity Test, and (5) Fossil Record Test.

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Discussion

(1) **Protein Phylogenies Test.** Attention must be given first to the newest basis for formulation of phylogenetic "trees." Reference is made to use of rapidly accumulating data from cytological and genetic research to produce numerous protein phylogenies. If research men and women become capable of knowing the sequences of the DNA components in all genes in all organisms, then conceivably it would be possible to quantify basic similarities and differences of genetic codes and to formulate a protein classification of all living things involving this type of physical-chemical trait.

The present state of things in research is far from such full knowledge, but it is possible today to compare amino acid sequences of the same and different species. A number of amino acid differences between the hemoglobin alpha chains of some animals have been compiled by Dayhoff and Eck.² For instance, the alpha chain of human globulin differs by only a single substitution amino acid from that in the gorilla, and the alpha chain of human globulin is identical with that in the chimpanzee.

Based upon mutation distances between homologous proteins Fitch and Margoliash³ have constructed phylogenetic trees. Superficially these trees look like classical phylogenetic trees of animal or plant groups constructed on the basis of morphological and paleontological information.

Of course, certain inconsistencies become apparent in that the turtle, for example, seems to belong to the birds and is placed quite remote from the rattlesnake. However, these and other inconsistencies should not be surprising as students of phylogenies know when only a single physical trait is examined.

But an interesting conclusion results from rigorous analysis of the practice of formulating protein phylogenies. All comparisons of homologous proteins, amino acids, or genes are based on a crucial, *basic assumption* commonly employed by authors of all typical or classical phylogenies. The basic assumption: *That the degree of relationship of living animals and living plants depends upon the degree of similarity of physical characteristics.*

Thus animals that have very similar protein patterns, or have other noticeably similar physical characteristics, are considered to be closely related, and other animals that do not look very much alike are considered more distantly related. A similar statement could be made for plants.

Yet no actual *genetic* connection is demonstrable in case after case of protein similarity, or other similarities, as between chimpanzee and man, or gorilla and man, for example. Significant breeding gaps exist between chimpanzee and

man, between gorilla and man; and significant breeding gaps exist between *all* major groups of animals, and between *all* major groups of plants.

Consequently, in the absence of any really empirical evidence of *genetic* connection between similar animals or between similar plants, the weakest kind of circumstantial evidence is being utilized by those who attempt construction of protein phylogenies as explanations of relationships of living things. Close examination of the kind of information published in the *Atlas of Protein Sequence and Structure 1966* by Dayhoff and Eck,⁴ which began a planned annual series, in no way may be used as basis for establishing *genetic* relationship between major groups of animals and major groups of plants.

Thus the monophyletic scheme is based extensively and completely upon circumstantial evidence as far as any possible relationship of major groups of animals and/or relationship of major groups of plants might be proposed because of protein similarities. To the extent that researchers try to formulate protein classifications of living things, the monophyletic explanation fails of any empirical support because protein phylogenies are based finally upon the above basic assumption of similarity of physical characteristics.

What can be said about a second test of "fit" between empirical data and theoretical explanation?

(2) **Structural and Numerical Mutations Test.** Of the different kinds of mutations mentioned in the introductory classification, let us consider first those grouped as structural and numerical changes. Many authors refer to such changes as possible mechanisms to be used in developing an argumentative basis for the monophyletic explanation of relationship of living things.

Introducing his chapter on chromosomal changes in evolution, White makes this statement:

Apart from cases of differences in chromosome number which are due to polyploidy, cytotaxonomic differences between karyotypes of related species *must have* arisen by chromosomal rearrangements, such as inversions, translocations, deletions and duplications, or combinations of these.⁵ (Emphasis added)

Before writing about breakage and joining of chromosome parts, deficiencies, duplications, inversions, translocations, and position effects, Gardner ended the introduction of his chapter on chromosomal structural modifications;

Structural modifications of chromosomes are common in nature and have apparently played a significant role in evolution. They

occur spontaneously, that is, without any known cause.⁶

Similar statements could be multiplied many fold. But the significance for this paper is found in the fact that all reference to different phenomena of ploidy and chromosomal rearrangements constitute nothing more than *ad hoc*, untestable hypotheses, as far as any attempt to explain any relationships between or among major groups of animals or major groups of plants is concerned. Absolutely no genetic connections are ever established between major groups of living things by means of any mechanisms involving ploidy and chromosomal rearrangements.

That inviolate *genetic* barriers exist between major groups of living things may be stated conclusively on the basis of available *genetic* evidences. Unbridgeable breeding gaps are known; and, no amount of reference to ploidy and/or chromosomal rearrangements will truly erase the undeniable evidence that breeding gaps between major groups of living things do in point of fact actually exist.

Hence we are once again at an impasse very similar to the conclusion reached after brief consideration of protein phylogenies. All discussions of structural changes of chromosomes partake of *ad hoc*, untestable hypotheses as far as they are offered in support of any phylogeny. Again the monophyletic explanation involving such *ad hoc*, untestable hypotheses constitutes a long exercise in the use of circumstantial evidences.

It is true that empirical findings can be amassed for changes of chromosomes by means of duplication, deletions, translocations, and inversions, but such data are always associated with studies of organisms *within* one species or one genus. Never do we find reports of research on structural or numerical changes of chromosomes that may be used to document any true *genetic* relationship *between* major groups of animals or major groups of plants.

Now we must consider the third test of "fit" between empirical data and theoretical explanation.

(3) Gene Mutations Test. If the Structural and Numerical Mutations Test results in recognition of dependency upon *ad hoc*, untestable hypotheses, then surely gene mutations are *the* mechanisms whereby new forms have come into existence and relationship of groups of animals and groups of plants can be established.

Importance of gene mutations to the monophyletic explanation of relationships among living things is evident in Dobzhansky's mention that gene recombinations or mutations are "the ultimate source of all genetic variability," and he adds further:

*If all life is monophyletic, derived from a single kind of primordial life, then all organic diversity must be the outcome of the accumulation and ordering of mutational changes.*⁷ (Emphases added)

Dobzhansky does admit that not all gene mutations are conserved as most are "cast out by natural selection." Nevertheless he puts the matter even stronger much later in his book by expressing,

Replication of genes has long been recognized as an important evolutionary [phylogenetic] process. On the *assumption* that primordial life was represented by a single gene, the thousands of different genes now found in the same gamete in most organisms *must be* the diverged descendants of the primordial gene.⁸ (Emphases added)

Even though other well-known evolutionists, such as Julian Huxley and G. G. Simpson, would agree readily with Dobzhansky, that gene mutations are the source of the raw materials of natural selection, nevertheless, a special problem obtains with regard to the context of this paper. Since a gene mutation is considered an inheritable change in the genotype which has resulted from alteration of DNA material, then any gene mutation results in *no more than* alteration of already existing or known traits.⁹ Or, if one wishes, gene mutations result in new characteristic expressions of the *same* physical trait already known.

For example, eyes in *Drosophila* may become red or white due to gene mutations, but we are *still* dealing with eyes of *Drosophila*. Or wings may become short, long, or nonfunctional, but the organs involved are still *wings* of *Drosophila*. And so the list might be extended to include effects of gene mutations regarding chemistry of food use or pigmentation, but no appearance of *new traits*, or *new organs* can be documented from empirically obtained *genetic* data.

In addition to this brief discussion of gene mutations, it can be asserted further that gene mutational changes may be referred to reasonably as "errors" in DNA replication. Just such a point is admitted by Potter:

There is a finite probability of *error* in the course of information replication. Novelty may be introduced by a built-in tendency toward spontaneous *copy-error* or by increased *copy-error* from environmental hazards. The *errors* may then be replicated and subjected to the test of survival. This paradigm is the basis for Darwinian evolution by natural selection. . . .¹⁰ (Emphases added)

And as *errors*, as *mistakes*, DNA mutational changes essentially result in *loss* or *degeneration*

or *degradation* of known physical traits. Loss of viability, loss of reproductive capacity, and even lethal conditions are readily demonstrable as results of most gene mutations. In what way, then does "progress" from single cells to complex multicellular organisms seem logically possible according to known *uniformly occurring aspects* of genotype-phenotype interactions with the natural environment?

Some one might be prone to mention "favorable" gene mutations. A change of color in moths or alteration of food use by bacteria might be cited as results of "favorable" gene mutations. Nevertheless such changes of moths or bacteria are only *within* a certain genus, and *not across* limits of genera. Therefore, any thought to consider any so-called "favorable" gene mutations as possible mechanisms for changes across limits of known kinds, which are the type of changes required if the monophyletic explanation is to be given any empirically sound basis, partakes again of dependence upon *ad hoc*, untestable hypotheses.

Clearly, then, empirical data on gene mutations do not "fit" with any theoretical monophyletic explanation of relationship between groups of animals and groups of plants. Upon rigorous examination and analysis, any dogmatic assertion, as an empirical *fact*, that gene mutations are the raw material for any mega-evolutionary process involving natural selection is an utterance of a *myth*.

(4) **Chromosome Number and DNA Quantity Test.** What about the fourth test of "fit" between empirical data and theoretical explanation?

The number of chromosomes commonly identified with any one species, genus, or kind of living organism may be considered as a physical characteristic, as is testified to by Gardner,

Chromosome number is probably more constant, however, than any other single morphological characteristic that is available for species identification.¹¹

Therefore, if the chromosome number is a constant physical or morphological characteristic of a species, and chromosomes are the carriers and packages of gene materials, why not consider a logical *prediction* from the commonly accepted monophyletic explanation of relationship of living things? As a classroom professor teaching evolutionary concepts to bright, independently working students, I have been shown, often, different lists of chromosome numbers from a variety of textbook authors. My bright students bring lists like the following from page 211 of Gardner, which I have modified to show 2n values:

Plant Species	
Species	2n Count
Garden pea, <i>Pisum sativum</i>	14
Sorghum, <i>Sorghum vulgare</i>	20
Maize, <i>Zea mays</i>	20
Johnson grass, <i>Sorghum halepense</i>	40
Alfalfa, <i>Medicago sativa</i>	32
Barley, <i>Hordeum vulgare</i>	14
Oats, <i>Avena sativa</i>	42
Tomato, <i>Lycopersicon esculentum</i>	24
Tobacco, <i>Nicotiana tabacum</i>	48
Trillium, <i>Trillium erectum</i>	10

Animal Species	
Species	2n Count
Gypsy moth, <i>Lymantria dispar</i>	62
Mouse, <i>Mus musculus</i>	40
Rabbit, <i>Oryctolagus cuniculus</i>	44
Cow, <i>Bos tarus</i>	60
Horse, <i>Equus caballus</i>	64
Donkey (ass), <i>Equus asinus</i>	62
Dog, <i>Canis familiaris</i>	78
Monkey, <i>Macaca rhesus</i>	42
Gorilla, <i>Gorilla gorilla</i>	48
Chimpanzee, <i>Pan troglodytes</i>	48

And Koller's paperback¹² just published by Norton affords this list:

Chromosome Number in Various Species of Animals and Plants	
Species	Number 2n
Copepode-crab	6
Drosophila	8
Broad bean	12
Garden pea	14
Onion	16
Corn	20
Opossum	22
Tomato	24
Mink	30
Fox	34
Pig	38
Mouse	40
Rat	42
Rabbit	44
Man	46
Deer mouse	48
Striped skunk	50
Spectacled bear	52
Cebus monkey	54
Donkey	62
Horse	64
Aulacantha (Protozoa)	1600

My independently thinking students formulated the question or problem: If animals changed from so-called single forms to complex multicellular forms (and they raised the same thought regarding plants), then is there any *pattern* of increase of chromosome number? Scientists are always looking for patterns that can be used as basis for some generalization.

Or the problem could be stated: Is there a degree of correlation of chromosome count in consideration of those animals grouped closely as related, and those plants similarly grouped as related, according to the monophyletic scheme of phylogeny?

On the basis of the monophyletic explanation of relationship of living things the following *prediction* or *expectation* in answer to these problems is logical: if so-called evolutionary changes occurred whereby single cells became multicellular, and higher complexity was manifested in vertebrate organisms that supposedly came about through changes in invertebrate animals, then it is reasonable to expect an increase in chromosome number as one morphological characteristic of increased complexity.

As a consequence of my personal search for conclusive empirical evidence from the work of cytologists, I have prepared two **original** diagrams of $2n$ counts of chromosomes in animals and in plants. (See diagrams.) The groups of organisms have been arranged according to the commonly accepted monophyletic "sequence" of relationship of major groups, and the various entries within the major groups of animals and major groups of plants are merely representative. However, these two brief diagrams contain a much more detailed range of chromosome count than that usually found in textbooks.

(Very extensive enumeration of such chromosome counts for mammals is being published by T. C. Hsu and Kurt Benirschke¹³ in a series of six volumes. These authors have announced also a forthcoming new chromosome atlas for fish, amphibians, reptiles and birds.)

From just "spot inspection" of these diagrams, with major groups and chromosome counts positioned according to the commonly accepted monophyletic system for denoting supposed relationship, at least one conclusion is obvious. There is *absolutely no pattern of increase* of chromosome count that might possibly be construed or correlated with so-called increase in complexity of organization of major groups of animals (and the same generalization can be maintained for major groups of plants). No *ad hoc*, untestable hypotheses about chromosome duplication or deletion, or even any type of ploidy, seem at all satisfactory or applicable to

explain the separate arrays of representative chromosome counts in the two diagrams.

In so-called simple animal forms the range of chromosome count found is from *Ascaris* with 2 to *Radiolaria* with over 800 (and attention could be called to the protozoan entry with 1600 cited from Koller). Yet, among so-called higher animal forms, the range of chromosome count is *Salmo*, 80-96; *Triton*, 18-24; *Emys*, 50; *Passer*, 40-60; *Mus*, 40 and 44; *Sus*, 18, 38, and 40; and *Homo*, 46. And then there is *Lysandra* in the Insecta with 380.

In so-called simple plant forms the range of chromosome count found is from *Escherichia* with 1 to an alga *Cosmarium* with up to 120-140. Yet among so-called higher plant forms the range of chromosome count is *Marchantia* with $n = 9$; *Lycopodium*, 46, 340, and 528; *Abies*, 24; *Yucca*, 60; and *Chrysanthemum*, 18, 36, 56, 138, and 198. And then there is *Ophioglossum* in the Pteridophytes with 960.

Is the previously mentioned basic assumption, that the degree of similarity of physical characteristics is a basis for degree of relationship, at all applicable to the physical characteristic of chromosome count, considered by Gardner as that one characteristic more constant than any other? No! Upon close examination of these data on chromosome counts in animals and in plants, it would seem quite appropriate to conclude that the currently popular imagined transformational pattern of phylal relationships, called the monophyletic scheme, is *more illogical than biological*.

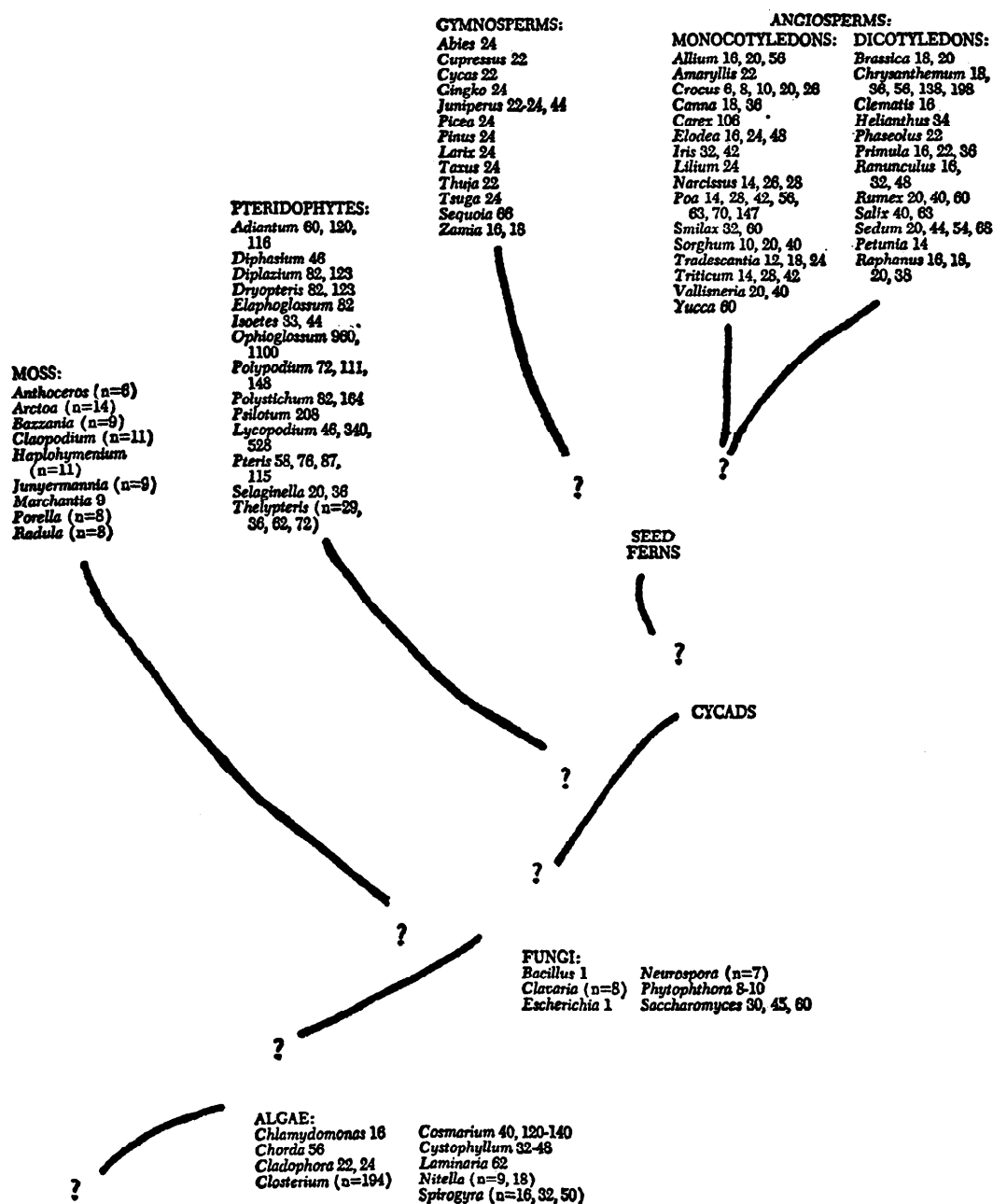
But at this point some geneticists might hold that the number of chromosomes is not so important as the pattern of genes or sequences of amino acids. That is, some one might maintain that the quantity of gene material rather than the number of the chromosomal bodies or packages of DNA material is most important. Let us look then at a puzzlement of Dobzhansky's in his 1970 book. After maintaining that the diversity of living things is evidently based not on the proportions but the arrangements of purines and pyrimidines, he writes:

The amounts of DNA per cell are, as a rule, uniform in different tissues and individuals of the same species. Sex cells carry one-half as much DNA as do body cells. The amounts vary, however, in organisms, as shown in Table 1.3.¹⁴

And that Table 1.3 is as follows:

CHROMOSOME COUNT IN PLANTS

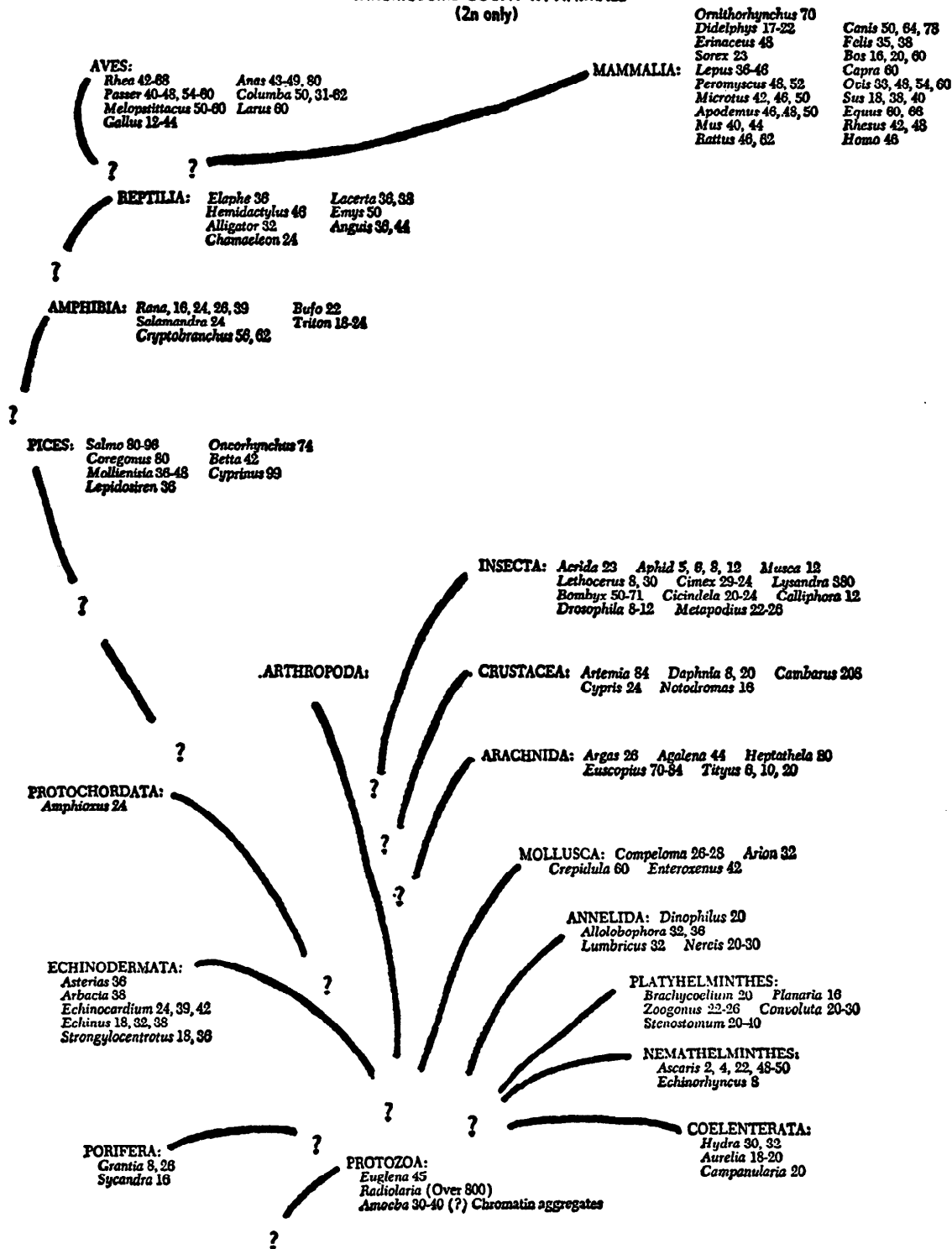
(2n, except as indicated)



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CHROMOSOME COUNT IN ANIMALS (2n only)



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**Estimated Amounts of DNA (in 10^{-12} Gram)
Per Haploid Chromosome Complement**

Amphiuma	84
Protopterus	50
Frog	7.5
Toad	3.7
Man	3.2
Cattle	2.8
Green turtle	2.6
Carp	1.6
Duck	1.3
Chicken	1.3
Sea urchin	0.90
Snail	0.67
Yeast	0.07
Colon bacteria	0.004,7
Bacteriophage T2	0.000,2
Bacteriophage ϕ X174	0.000,003,6

Then Dobzhansky comments:

More complex organisms generally have more DNA per cell than do simpler ones, but this rule has *conspicuous exceptions*. Man is far from the top of the list, being exceeded by Amphiuma (an apode amphibian), Protopterus (a lungfish), and even ordinary frogs and toads. *Why* this should be so has long been a puzzle.¹⁵ (Emphases added)

Dobzhansky continues with a very brief discussion of a "lead" to the solution of this puzzle found through certain research wherein paired strands of the DNA double helix have been separated. Apparently a large fraction of the DNA consists of segments with identical sequences in some karyotes. This is a problem of *redundancy* in genetic materials. Yet this apparent redundancy is absent in other karyotes. So Dobzhansky ends his attention to the puzzle of varying amounts of DNA in chromosome complements by writing, "whether or not redundancy increases systematically from the less complex to the more complex organisms *remains to be seen*." (p. 18, emphasis added)

Or, in other words, another *ad hoc*, untestable hypothesis is in use, at the present stage of knowledge, by supporters of the popular monophyletic scheme of relationship for animals and plants. Thus, the test of chromosome number and DNA quantity of gene material carried by chromosomes as possible source of empirical basis for the monophyletic scheme results in complete failure. Absolutely *no pattern* of increase of chromosome number from less complex to most complex is at all detectable; hence, the above prediction is denied.

What about the fifth test of "fit" between empirical data and theoretical explanation?

(5) **Fossil Record Test.** And what might be said further in response to those who would turn to the fossil record as a "history" of past events, a record of past life forms? We find that even the fossil record contains no material truly useful to support empirically the monophyletic thinking of the majority of informed scientists.

The possibility of gaps between kinds of animals and kinds of plants that have existed always has been recognized by John Keosian¹⁶ and J. R. Nursall¹⁷ and, even years ago, by Leo S. Berg in his 1926 book, *Nomogenesis*, now recently republished in a 1969 edition with a Foreword by Theodosius Dobzhansky.¹⁸ (Many other references contain polyphyletic hypotheses about relationships of major groups or organisms.¹⁹)

Geological researchers have confirmed the existence of gaps in the fossil record across which no "link" may be stretched, and also gaps that would require entire chains of links to cross from one major group to another major group. The British publication, *The Fossil Record*²⁰ published in 1967, contains 71 charts wherein specialists clearly admit absence of connections between major groups of living things.

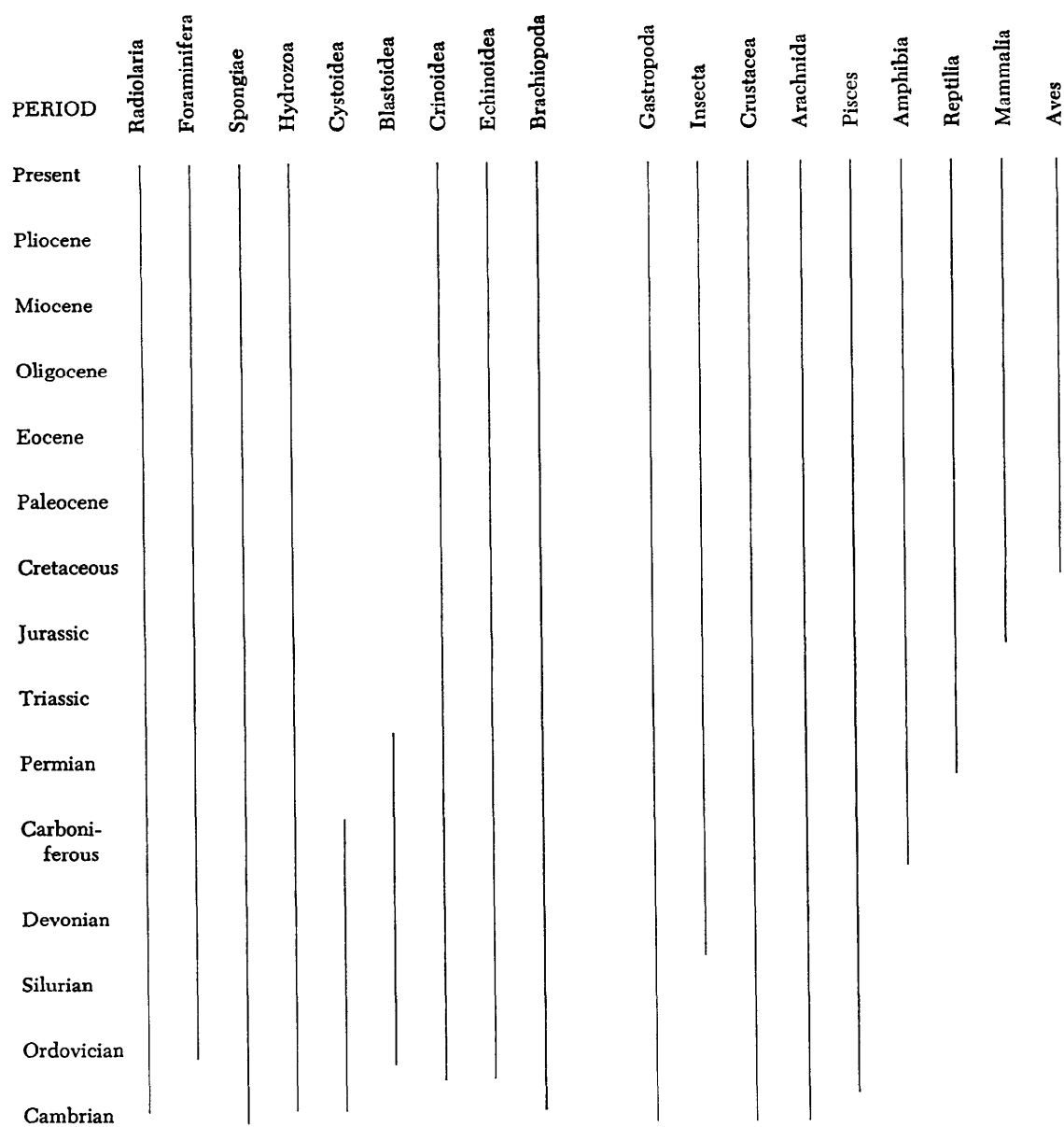
(Acknowledgement should be made of the fact that some zoological specialists did attempt to indicate in this British publication possible, limited "connections" by means of dotted lines, but such tenuous relationships as suggested always involve possible "connections" *within* major divisions of animals, i.e., Porifera, Brachiopoda, Mollusca, Agnatha, Amphibia, Aves, or Mammalia. No such limited "connections" were even suggested by any botanical specialists by way of the charts.)

Diagrammatic abbreviations of these 71 charts are provided in Charts 1 and 2. And these charts are corroborated by other charts in the *McGraw-Hill Encyclopedia of Science and Technology*²¹ and in textbooks by Raymond C. Moore²² and Neal Buffaloe.²³ Empirically demonstrable connections across limits of animal kind or across plant kind are required if discussion of the fossil record is to be raised above the level of *ad hoc*, untestable hypotheses, and the monophyletic position is to be given any type of empirical support based on analysis of fossils. Thus the monophyletic scheme of relationship, so widely and popularly accepted, fails of any empirical support from the fossil record.

Conclusions

Based upon a careful, five-fold examination, no empirically demonstrable data can be found which can "fit" the commonly, popularly accepted monophyletic explanation of relationship in diversity among animals or among plants.

By means of the Protein Phylogenies Test it is evident that mere circumstantial evidence is



— after O'Brien

Chart 1 — Generalized Geological Record of Animals
 Vertical lines represent duration of existence of each animal group. No common ancestors are known.
 (Based on Harland, W. B. and Others (Editors). The fossil record. London: Geological Society, 1967.)

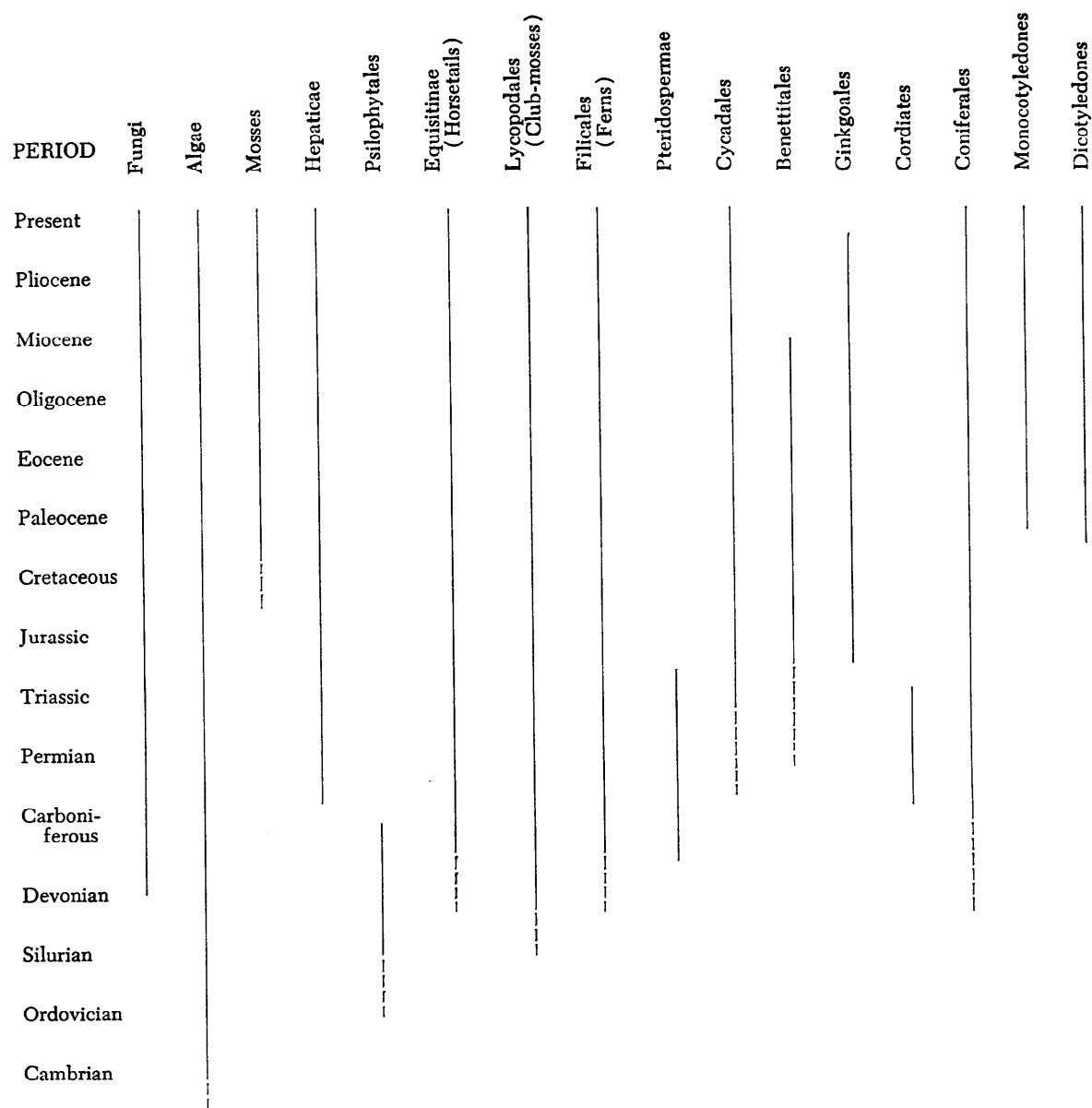


Chart 2—Generalized Geological Record of Plants. Solid vertical lines represent duration of existence of each plant group. Broken line portions indicate some doubts as to earliest appearance of some groups. No common ancestors are known. (Based on Harland, W. B. and Others (Editors). The fossil record. London: Geological Society, 1967.)

employed by developers of monophyletic trees based on protein similarities.

Dependency upon *ad hoc*, untestable hypotheses by monophyleticists was clearly identified by means of the Structural/and Numerical Mutations, Gene Mutations, Chromosome Number and DNA Quantity, and Fossil Record Tests. Furthermore, *no new traits* come from gene mutations.

Apparently the present is NOT the key to the past. Because of discernable gaps in breeding records between major kinds of animals, and because of gaps in the breeding records between major kinds of plants, the conclusion seems inescapable that known living varieties of animals and plants are actually manifestations of a concept of "fixity of kinds." And this conclusion is further strengthened upon consideration of the fossil record.

All the empirical data available from breeding records and from over 100 years of research into the fossil record can be used to support the conclusion that "fixity of kinds" exists today and has existed in the past in contradistinction to all the "trees" drawn by proponents of the monophyletic viewpoint.

Therefore, the following diagram, presented under the heading of "Explanation and Simplicity," seems most worthy of consideration as a manifestation of a *polyphyletic* viewpoint or interpretation of the SAME empirical data from breeding records and the fossil record as used by monophyleticists.

A complete contrast of position is presented in this diagram as the real empirical data are positioned in the center and two contrasting and opposing *interpretations* appear on either side. Which interpretation or explanation is in most agreement with the empirical data and which is in closest agreement with the practice of parsimony?

There is sound empirical basis for a polyphyletic interpretation, as compared with the opposite position of monophyleticists, that can be gained from close examination of breeding records of animals and plants, and further close examination of the fossil record.

Also the conclusion is plain that textbook authors and professional biologists, who interpret empirical data through an "exclusive" monophyletic viewpoint, are doing so in a selected indoctrinatory attitude far removed from careful examination of real data.

Therefore, specialists in phylogeny in so-called evolutionary history are duty bound to research and write in multiple hypothetical fashion of the contrast between a monophyletic interpretation of facts and polyphyletic interpretation of the same facts. Furthermore, science teachers and

professors, who use the results of research specialists, should be duty bound in *academic freedom and responsibility* to present BOTH monophyletic and polyphyletic interpretations. Each conceptual framework is offered by proponents as an interpretation of possible relationships of major groups of animals and major groups of plants.

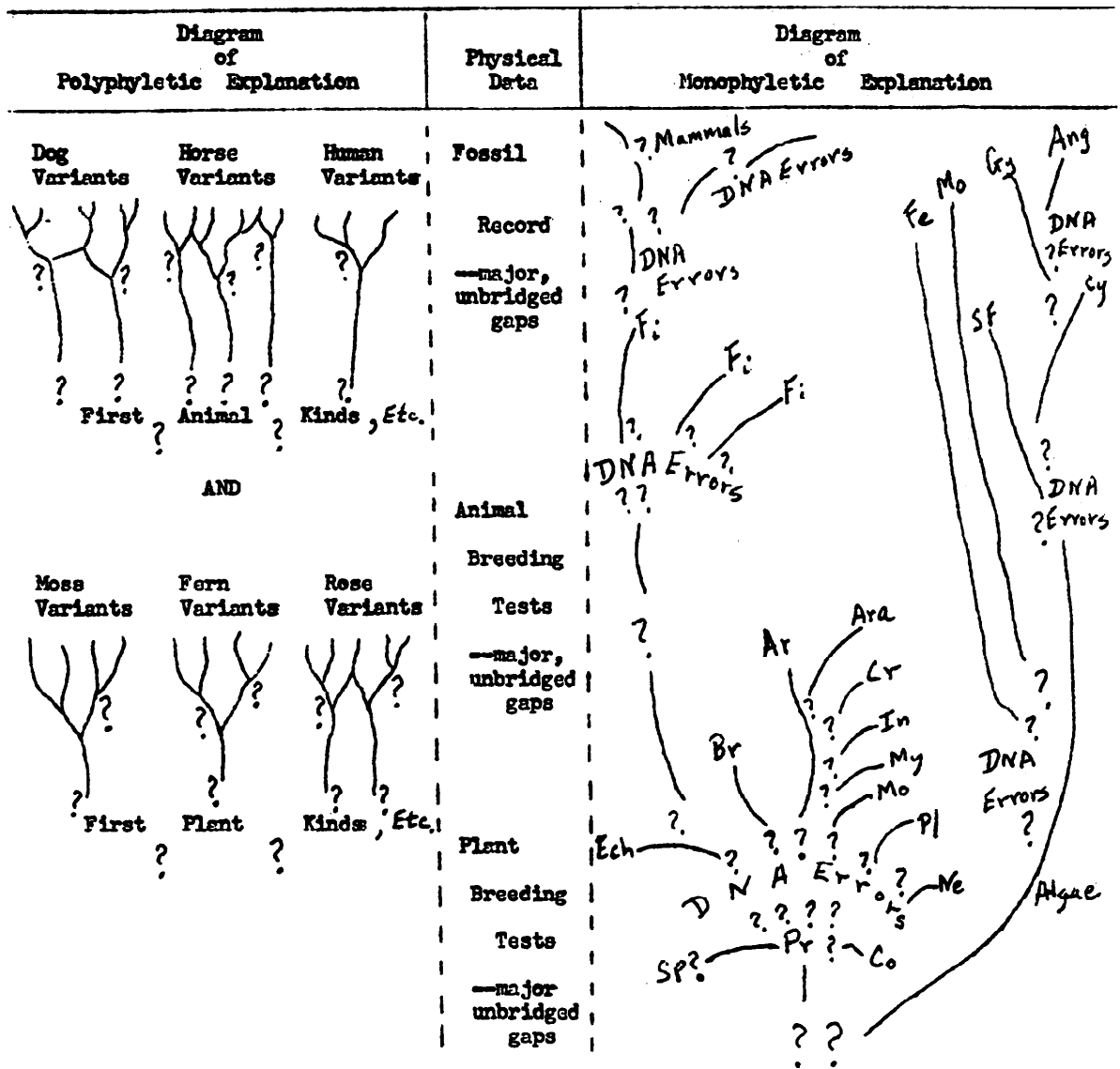
In a word, this paper is a call for immediate re-examination of all data from genetics, comparative anatomy, comparative embryology, rudimentary organs, blood and protein analyses, and the fossil record from the *polyphyletic* viewpoint. Also, this paper is a call for immediate introduction of *polyphyletic* interpretations into new textbook material, along side of the long dominant monophyletic interpretations, at all levels of American educational efforts.

If such a two-way treatment of polyphyletic along with monophyletic interpretation of possible relationships of major groups of animals and major groups of plants is practiced by textbook authors, and if such is followed by teachers and professors, then selected indoctrination of another generation of bright, independently thinking students regarding phylogeny might be avoided.

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- ⁷Dobzhansky, *Op. cit.*, p. 30.
- ⁸*Ibid.*, p. 413.
- ⁹Taylor, Hebden. 1967. *Evolution and the reformation of biology*. Craig Press, Nutley, N. J. He writes on p. 15, "That new genes do not arise by the introduction of new genetic building material (DNA) is also recognized by Dobzhansky in *Genetics and the Origin of Species*: 'The formation of new genes in evolution can be visualized only through radical modification of pre-existing ones'" (1953, p. 296).
- ¹⁰Potter, Van Rensselaer. 1971. *Bioethics, bridge to the future*. Prentice-Hall, Englewood Cliffs, N. J. p. 18.
- ¹¹Gardner, *Op. cit.*, p. 211.
- ¹²Koller, P. C. 1971. *Chromosomes and genes*. W. W. Norton & Company, Inc., N. Y. p. 23.
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- ¹⁴Dobzhansky, *Op. cit.*, p. 17.
- ¹⁵*Ibid.*, pp. 17-18.
- ¹⁶Keosian, John. 1960. On the origin of life, *Science*, 19 February: 479-482.
- ¹⁷Nursall, J. R. 1960. On the origin of the major groups of animals, *Evolution*, 16, March: 118-123.

Explanations and Simplicity



Which diagram fits the physical data better?

Which diagram agrees closest with the Rule of Simplicity?

J. N. Moore

- ¹⁸Berg, Leo S. 1969. *Nomogenesis or Evolution determined by law*. Paperback. The M. I. T. Press, Cambridge, Mass.
- ¹⁹Russell, Loris S. (in) *Evolution: its science and doctrine*. 1960. Edited by Thomas W. M. Cameron. University of Toronto Press, Toronto, Canada; Olson, Everett C. 1959. The evolution of mammalian characters, *Evolution*, 13, September: 344-353; Reed, Charles A. 1960. Polyphyletic or monophyletic ancestry of mammals, or what is a class?, *Evolution*, 14, September: 314-322; Romer, Alfred S. 1965. Possible Polyphylety of the vertebrate classes, *Zoologische Jahrbücher Abteilung Für Systematik*, 92: 143-156; Simpson, G. C. 1959. Mesozoic mammals and the polyphyletic origin of mammals, *Evolution*, 13, September: 405-414; Vaughn, Peter P. 1960. On the possibly polyphyletic origin of reptiles, *Evolution*, 14, June: 274-276; Hanson, Earl D. 1964. *Animal diversity*. Second Edition. Chapter 7, "Phylogeny." Prentice-Hall, Inc., Englewood Cliffs, N. J.; and Olson, Everett C. 1965. The evolution of life. Chapter 10: "Origins of Higher Categories." Mentor Book MT 648. The New American Library, N. Y.
- Interestingly, Charles Darwin was undecided as to the beginnings of living things, and wrote near the close of his *Origin of Species*, "I believe that animals are descended from at most only four or five progenitors, and plants from an equal or lesser number." And on the last page of his book Darwin referred to life starting into "a few forms or into one." Even today there is a minority of scientists who postulate, just as Darwin suggested, that living things have come from more than one organization of matter into living form.
- ²⁰Harland, W. B. and Others (Editors). 1967. *The fossil record*. London: Geological Society.
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A PHILOSOPHICAL NOTE ON CREATIONISM

HARRY V. WIANT, JR.*

Those of us in frequent contact with college students recognize that young people at this stage are forming the philosophical framework with which they will henceforth judge reality.

Some develop a materialistic philosophy. To them, life is a struggle for survival, a struggle to obtain money and that which it will buy.

Others adopt socialistic concepts and see the evolution of an all-powerful state as inevitable and as man's only hope.

Most accept an evolutionary explanation of origins and interpret all scientific findings through that theory. These students are usually surprised to learn that some professors, who they assume are educated men, believe in the literal creation as given in Genesis.

It should be understood that most students accept the evolutionary theory with a minimum of study of the evidence; and, one can gently point out to them that their education has been biased in that they have not considered the evidence for creation. It is helpful to indicate that belief in a Creator-God requires no greater faith than that required to believe the complexity of life on this earth was created by the god of time. Time is all the mechanistic evolutionist can be given; if he starts with matter of any kind, he must explain its origin.

Actually creationism or evolution must be accepted by faith, and all reality will be fitted by the believer into his adopted framework. Individuals who try to blend the two theories please neither camp and are confronted with a continually changing frame of reference. Even-

(Continued on page 198)

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THE CAP THROWER FUNGUS

GEORGE F. HOWE*

*The daily cycle of growth of **Pilobolus** filaments is discussed with emphasis on the manner in which this fungus aims at the sun. Many of the spore masses are discharged and glued on the leaves of distant plants because of an explosion in each filament at about 9:00 A.M. If the leaf, with spores attached, is consumed by a horse, the **Pilobolus** spores grow in the dung and another crop of fungus filaments matures. A plan for the laboratory study of **Pilobolus** is briefly discussed.*

*The lens system, biological timing, ballistic aiming, missile firing, and attachment devices of the **Pilobolus** are seen as unmistakable evidences of Divine creation in the world of fungi.*

Certain fungi have been equipped with amazing means for spreading their reproductive spores but *Pilobolus*, the cap thrower fungus, must surely be the most unique. It is able to propel its spores many feet by doing just what its name implies—throwing its cap which contains the spores.

Pilobolus is one fungus that thrives well in the dung of herbivores—particularly horses. A tiny, single-celled spore grows in this material forming a fungus network or “mycelium” that is largely without any dividing cross walls but forms a living tubular system with many nuclei.

Before long this branching mycelium produces some upright stalks called sporangiophores. A new crop of sporangiophores ripens each day for several days if the dung is moist and surrounded by humid air.

As the sporangiophore gets longer, it begins to swell just beneath a black mass of spores found at the tip.¹ A. H. Reginald Buller's drawing in Figure 1 shows how the tip of the tiny sporangiophore swells and enlarges. The sporangiophore is transparent as seen in Figure 2.

Buller recorded the typical development stages as follows: 1. a primordium appears at about noon, 2. the future stipe is visible by afternoon and is orange at its tip, 3. by evening the sporangium (black spore-filled cap) appears and is complete by midnight, and 4. after midnight the subsporangial region begins to swell while the stalk continues to elongate (see Figure 1).

By dawn the amazing finger-like filaments have emerged well above the surface and have become oriented so that they all point toward the sun at a low angle. As the sun “rises” higher in the sky, the filaments remain aimed at the sun and bend, following it upward.

A. H. R. Buller studied the optical properties of *Pilobolus* and found that the transparent subsporangial swelling acts as a miniature lens, focusing all light rays on one apparently light-sensitive spot near the base of the swelling! This lens action is evidently the means by which *Pilobolus* orients itself to the light and aims at the sun (see Figure 3).

Any ballistics student knows that a bullet will travel the greatest possible horizontal distance if the shell is fired when the barrel points at a 45° angle. As Buller found, such “knowledge” is built right into the firing system of this fungus. The subsporangial cavity expands under turgor pressure until it finally explodes, ejecting the sporangium in a parabolic course. But the explosion does not occur until about 9:00 a.m. (the exact time when *Pilobolus* has followed the sun to an angle of 45° with the horizon!). (See Figure 4)

The explosion occurs because a little ring breaks beneath the sporangium under the tremendous turgor pressure which develops. As the sporangium follows its trajectory, it may be carried more than five feet horizontally. A drop of liquid from the old subsporangium adheres to the sporangium and travels with it. When the sporangium hits some object (a grass blade, for example) the sticky liquid immediately flattens out under the impact and glues the sporangium to the very spot which it hits! (See Figure 5)

A new crop of explosive sporangia develops during the day and these are prepared for firing the following morning as described earlier. The whole process has great adaptive significance because the sporangium usually becomes attached to a leaf where it is likely to be consumed by a horse. The *Pilobolus* cycle will begin again when the spores develop in the dung after having passed through the animal's intestinal tract.

A unique teaching demonstration of this cycle can be prepared by simply placing some freshly collected samples of horse dung in a covered box (such as a shoe box). The samples should be kept damp but not too moist. This may be accomplished by water spray from an atomizer from time to time. In two to four days the cap thrower fungus will grow if any spores are present.

An interesting addition to the experiment may be gained by poking a pin into one end of the box to form a small pin hole. A bright source of light is then placed outside the pin hole. All other sources of light should be eliminated. Instead of following the sun, in this case *Pilobolus* filaments will adjust by aiming at the pin point of light and firing at the appointed time! A

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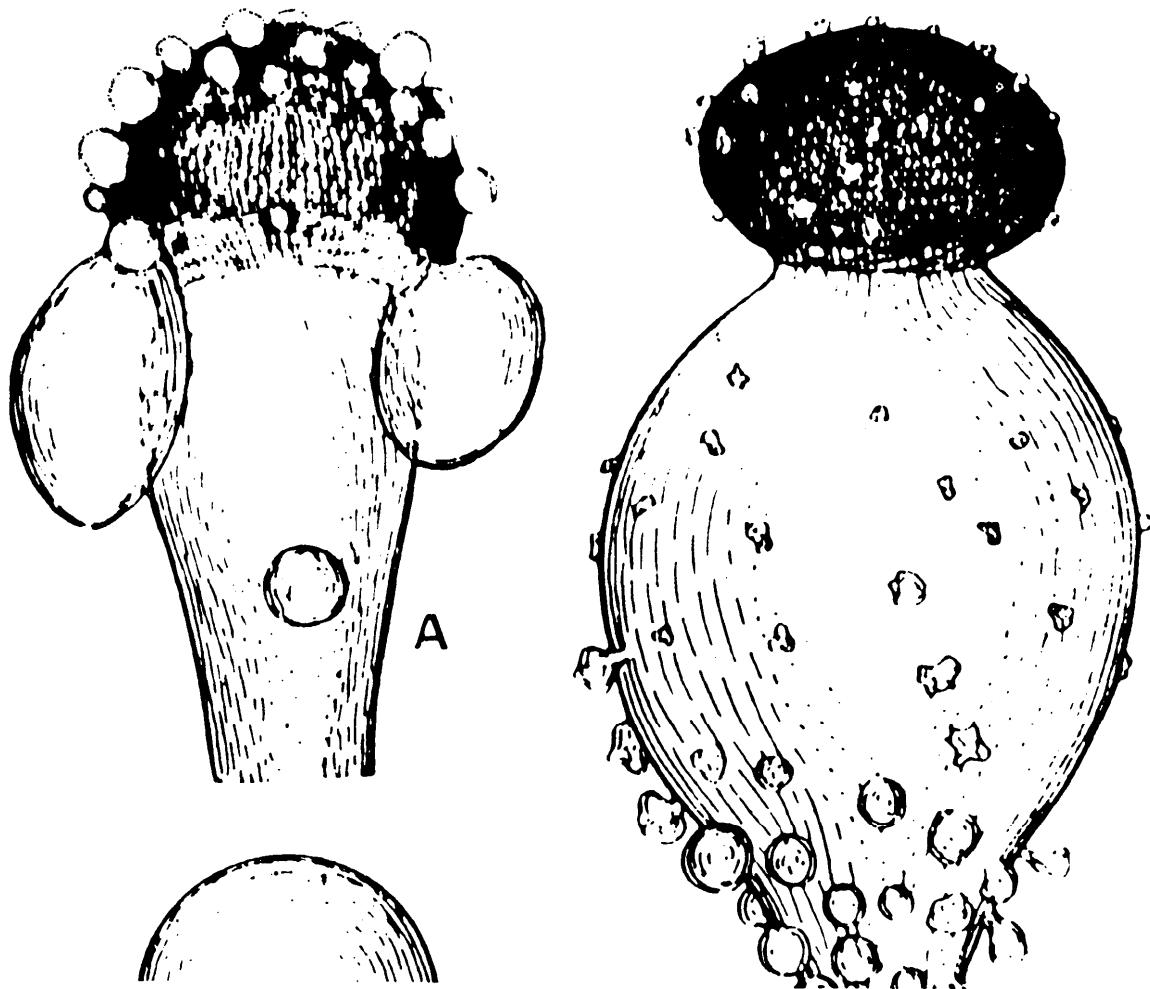


Figure 1. Development of the subsporangial swelling in *Pilobolus*. The black cap containing spores is figured here in both stages. Comparison of right with left shows the growth and swelling which takes place in the region just under the sporangium. Note active excretion of material also figured beneath the sporangium. This line drawing is after A. H. R. Buller, Langeron, M., and R. Vanbreuseghem. 1952. *Précis de mycologie*. Libraires de L'academie de medecine, Masson et Cie, Paris. p. 301. Used by permission of the publisher, Masson et Cie.

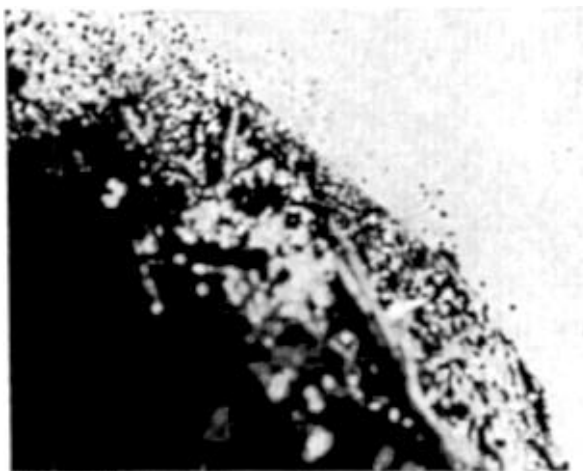


Figure 2. Photograph of *Pilobolus* filaments growing from dung. This photograph was taken of *Pilobolus* filaments raised in a shoe box as described, in the article. The picture was taken in the morning sunlight, showing the manner in which the filaments point toward the sun. Note tiny black spore masses (sporangia) above the crystal clear subsporangial swellings and filaments. Photo by George F. Howe.

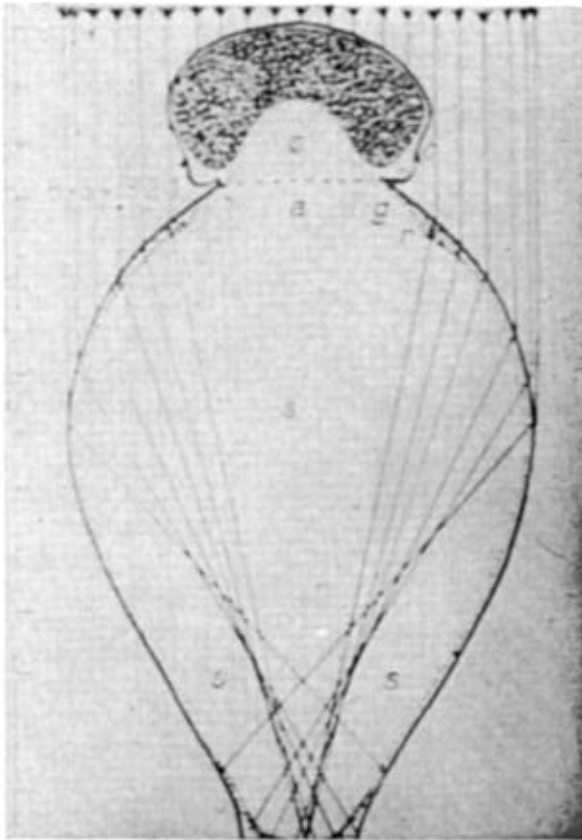
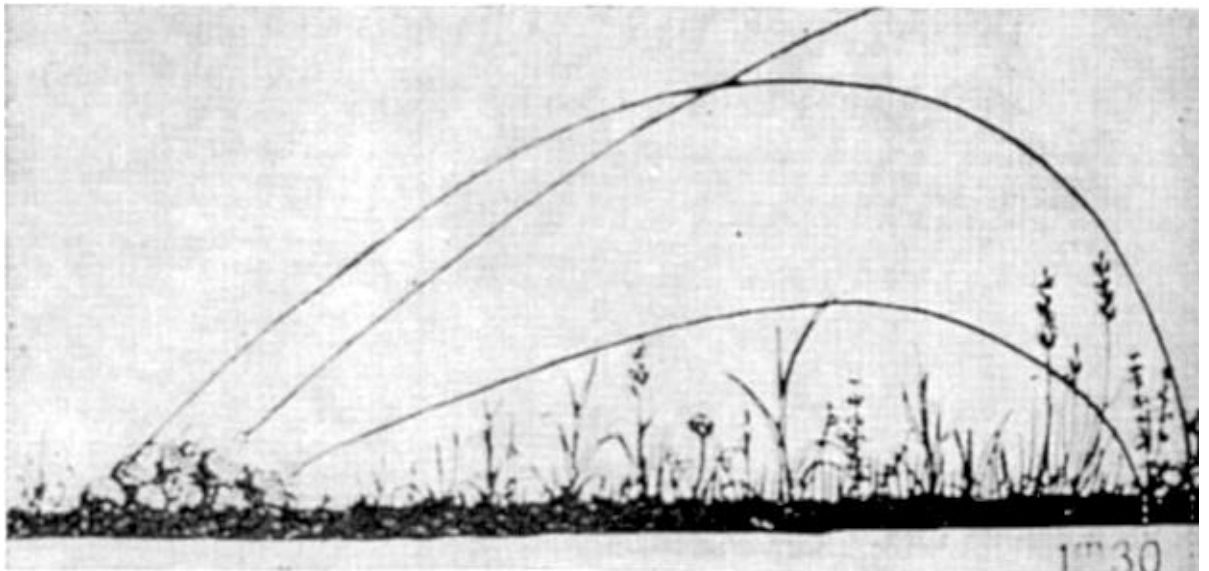


Figure 3. Lens action in *Pilobolus*. A. H. R. Buller produced a drawing showing the course of light rays through the subsporangial swelling of *Pilobolus*. The lens action is obvious with light being focused at a region in the base of the swelling which may be the site of photochemical processes involved in the orientation of *Pilobolus* to sunlight. This line drawing is after A. H. R. Buller, Langeron, M., and R. Vanbreuseghem. 1952. *Précis de mycologie*. Libraires de L'academie de medecine, Masson et Cie, Paris. p. 302. Used by permission of the publisher, Masson et Cie.



Suite de la résistance de l'air, ils descendent parvient à 2 m 15 ne parcourt horizontal emen

Figure 4. Trajectory of *Pilobolus*. Here A. H. R. Buller sketched pasture scene in which one group of sporangio-phores of *P. kleinii* seen on dung. Explosion of the subsporangial region while the filaments make a 45° angle with the horizon provides for a long trajectory and wide distribution of sporangia. It is obvious from the drawing and French words beneath that under favorable circumstances the sporangium may be fired for a distance of several meters. This line drawing is after A. H. R. Buller, Langeron, M., and R. Vanbreuseghem. 1952. *Précis de mycologie*. Libraires de L'academie Medecine, Masson et Cie, Paris. p. 305. Used by permission of the publisher, Masson et Cie.

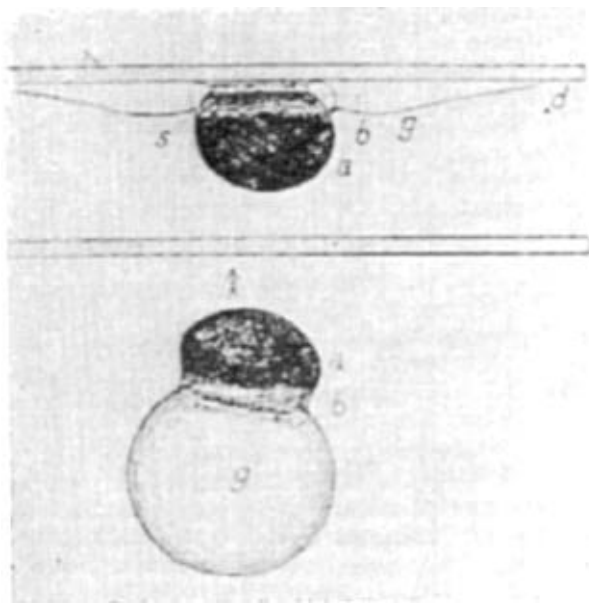


Figure 5. Impact and adhesion of *Pilobolus*. Buller's lower sketch shows a sporangium projectile with a drop of liquid from the old subsporangial region approaching an object such as a blade of grass (traveling in the direction of the arrow). When the sporangium lands (see upper drawing) the material adhering to the sporangium splatters out, acting as a glue cementing the sporangium to the leaf where it may possibly be eaten by a horse. This line drawing is after A. H. R. Buller, Langeron, M., and R. Vanbreuseghem. 1952. *Précis de mycologie*. Libraires de L'Académie de Médecine, Masson et Cie, Paris. p. 306. Used by permission of the publisher, Masson et Cie.

"scatter pattern" of sporangia found glued close to the region surrounding the pin hole of light will be a testimony to the accuracy of *Pilobolus*!²

Here in a "lowly" fungus is a light sensing ballistic system that points the sporangiophores unerringly toward a light source (usually the rising sun). Here too is a biological clock which causes the subsporangial swelling to explode at the time when the angle of trajectory will insure the greatest horizontal distance of travel. Here is a fungus that literally "blows its top" at just the right time and in just the right manner to guarantee its spores a better chance to enter the digestive tract of a horse! Here is a fully planned system which fits well with the design expected in a wise Creator's handiwork. But here too is a significant problem to anyone who holds that life developed by chance.

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¹Excellent line drawing of this growth process and other steps involved in the development of *Pilobolus* were made by the careful Canadian researcher, A. H. Reginald Buller. Buller produced a series of volumes on fungi. Reference material regarding *Pilobolus* in particular may be found in Part I, chapters 1 and 2 of: Buller, A. H. R. 1934. *Researches on fungi*. Vol. 6. Longmans Green, London.

²The author is indebted to Dr. Ralph Emerson, noted mycologist, for this suggestion regarding classroom use of *Pilobolus*. The author's own introduction to this fascinating fungus came during a lecture by Dr. Emerson at the National Science Foundation Summer Institute of Botany held in conjunction with the Botanical Society of America at Washington State University, Pullman, Washington, 1961.

WHY GENETIC VARIATION BETWEEN NEW GUINEA COMMUNITIES? (MIGRATION-DISPERSION MODEL APPLIED)*

R. DANIEL SHAW**

As members of small populations migrating from a relatively large common source are subjected to premature death through warfare, epidemic disease, and other unusual events, genetic drift is greatly accelerated. Migration coupled with unusual events is offered as the primary mechanism in producing genetic variation between the populations of New Guinea. This theoretical interpretation fits well with the facts, presented in table form, and solves a distribution problem of some complexity.

Introduction

The island of New Guinea offers an excellent opportunity to apply and develop theories and concepts in all areas of anthropology. The diversity in linguistic and genetic make-up displayed by populations on the island is particularly striking. Until very recently, isolation has been a

fact of life and is still the key to understanding existing diversity.

From the genetic standpoint, New Guinea provides opportunity to use the Migration-Dispersion theory^{1,2} and note its application to living populations. It must be made clear at the outset that this is in no way considered to be a validation of the theory since conclusive evidence necessary for validation is not available. Much of the material is in the form of tribal tradition and folklore which, while apparently supporting the hypothesis, can not be considered conclusive. It is, however, interesting to combine

*The author gratefully acknowledges that a portion of the research involved in preparation of this paper was funded by the New Guinea Research Fund.

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this material with genetic data available and note the similarity between an application of the theoretical model and the actual known diversity.

Migration-Dispersion Model

Briefly described, the Migration-Dispersion theory recognizes that as individuals migrate in small numbers from a common gene pool, the new group becomes more variable than the source group. Since migrants have isolated themselves from the parent stock, new generations come only from a limited gene pool, making the migrant group more variable. Selective forces acting on this new group would produce further diversification from the original genetic source.

Previously,³ I have applied this theory to the distribution of hominid fossils throughout the Old World. That distribution shows that the most "primitive" types appear on the periphery, while the most morphologically "advanced" forms appear closer to the center of the Old World, the Mesopotamian Valley. People migrating from this region, encountering conditions as they existed prior to the Biblical Flood, and finally being subjected to the Flood itself could produce great variation resulting in the hominid fossil record we observe today.

Genetic Diversity Noted

The origin of the New Guinea peoples remains in dispute. Coon⁴ sees the people as an outgrowth of the Pithecanthropoid Pleistocene population, while Macintosh⁵ feels the "Papua-Melanesians" appear to have developed in Southeast Asia and may have somewhat hybridized there before migrating to Oceania. I would tend to agree with Macintosh on this point, since, as noted previously, any Pleistocene populations that may have existed would have been destroyed by the Biblical Flood.

Regardless of their origin, the New Guineas have in the past tended to isolate themselves into relatively small local groups which have become linguistically⁶ and genetically^{7,8} diversified from their neighbors. Reasons for such diversification have been open to question for some time and yet have received relatively little attention in the literature. One possible reason for this is the relative lack of data available.

However, I have compiled genetic data (ABO, MNS and Rh blood groups) for thirty-seven areas spread over the entire island of New Guinea in an attempt to discover any relationships or factors which might correlate with this diversity (See accompanying map and table).

These data present a near random distribution that eludes any attempt to correlate frequencies with linguistic groups, culture areas, disease, or environment. Though each of these factors may have a part in shaping the frequencies in any

given group, there are no correlations apparent which can be attributed to any one factor.

Populations of close proximity exhibit quite dissimilar gene frequencies (compare Telefolmin, Kopiago and Oksapmin), while they compare with other groups in dissimilar conditions. Frequencies between highlands and lowlands do not indicate any overall environmental trends of selection, high and low frequencies of any one gene being found in adjacent populations which are presumably subject, at least, to the same environmental pressures. Therefore it is impossible, at least with the present data, to plot any gradients, or clines, due to the apparent sudden shifts in frequencies from one region to the next.

Factors Contributing to Diversity

What factors could contribute to this type of near random distribution? I would like to briefly discuss two interrelated factors, unusual events and migrations, and note how these relate to the theory at hand.

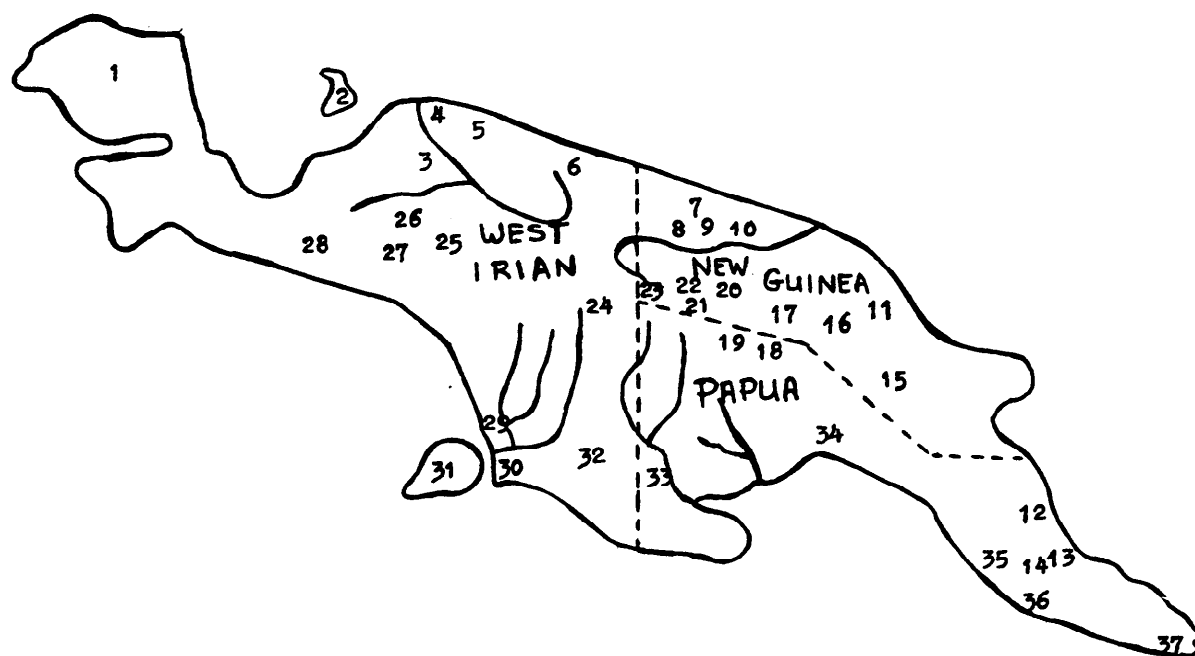
Unusual Events: Physical anthropologists have long agreed that populations are subject to selective forces. Gajdusek³⁰ has proposed another factor which could also play an important role. "Strange historical accidents," or unusual events, can singly or collectively have a varied effect in changing the gene frequency patterns.

Populations ravaged by disease, natural calamity, or social disruption leave only a relatively few men and women to propagate the next generation. Selective forces, of course, can only act upon the genes present, and if some are dropped, either through genetic drift, migration, or unusual event, they will be lost to future generations which reflect the genetic make up of the "founders."

An example of an unusual event could be the occurrence of disease in a community. Epidemic diseases are known to be prevalent throughout New Guinea. Malaria is endemic up to 5000 feet elevation and filariasis is prevalent as is yaws and, more recently, leprosy, tuberculosis, and influenza. Infant mortality due largely to infections, malaria and malnutrition has been high until very recently.³¹

Warfare, headhunting practices and sorcery disputes could be considered unusual (or not so unusual) events with social overtones. When individuals are thus removed from the gene pool, future generations are deprived of their genetic potential.

Therefore, epidemic disease, near continuous warfare, and headhunting and sorcery practices, continuing to the present in remote areas, undoubtedly have had an effect on the diversity of the New Guinea peoples. Furthermore, all such "removals" reduce the population and create



Northern (lowlands)

1. Sorong
2. Biak
3. Mamberamo
4. Martewar
5. Sarimi
6. Nimboran
7. So. Arapesh
8. Mid-Sepik
9. Maprik
10. Boiken
11. Madang
12. Ewa Ge
13. Orokaiva

Central (highlands)

14. Goilala
15. Kukukuku
16. Chimbu
17. Mt. Hagen
18. Mendi
19. Tari
20. Wabag
21. Kapiago
22. Oksapmin
23. Telefomin
24. Star Mtns.
25. Pyramid
26. Mulia
27. Uhunduni
28. Wissel Lakes

Southern (lowlands)

29. Asmat
30. Auyu
31. Fredrik Hendrik Is.
32. Mandobo
33. Western Dist.
34. Kikori
35. Motu
36. Koita
37. Milne Bay

a greater chance of inbreeding with the associated likelihood of variability as a consequence.

Migrations: Macintosh³² maintains that the introduction of new genes through migrations may also help to explain the diversity. He feels that the original population had a common origin and became fairly homogeneous. This stable situation may have been subsequently modified by later intrusions which reached the coasts and followed the rivers altering the existing gene pools as they went. The extent of inter-mixture would, of course, depend upon selective forces acting on the newcomers, including environmental and cultural factors.

The Migration-Dispersion model is almost the antithesis of Macintosh's ideas, viewing the diversity as a result of migration away from a common

gene pool rather than movement into a stable pool. Linguistic classifications, especially in the highlands, "indicate the probability of a common source, or related sources."³³

As people moved out from a common source, probably in relatively small groups, they would become isolated by natural geographic barriers (which abound in New Guinea). This separation would reduce the gene flow, forcing the individuals to inbreed.

Small groups tend toward greater diversity since mutant genes are more frequently brought together in the homozygous condition and are thus expressed phenotypically. A small isolated population gives rise to individuals who represent the limits of potential variability in the original population which may not show up otherwise

TABLE 1

Locality Northern (lowlands)	Number tested	A	ABO B	O	mS	MNS ms	nS	ns	R ₁	Rh R ₂	R ₀
1. Sorong ⁹	25	0.15	0.10	0.75	0.	0.24	0.06	0.70	0.94	0.02	0.04
2. Biak ⁹	183	0.10	0.12	0.78	0.	0.26	0.04	0.70	0.93	0.06	0.01
3. Mamberamo ¹⁰	122	0.12	0.20	0.68	0.04	0.22	0.01	0.72	0.99	0.01	0.00
4. Martewar ¹¹	199	0.15	0.30	0.55	0.12	0.04	0.07	0.77	0.98	0.02	0.00
5. Sarmi ¹¹	59	0.36	0.09	0.55	0.01	0.24	0.	0.75	0.93	0.05	0.02
6. Nimboran ¹²	127	0.24	0.08	0.68	0.	0.03	0.	0.97	0.91	0.09	0.00
7. So. Arapesh ¹³	85	0.19	0.15	0.66	0.04	0.08	0.15	0.73	0.87	0.12	0.01
8. Mid-Sepik ¹³	47	0.45	0.14	0.41	0.06	0.03	0.17	0.75	0.81	0.15	0.04
9. Maprik ¹³	71	0.28	0.21	0.51	0.	0.18	0.12	0.70	0.92	0.07	0.01
10. Boiken ¹⁴	158	0.21	0.18	0.61	0.	0.04	0.22	0.74	0.87	0.08	0.05
11. Madang ¹⁵	26	0.29	0.19	0.52	0.	0.12	0.32	0.56	0.92	0.08	0.
12. Ewa Ge ¹⁶	191	0.34	0.14	0.52	0.00	0.11	0.20	0.69	0.94	0.04	0.02
13. Orokaiva ¹⁶	49	0.26	0.09	0.65	0.08	0.18	0.22	0.52	0.88	0.07	0.05
Central (highlands)											
14. Goilala ¹⁷	433	0.12	0.09	0.79	0.	0.05	0.06	0.89	0.97	0.02	0.01
15. Kukukuku ¹⁸	111	0.34	0.06	0.60	0.	0.10	0.04	0.86	0.83	0.13	0.04
16. Chimbu ¹⁹	864	0.25	0.16	0.59	0.	0.02	0.15	0.83	0.89	0.08	0.03
17. Mt. Hagen ²⁰	473	0.21	0.20	0.59	0.	0.04	0.15	0.81	0.95	0.04	0.01
18. Mendi ²¹	59	0.22	0.11	0.66	0.	0.01	0.14	0.85	0.97	0.03	0.
19. Tari ²¹	54	0.20	0.16	0.63	0.	0.01	0.09	0.90	0.91	0.09	0.
20. Wabag ²²	2608	0.24	0.12	0.64	0.00	0.05	0.20	0.75	0.93	0.05	0.02
21. Kapiago ²³	188	0.15	0.21	0.64	0.	0.08	0.02	0.90	0.90	0.05	0.05
22. Oksapmin ²⁴	147	0.06	0.10	0.84	0.	0.06	0.01	0.93	0.78	0.12	0.10
23. Telefolmin ²⁵	134	0.22	0.06	0.72	0.	0.06	0.01	0.93	0.85	0.08	0.07
24. Star Mountains ²⁶	166	0.08	0.18	0.74	0.	0.02	0.	0.98	0.97	0.02	0.01
25. Pyramid ¹¹	386	0.19	0.25	0.56	0.	0.10	0.01	0.89	0.98	0.02	0.00
26. Mulia ²⁷	184	0.17	0.39	0.44	0.	0.10	0.	0.90	0.91	0.08	0.01
27. Uhunduni ²⁷	47	0.11	0.15	0.74	0.	0.12	0.	0.88	0.96	0.04	0.
28. Wissel Lakes ²⁷	214	0.03	0.12	0.85	0.	0.10	0.02	0.88	0.82	0.15	0.03
Southern (lowlands)											
29. Asmat ²⁷	338	0.21	0.13	0.66	0.	0.02	0.04	0.94	0.95	0.03	0.01
30. Auyu ²⁷	71	0.22	0.15	0.63	0.	0.03	0.09	0.88	0.87	0.09	0.04
31. Frederik Hendrik Is. ²⁷	22	0.07	0.10	0.83	0.	0.09	0.05	0.86	0.91	0.09	0.
32. Mandobo ²⁷	39	0.12	0.03	0.85	0.	0.17	0.18	0.65	0.83	0.17	0.
33. Western District ¹⁵	52	0.22	0.11	0.67	0.	0.06	0.11	0.83	0.91	0.04	0.05
34. Kikori ²⁸	339	0.21	0.12	0.67	0.	0.04	0.10	0.86	0.95	0.04	0.01
35. Motu ²⁹	459	0.13	0.18	0.69	0.	0.24	0.06	0.70	0.94	0.06	0.00
36. Koita ²⁹	294	0.12	0.16	0.72	0.	0.18	0.09	0.73	0.86	0.14	0.
37. Milne Bay ¹⁵	74	0.20	0.10	0.70	0.	0.28	0.15	0.57	0.91	0.04	0.05

(Note that frequencies represented by 0.00 indicate a frequency of less than 0.005 before rounding to two significant figures.)

since a large population reduces the likelihood of closely related individuals mating.

Related individuals are more certain to have mutant genes at the same loci and in isolated communities these are brought together more frequently resulting in offspring which show greater variability. Therefore, variability in small populations is also directly related to the corresponding increase in inbreeding, accelerating the genetic change affected by natural forces of selection. These natural forces are, in turn, affected by disease, social disruption and other

calamities which further change the genetic inheritance of succeeding generations.

Such subdivision of populations was noted by Wright³⁴ and is considered to be very conducive to rapid change. Neel³⁵ feels that the type of dispersion noted here is "the single most important step" in the formation of a genetically distinct population. He goes on to say:

These villages . . . tended to consist of related individuals, thus providing unusual scope in man for what we have termed the 'lineal effect' in establishing subpopulations

whose gene frequencies are quite different from those of the parent population.³⁶

Such genetic and cultural isolation could thus be vital forces in creating the variations observed today. In nearly every tribe there are traditional origin stories which mention prehistoric migration of all or part of the tribe. In many instances there are accounts of migrations during the past century, indicating that migration is a continuing process affecting the present genetic distribution. As new waves of migration occur, the earlier migrants appear to be pushed further in the same direction. Observe the present spreading of large languages in the highlands at the expense of smaller, more closely related languages which have in some cases been surrounded, assimilated, or pushed to peripheral lands.³⁷

Model Applied

Remembering the theoretical nature of the Migration-Dispersion model, and that this is an application not a validation, I would like to briefly hypothesize a series of events using the model and note the results.

Beginning with the assumptions made by Macintosh,³⁸ the "Papua-Melanesians" possibly migrated to New Guinea, in relatively large numbers, from somewhere in Southeast Asia. Arriving on the coasts of what was probably a largely uninhabited island, they settled down to living off the land and establishing their position on it.

As the population began to grow, it is natural to expect that it would expand geographically, eventually moving up the river valleys and into the highlands. Pushed by new waves of migrants, these small, relatively mobile groups were affected by unusual events as well as other selective forces which resulted in varying degrees of genetic drift, and produced after several generations a population which was not only distinct from other isolated groups but quite different from the source group as well.

Continuous change that brought about such conditions would result, in fact, in considerable variation within a relatively short time as noted by Cavalli-Sforza.³⁹ In the highlands, lexical material indicates a continuous development of linguistic diversity of about 6000 years,⁴⁰ a time span which agrees well with the archaeologists.⁴¹

Conclusion

Diversity, then, is a fact of life in New Guinea. I have attempted here to apply a theoretical model to a problem and note the results. The Migration-Dispersion model appears to answer some of the questions in a relatively plausible manner. This is not to say that other explanations are not valid, it simply presents one possibility. It could well be that when further data are available the apparent genetic diversity will not

appear as great. Only thirty-seven areas are included here, thus the sampling is very small considering there are probably nearly 1000 tribal (language) areas on the whole of New Guinea. Clearly more data are necessary.

Another factor contributing to the variability is that published figures are only *estimates* of gene frequency, being based on a sample taken from the population. The smaller the sample the larger the standard error, and sample size varies considerably. For this reason all figures noted have been reduced to two significant figures.

Natural forces of selection have without doubt had an effect on New Guinea populations. Premature death through epidemic disease, warfare, and other unusual events acts upon small migrating groups to accelerate genetic drift, thus increasing variability. Migration, then, coupled with unusual events and natural forces could well have produced the genetic diversity noted in data available among populations on the island of New Guinea. While evolutionists posit gradual processes to produce such change, it is here suggested that the change was rapid as a result of small populations living in isolated circumstances and being subjected to unusual events. Thus long periods of time would not be necessary to produce the differences seen.

The type of data presented here could be offered as evidence of what might have occurred on a much larger scale to produce the "living races of man" since the Biblical Flood. Since that Flood, man has proliferated at a much slower rate than other creatures, producing only distinct *races*, the cross breeding of which all produce viable offspring.

The races do, of course, display a high degree of adaptability to the environmental conditions in which they find themselves *e.g.* the Australian Aborigines and natives of the Magellan Straights are highly adapted to extreme cold while natives in the high Andes are adapted to living in high altitudes. Others entering these areas of environmental stress can, however, cope by using cultural items (clothing, housing, heating devices and oxygen). It probably is man's ability to use culture to his advantage thereby manipulating the environment that has enabled him to exploit new situations and reduce genetic variation.

The very action of God at the Tower of Babel may have had a direct bearing on the mechanism discussed here. As a result of this incident the tongues and languages were suddenly and rapidly developed and man was dispersed throughout the Earth. As he went, man carried his genetic heritage with him and as he moved from the large common gene pool at Babel and dispersed, the result was small migratory populations scattered about the Earth.

The populations within New Guinea though by no means approaching racial distinctions do provide for observation and recording of the mechanisms at force to produce genetic variation. As indicated earlier, the Migration-Dispersion model fits with the data presented. Though more data are needed and perhaps other creationist models are valid at this point, the Migration-Dispersion model provides a description which fits with the Biblical account and solves a population distribution problem of some complexity.

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COMMENTS ON SCIENTIFIC NEWS AND VIEWS

HAROLD ARMSTRONG*

Convergence in Thermoregulation

Sphinx moths, when at rest, have a temperature very nearly that of their surroundings.¹ Under cold conditions, they can move only sluggishly. In order to prepare to fly, they have to do "warming-up exercises," by flapping their wings slightly. The colder they are, the longer it takes to warm up.

When they are active, of course, the insects have to lose heat to the surroundings; and they have to control the rate of loss so as to keep themselves at a suitable temperature. Apparently the circulatory system, by controlling the distribution of heat throughout the body, controls the rate of loss of heat as in reptiles!

Evolutionists seem to hold that insects and reptiles "evolved" separately. If they arose from some creature living in the water, the ancestors both of insects and of reptiles, upon emerging, suddenly had to find some means of regulating their temperature. Is it not odd that much the same system appeared in both independently?

Indeed, the author noticed this point. He remarks that the larger sphinx moths are about as large as a humming bird and that their (alleged) ancestors met similar problems, and solved them in similar ways. This, of course, is called "convergence."

Note that according to the "convergence" concept, if we find similarities in a half-dozen books by one author we say that piles of type were thrown together at random in the printing shop; the printers "selected" those that seemed to make some sense (remember the system of this kind which Gulliver found on his travels?); and the similarity of the books is due to "convergence."

Indeed, it would have been odd had even *one* ancestor hit upon a suitable regulating system. In the water there would be no advantage to it and therefore no "selection"; out of the water it had to work well. Here "gradualism," can provide no explanation, but the difficulties vanish when we look upon these creatures as the work of a wise Designer.

Creation Evidence from Algae

The alga *Mougeotia* has one flat disc-shaped chloroplast, with which to carry out photosynthesis. In blue or bright white light the alga is found to turn the chloroplast edge-on to the light; in dim white or red light it turns it flat-side-on. This, presumably, is to get enough light, but not too much. The chloroplast is turned by "tiny contractile protein fibres"^{2, 3} which would seem to correspond to muscles in larger creatures.

How could such a thing have evolved? It would be an incredible coincidence if the chloroplasts and the "muscles" should have evolved together. The muscles would scarcely be expected to have come first, when there was nothing for them to do. If the chloroplasts came first, what incentive was there to evolve muscles, without which things were already working well? The whole creature is one working unit, and it is much easier to believe that it was created thus.

Vestigial Theory Becoming a Vestige

Perhaps nobody really believes in organs which are just "vestigial" anymore. But the notion is still perpetuated in some books.

It appears that no organ is really useless. Tonsils and adenoids, for instance, were once thought to be of little use. Now it is suggested that, at a certain age, they play an important part in swallowing.⁴

Children of a few years old, it is proposed, because of the relative sizes of throat, tongue, and palate, need something else, to fill up excess space, and possibly as a guide, so that they can swallow readily. The same problem does not arise either when they are younger or as adults. Here the tonsils and adenoids play a part. They may also, it is suggested, help in speaking. Being composed of lymphoid tissues, they may have some defensive use. These conclusions were arrived at by some studies with X-rays.

It could be noticed that the theory of vestigial was always particularly illogical. For its advocates proposed that the creature kept some of the vestigial, which by hypothesis were of no use, and lost features which could have been useful. For instance, would a coat of hair not have been a real advantage to primitive man (according to the evolutionary view)? So the notion is sometimes in direct contradiction with "survival of the fit."

Evidence for Recent Sedimentation

In the study of the Flood, some have wondered whether the sedimentary rocks could really have been formed so recently. It is not hard to believe that the sediment could have accumulated quickly; the question has been whether it could have hardened in a short time. There is, however, evidence to show that certain sediments have hardened within historical times.^{5, 6}

In certain places in the Mediterranean, especially, there are "... hard rocky sea beds formed by recent underwater cementation of carbonate sediments ...". One proof that they are recent is that fragments of pottery are found in them, cemented by "... high-Mg calcite within the lithified algal framework ...". It is concluded

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that "... the lithification must accordingly be a recent process which most likely still is taking place ..."

Incidentally, we need not conclude that the sedimentary rock necessarily assumed its final or present form immediately after the Flood.

Some other investigators, although they do not find the dramatic evidence of the pottery, reach the same conclusion.⁷ They find, "Modern terrigenous sediments cemented by low-magnesium calcite ...", and conclude that the processes responsible "... may include dissolution of calcareous shells ... followed by precipitation of calcite ...".

When we consider, then, the amounts of sediment, and of water, involved in the Flood, and the materials, suitable for cementing, which may have been dissolved in the water, it is not so very hard to see that the sedimentary rocks could, indeed, be only a few thousand years old.

Rapid Growth of Quartz — Application to The Flood

Silica can dissolve in the sea water to a certain extent; at 25 C, which might be typical of some ocean water, the concentration reached slightly over 4 ppm.⁸ In three years there was an appreciable growth of quartz crystals. It is concluded that: "... quartz growth in nature may occur in relatively short intervals of time ...".

These observations may apply to the problem of the formation of sedimentary rocks which uniformitarians cannot explain. Is it supposed that relatively thin layers of earth or sand, such as we find today, hardened somehow? But in no place does the earth turn gradually into stone, or a sand dune into sandstone, as we go down.

Was the sediment collected, miles deep maybe, into huge pits, or something of the sort to become the geosynclines? But is it really likely that a pile of mud could be raised a mile or more without eroding and sliding away drastically, and without great distortion of the strata?

It is much easier to understand many of the rocks in terms of the Flood. Enormous deposits of sediment were collected while the water covered the earth. At the same time there was incorporated in the sediment some cementing agent, which had been dissolved in the water.

The silica just mentioned could well have been one. If the breaking up of the fountains of the great deep refers to the bursting forth of water from underground, it seems very likely that such water, which had been at high temperatures and pressures, would have had many minerals dissolved in it, various ones of which might have helped in the cementing. The cement was perhaps half set at the end of the Flood, when parts of the earth were raised out of the water; it was hard enough that the strata did not merely go

into a jumble, but soft enough that they could fold and bend.

There is a natural volcanic product which was used as a cement, which set when mixed with water, in Roman times. It is highly likely that the eruptions, which went along with the flood, would have mixed much of that or a similar cement with the water.

Poynting-Robertson Effect and a Young Solar System

It has been mentioned in this *Quarterly*⁹ that were the Solar System as old as the uniformitarian theory would have it, there would be no dust and small particles at all left in the system. For very small particles would be pushed out by the pressure of the Sun's light. For larger ones just the opposite would happen; their re-radiation would cause a braking effect, their orbits would shrink, and eventually they would fall into the Sun.

The author of a recent review article takes many factors into consideration and then draws much the same conclusion.¹⁰

Particles are swept in toward the Sun, until they start to evaporate. The effect of the evaporation may cause extremely small particles to move away from the Sun again, and they move right out of the Solar System. Larger ones just evaporate. So in any event the particles are removed from the System.

When the possibility of electrical and magnetic effects, brought about by the solar wind, is considered, it is found that they enhance the Poynting-Robertson effect, speeding it up by about thirty per cent. So all the conclusions that creationists have drawn remain valid, and, in fact, even stronger.

Tektites and a Young Universe

Now another evidence for a young universe has appeared, in the course of some investigation of the peculiar meteorites known as tektites and australites.¹¹

The notion is that, while the meteorites were in outer space, they were being bombarded by cosmic rays. Thus certain nuclear reactions would be caused, and, in particular, carbon-14 would build up. After they had landed on the Earth, where the cosmic rays are much less intense, the carbon 14 would decay again. If the amount which they had when they struck the Earth can be estimated from the present amount, then there is some evidence as to the time which they spent in outer space.

In the particular case mentioned, the results gave a maximum time of exposure to cosmic rays, and hence spent in outer space, of about 1,000 years. There are uncertainties in this, for one thing because it is not very certain how long they have lain on the Earth; but some other evidence

gives an upper limit on their stay in space of about 100,000 years.

If it is supposed that the meteorites have been out in space at least since the Solar System was formed, this presents obvious difficulties to uniformitarian theorists. It might be claimed that they were ejected from, or are fragments of, some larger body; but there seems to be no independent evidence for such a thing.

Meteorite Organic Matter

Much has been spoken and written about the traces of organic materials which have been found in certain meteorites, such as the Murchison meteorite, which fell in Australia. Yet, it has been known for a long time that such organic materials as methane were present in the giant planets, so it does not seem so surprising that some should be found in a meteorite.

Of course, there are those who, because of uniformitarian prejudices, want to find living things elsewhere than on the Earth; the making so much of a little organic material in a meteorite represents their grasping at straws.

A long report on some analyses of these materials contains the conclusion that, while from outside the Earth (i.e., they are not contaminants), they are not of biological origin.¹²

Oddly enough, the author goes on to speculate about the possibility of life outside the Earth, and to try to tie these organic materials in with the speculation somehow. But, of course, the meteorites furnish no evidence whatever of anything living outside the Earth.

Universal "Knowledge," Solar System Ignorance!

A report of recent discussions by members of the Royal Society and the Royal Astronomical Society on the origin of the Solar System concludes that: "... there are as many theories on the subject as there are researchers ... a solution is no nearer now than it was 300 years ago."¹³

Moreover, every theory runs into difficulties. For instance, as for the theory which would have eddies in a nebula condense into planets: "... the accretion of a planet would take about 10^8 years and this is a factor of 10^5 greater than the eddy lifetime ..."

Despite all this, there is constant talk of the "big bang," "primeval fireball," etc., as if they were historical facts. About the Solar System, which is relatively near both in time and in space, we can reach no certain conclusions.

But for things far more distant, much certainty is claimed. Perhaps that we have enough in-

formation about the Solar System to be able to see the faults in any theory which may be proposed. But we are simply so ignorant about the universe that one theory seems about as good as another.

Quotable Quote

Some . . . sciences are a curious mixture of observation, coupled with interpretations . . . with an extrapolation so far from actual experiment that one may feel shivering and wondering: how much wishful thinking, how much science fiction. It is splendid to discuss the creation of our world, but never forget that you are dreaming, and do not expect the reader to believe in any model, whether with a sudden atomic explosion or with a story expanding back and forth . . . All this is too wonderful to be true, too incredible to be believable . . . we still are very far from understanding cosmogony.¹⁴

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ARTICLE REVIEWS

"Love Song of the Fruit Fly" by H. C. Bennett-Clark and A. W. Ewig. *Scientific American*, 223: 84-90, July, 1970.

Reviewed by Otis Gatewood*

For years the fruit fly has been the favorite experimental insect for geneticists. Now experimental studies and taxonomic investigations have now made it possible to study the behavior of the *Drosophila* genus, say H. C. Bennett-Clark and A. W. Ewig.

The particular *behavior*, that has been the center of their study and experimentation in recent years, is the love song of the fruit fly. The chief effort has been to try to determine the "significance" of the love song and to answer the question: "How did the love song of the fruit fly evolve?" (p. 85) Their studies on the "significance" of the love song have been most rewarding, and what they have learned tells a story that answers the question about the origin of the song.

Love Song Played on Wings of Male

The love song, so they say, is played on the wings of the male. If the wings of the male are removed he is seldom successful in courtship. One species (*D. obscura*) makes no sound with his wing display, but he cannot mate in the dark, thus indicating that the visible display of the wing makes his song successful. However, most species do breed successfully in the dark, thus indicating that sound is a key factor in the love song.

Love Song Recorded

Bennett-Clark and Ewig have successfully recorded love songs and have therefore determined that there are approximately 2,000 species of the genus *Drosophila*. All males in courting, approach to within two millimeters of the females and engage in wing displays. "By getting that close, two flies can meet and identify one another even in noisy surroundings." (p. 90)

Wing displays produce sounds that are peculiar to each species. Females of another species will not respond. The rejection song of females of all species is the same, thus making it possible for her to make her rejection understood to all species. But the male love song of each species is different. Females respond favorably only to the song of the male of her own species. Females are able to determine the vibration of the wing display by her arista - - - "feathery projections of the antennae." When the antenna of a recep-

tive female was immobilized with glue, she ceased to be receptive. The authors report, "... in courtship the females respond to a unique signal that is emitted only by the males of the same species." (p. 85)

Song Discrimination Clue in Mixed Populations

Taste also plays a role in courtship. Before wing display, the male of one species (*D. melanogaster*) taps the female with his front legs. If the "taste" indicates that the female is of another species, the male normally does not begin his wing display. The male might be rejected by a female of his own species, provided she is pregnant or too young for mating. If no rejection song is played by the female, mating ensues.

The specific scent of a female does not develop until about two days after she reaches adulthood. Before the "scent" develops, males will court females of another species. Difference in the song of the male may be the only clue for discrimination. The male "tastes" the female only at the onset of the courtship. Once the courtship has started, a male may, in a mixed population of flies, switch his attention from a female of his own species to another species. The female rejects his approach because he does not play the proper song on his wings. "Most species of *Drosophila* have overlapping ranges." In Hawaii there are over 1000 species. Breeding is "genetically isolated" by variety in the love songs, played by the vibrations of the male "wing display."

Recording of Songs No Easy Task

Recording the love song of the fruit fly was no easy matter because in comparison with the loud song of the cricket or the cicada, it is a rather quiet and private affair. Bennett-Clark and Ewig, who worked in the laboratory in the University of Edinburgh, Scotland, state that the power output of love song of the *Drosophila* "does not exceed a ten-billionth of a watt." (p. 85) Such a minuscule output can easily be drowned out by other sounds. These scientists therefore erected an elaborate sound-proof box, installed it with a "sensitive crystal microphone" and a "low noise amplifier." They placed the flies directly on the "microphone diaphragm" in order to get an accurate recording. Even then they found that it was best to record in the middle of the night.

Great Variety in Love Songs

Each song is composed of a "train of sound pulses" with silence following each short pulse. ... the pattern of sound and silence varies considerably from species to species. At one extreme is the song pulse of *D. melanogaster*, which consists of a single cycle that lasts only three thousandths of a second. At the other

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extreme is the pulse of the *D. microcelanica*: a continuous buzz that may last as long as 10 seconds. Between these extremes are song pulses that continue for two to four cycles (*D. ananassae* and *D. athabasca*) or for three to seven cycles." (p. 86)

The songs are also distinguished by the variety in tones. Some tones are as high as 575 c.p.s. and others as low as 225 c.p.s. But the tones of each species are not monotonous. During the song a shift may be made from higher to lower tones. The songs also vary in the interval between the sound pulses. The *D. melanogaster* gives 30 pulses per second and its nearest relatives pulse only 20 times per second. *D. melanica* waits four tenths of a second between pulses. The beat of another fly examined was 270 per second. The authors concluded this part of the study by saying, "With such a wide range of variation, the possible number of fruit fly songs is very large."

"Significance" of Love Songs

The article is supplemented by pictures of flies in courtship, as well as diagrams of variations in the love songs. It is clear to see that the songs of the species recorded "produce quite different oscilloscope records." (p. 87) In this way even two different species "can scarcely be told apart on morphological grounds, but it is simple to separate them on the basis of their completely different love songs." (p. 90) The following statements summarize the "significance," or purpose, of the love song of the fruit fly: "Good circumstantial evidence supports our conclusion that courtship songs are important in maintaining sexual isolation." (p. 90) And, "... The unique love song of each species constitutes a powerful isolation mechanism that acts as a barrier to interbreeding and thus maintains the genetic integrity of each species." (p. 85)

Conclusions on "Evolution" of Songs Not Definite

After five and one half pages of study on the "significance," or purpose, of the song of the fruit fly, Bennett-Clark and Ewing conclude their article with a one and one half page discussion of the question: "How did the various song patterns evolve?"

Their conclusions here were not definite. Such words as "this suggests," "it is believed," "postulations," "evidently," "suggests an answer," "one wonders," "could well be true"; are used and one sees immediately that they have left the scientific field of reproducible, observable, verified conclusions and have entered the field of speculation.

Crosses in Laboratory "Downward" Instead of "Upward"

"Crosses between races are *partially sterile*. The

races also show some *behavioral isolation*. In mixed populations the individual flies mate preferentially with *members of their own races*." (p. 90)

If evolution were true, the crosses would be beneficial instead of harmful, and the trend would be "upward" instead of "downward." The authors confess earlier in the article the *possibility* in nature of hybridization is "extremely unlikely" between two closely related species of fruit flies with similar songs. (p. 90) Since laboratory hybridization produces harmful effects of sterility, and since the races show "behavioral isolation," "evolution" has not been demonstrated. What is proved to the contrary is that: "in courtship the females respond to a unique signal that is emitted *only* by males of the same species." (p. 85)

"Original Barrier to Interbreeding"

In experimenting with the seven species that had similar songs, they also state that there was an "*original barrier to interbreeding*." After having proved definitely by experimentation outlined in the first part of the article, that the *purpose of the song of the male* was to "maintain sexual isolation" they seem to state the exact opposite when they try to imagine how the song supposedly evolved.

"Did" Instead of "How" A Better Question Concerning Evolution

The better question for the authors would have been: "*Did* the love patterns evolve?" If they had asked this question instead of: "How did the various song patterns evolve?", they would not have started their latter experiments on an "assumption" that they had not proved. And if they had asked, "Did the love patterns evolve?", the question would have been answered by the "significance" of the love song: "to maintain sexual isolation," "isolation mechanism," "barrier to interbreeding," "genetic integrity."

Unproved Theories Blind

It is really a pity that men of science can be so blinded by an unproved theory that they contradict themselves. Yet such contradictions are not necessary if they stay with facts rather than speculation.

For decades evolutionists have believed the fruit fly to be their best evidence to support their theory. But these two scholars, have by their experiments, exploded this supposition and have proved beyond a doubt that over 2,000 distinct species of fruit flies do exist and that the "isolation barrier" of the song of the male supports again the age-old truth of the Bible, that says that each produces only "after his kind." (Gen. 1:12, 24.) Certainly the evidence in this amazing article clearly favors special creationism.

"The Scientist as Shaman" by Malachi Martin. *Harper's*, March, 1972. Quotations taken from pp. 54-57, and p. 60.

Reviewed by William Springstead.*

The credulity of the average science article reader is both widespread and amazing. For many, the gods of today are those of modern Science and Technology. Their high priests and apostles are the scientist and technologist.

Yet occasionally one comes across a counter current against the concept that all that appeals in the name of science is sacrosanct. It is more exceptional when it comes from a non-creationist. An excellent example is a recent article appearing in *Harper's* March issue, entitled, "The Scientist as Shaman" by Malachi Martin.

Martin boldly takes to task the current science writer who, in his words uses: "his background to extrapolate the currently known data of his field—and if necessary, the data of other branches of science—in order to discourse on the *whole* of man." The writers are labeled by Martin as Scientians. He states that they are "engaged in a gentleman's crusade to liberate man from the toils of superstition, animism, outmoded clerical domination, and all prescientific/unscientific/non scientific moralities and systems." These writers are quite ready however to introduce their own moral concepts and philosophies, under the cloak of scientific expertise.

Among those listed are the names of Jacques Monod, George Haber, Kenneth Clarke, B. F. Skinner, Lionel Tiger and Robin Fox. While these authors have recognized scientific background, some of their writing is lacking in scientific objectivity. Martin observes: "Monod, Skinner, Lorenz, Morris, Tiger and Fox intend us to believe that their suppositions are true, to take them as fact, to assume that they are sufficient because of scientific reputation that buttresses them."

That Martin is not a creationist is apparent. Creationists however can partly agree with his sweeping indictment: "Today the grip of the

organized religions is failing, and their function as explanation-givers is either totally rejected or falling into desuetude." Much that comes under the designation of organized religion is "failing." The reason is, that it does not have a solid Biblical foundation.

But when Martin includes theology as being "out" and as being "no more scientific than astrology," creationists cannot concur. For them Bible-based theology is good science whenever it makes scientific pronouncements, and is also fully satisfying as "explanation givers."

Scientians come under Martin's sound indictment: "For scientians belie the very principle of scientific objectivity. They gloss over their own illogic, presenting their own fantasies as fact, passing objectively and self-forgivingly from a conditional 'would be' or 'might have been' to a very dogmatic and assertive 'was', 'is' or 'will be'."

Creationists would be even more sweeping in indictment. The pseudo-scientific philosophies of doctrinaire evolution and uniformitarianism, would be included. Variation, change and adaptation are indeed observable. This universe is run according to recognizable orderly laws. But the God Who both regulates change, and works in orderly ways is not the servant of His own laws. He can redirect them at will. Bible creationists believe He has done so in the past.

Is there a trace of wistfulness in Martin's appraisal of scientian efforts? "... and scientism produces a childlike hope, a certain trust and euphoria among intelligent people who want to hear some reassuring and confident voice speaking about the great issues of life at a time when all the sign posts are twirling dizzily in the rush of high and unchartered ends."

When men divorce themselves from "thus saith the Lord" and woo "thus saith men" what else can be expected? The Apostle Paul well said: "And they shall turn away their ears from the truth, and shall be turned unto fables." (II Tim. 4:4)

The growing number of books, written by the authors Martin has discussed are widely read. Creationists on the other hand need to have one voice that speaks out loud and clear in protest of this kind of scientian pronouncement. We may be grateful to author Martin for pointing out this trend and as believers in the Triune God we should resist scientian pronouncements.

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BOOK REVIEWS

Darwin Retried by Norman Macbeth. 1971. Gambit Incorporated, Boston. \$6.95.

Reviewed by Larry Butler.*

Norman Macbeth is a lawyer who, having examined the evidence in the form of the writings of leading evolutionists, contends that classical Darwinism is dead. The purpose of the book is to make this news available to the unsuspecting public.

Many Christian believers, like Macbeth, regard this as heartening, important news: according to *Christianity Today* this is "a candidate for the most significant book for Christians this year," and the *Bible-Science Newsletter* proclaimed it "an excellent work."

In a series of short, easy-to-read chapters Macbeth utilizes extensive quotations from modern evolutionists to show that they no longer agree on the validity of the concepts associated with classical Darwinism. As a lawyer, Macbeth is especially skillful at detecting fallacious arguments. For example, he clearly demonstrates that the concepts of "survival of the fittest" and "struggle for existence" are tautologies, and therefore meaningless. In so doing he has performed a genuine service to creationists.

It must be remembered, however, that as the title states, it is Darwinism, not evolution, on trial. Macbeth does not always clearly distinguish between the two, although he carefully defines classical Darwinism as the assertion that the progression from the early species to the later ones, as observed in the rocks, was a process of actual physical descent governed by natural selection through such agencies as the struggle for existence, survival of the fittest, sexual selection, and adaptation, all of which worked in small cumulative steps through vast periods of relatively undisturbed time.

Unfortunately, Darwinism and the broader notion of evolution are often confused in laymen's minds, so that they naturally infer from the demise of Darwinism that the whole concept of evolution is similarly recognized as defunct. Such is not the case.

Indeed, it is primarily the *method* proposed by Darwin to which Macbeth objects; he apparently accepts the occurrence of some sort of evolution as a fact. Thus, after defining the "large and easy" aspect of evolution as fossil evidence that "there had been changes in the course of time, numerous species having been added or eliminated since the beginning," he states:

I am not denying evolution in the large sense. I am not discussing genetics. I am not defending fundamentalism or propounding any other theory. I assert only that the mechanism of evolution suggested by Charles Darwin has been found inadequate by the professionals, and that they have moved on to other views and problems. In brief, classical Darwinism is no longer considered valid by qualified biologists.

Evolutionary biologists do not generally agree with Macbeth's conclusion that classical Darwinism is dead any more than they accept the judgement by Dr. Henry Morris that the notion of evolution is itself in its twilight phase. Macbeth makes it clear that the evidence for the validity of classical Darwinism (and by inference, evolution) is so weak that those who hold them must have other reasons. This reviewer would go further and suggest that they are held because of atheistic abhorrence of the only biblically and scientifically acceptable alternative, special creation.

Among the many telling points made by Macbeth is that Darwinism has become a religion (he actually means *evolution* rather than *Darwinism*, for his thesis is that evolutionists place no credence in Darwinism). He documents five traits characteristic of a religious attitude among evolutionists:

- a. all who are not with me are against me,
- b. reproof of the fainthearted,
- c. missionary zeal,
- d. perfect faith, and
- e. millenarianism.

These comparisons with orthodox religions are so striking that they would be amusing if such a serious threat to truly biblical religion were not involved; as it is they are too true to be funny.

It is worth noting that Macbeth, as a lawyer, occasionally reveals a notably unscientific attitude. He professes surprise at the fallibility and lack of objectivity of scientists, as though they were somehow supposed to be immune to the weaknesses of ordinary mortals.

He cannot understand the scientist's desire to discover the mechanisms underlying natural phenomena; to him it "takes the charm out of biology." We can all be grateful that medical researchers over the years have not adopted this view.

Macbeth sometimes makes statements which the facts do not warrant. For instance, he says that every evolutionist has been trained in comparative anatomy, which is absurd if by evolu-

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tionists he means a scientist who fully accepts evolution. More serious is his repeated claim that phylogenetic trees showing descent from common ancestors are no longer employed.

On the contrary, in the last five years a wealth of information obtained by sequencing of amino acids in the polypeptide chains of proteins has lead to more detailed phylogenetic maps than were possible before. This field of comparative protein chemistry is burgeoning; we have seen only the beginning of such trees.

Perhaps the most unique feature of the book is the great weight Macbeth attaches to the burden of proof for the validity of classical Darwinism, which he assigns to those who hold that position:

The proponents of a theory, in science or elsewhere, are obligated to support every link in the chain of reasoning, whereas a critic or skeptic may peck at any aspect of the theory, testing it for flaws. He [the critic] is not obligated to set up any theory of his own or to offer any alternative explanations. He can be purely negative if he so desires.

Calling on his courtroom experience, Macbeth suggests that the discomfiture of William Jennings Bryan was due to his attempt to defend fundamentalism instead of keeping the burden of proof on the other side. Macbeth asserts that "the winner in these matters is the skeptic who has no case to prove."

One cannot help wondering if it is not possible, using this tactic, to win the skirmish but lose the war. Although Macbeth is surely correct in a legal or logical sense when he says, "If a theory conflicts with the facts or with reason, it is entitled to no respect. . . . Whether a better theory is offered is irrelevant," such a purely negative presentation is distasteful to this reviewer.

Such an approach does not promote biblical creationism. Christian believers have a responsibility to present a positive message of good news. Without a balanced presentation of the preferable creationist alternative, simply purging oneself of classical Darwinism will do no good, and may lead to acceptance of even less desirable alternatives (see Matthew 12:43-45).

Regrettably, a negative hypercritical attitude is characteristic of too many conservative Christians. Indeed, we creationists often seem to be motivated by a hatred of evolution rather than a love for the truth. I find Christian accolades for a negative book such as *Darwin Retried* difficult to explain on any other basis.

☆ ☆ ☆

Evolution or Creation? Proceedings of the Bible-Science Seminar sponsored by Christadelphians, Birmingham, April 24, 1971, published by

the Committee of *The Testimony*, price 65 cents, from A. G. Bateman, 25 Ferndown Road, Solihull, Warwickshire. (Available from Bible-Science Association).

Reviewed by Larry Butler.

The first of four papers, "Halting Between Two Opinions—Progress or Redemption?" is by Professor Peter T. Geach, Professor of Logic, Leeds University. This is a somewhat philosophical but always Biblical and scholarly presentation. For this reviewer this contribution alone is worth the price of the volume. Geach presents the thesis that, if the doctrines of the Fall and Original Sin are rejected, this involves such a skeptical attitude toward Christianity that we can have no possible reason to be Christians. Professor Geach is gratifyingly quotable:

It is a mere impertinence for somebody now to set up a claim that he can teach a revised Christian doctrine, superior in important ways to the old doctrine. . . . If it was true 1900 years ago . . . this cannot have ceased to be true by lapse of time.

The second paper, "A Second Look at Time," is by Professor Harold Slusher, Director of the Kidd Memorial Seismic Observatory, University of Texas at El Paso, who is more familiar to American creationists. Professor Slusher, whose contribution is somewhat more technical than the previous presentation, selects several indicators which provide evidence for the age of the universe. Consideration of the rate and accumulated amount of cosmic dust on the earth and moon, the Poynting-Robertson effect, the numbers of comets and their lifetimes, and several other factors point to a young age of the universe.

The third contribution, "Natural Selection and Fixity of Kinds," was presented by Dr. P. J. C. Hawkins, Head of House, Ifield School, and Science Editor of *The Testimony*. Dr. Hawkins cites a rather wide range of evidence which he feels cannot be accommodated by the theory of evolution. Certain of his statements seem somewhat stronger than warranted; Dr. John Moore, for example, would be surprised at his claim that it is now fashionable among evolutionists to speak of polyphyletic origin. Dr. Hawkins closes with the positive affirmation that "there is abundant evidence in the world around us to show that a belief in the Creation Account is not only logical but scientific."

The last paper, "Constructive Thought or Random Evolution," was contributed by Dr. A. D. Norris, a scientific translator and Examiner in Chemistry, who has authored several books on Biblical subjects. Dr. Norris considers the question of whether there is positive evidence that creation is right, as distinct from the negative evi-

dence of the faults, loopholes, and failures of evolution. He emphasizes the testimony of the risen Christ. This presentation is followed by several questions asked of the speakers at the Seminar, and their answers.

This modest but scholarly volume speaks well for the vigor of the creationist movement in England. This reviewer must also add that while he is not familiar with the Christadelphians, he found nothing in this volume inconsistent with the Statement of Belief of the Creation Research Society.

☆ ☆ ☆

Science Is God by D. F. Horrobin. 1969. Medical and Technical Publishing Co., Ltd., Chiltern House, Aylesbury, England. 165 pp. About \$4.00.

Reviewed by Harold Armstrong.*

First of all, it must be said that the title of this book does not indicate its attitude; the title, in fact, is intended ironically. The book reminds one a good deal of *Science Is a Sacred Cow*.

The author, who is a physician but mostly occupied in teaching, is concerned about the mistaken notions about science; notions held not only by the man in the street but also by many more closely concerned with science. "In some cases," he points out, "gross overestimates are made as to what science can do. In other cases the real power of science is foolishly underestimated. . . ."

A considerable part of the discussion is about the present state of science. Some of the suggestions and conclusions may be mentioned. "Pure" and "applied" science, it is maintained, are not really different. As a matter of fact:

Both our universities where pure science is king and our industries dominated by technology are largely staffed by prosaic individuals tackling prosaic problems with what amounts to not much more than complex kitchen equipment and cookery books. . . . there is no justification whatsoever for the almost moral superiority which some affected academics claim over engineers and technologists.

It is suggested that the tendency to give problems in research to teams rather than to individuals is not a good one, for individuals are much more fruitful of results, especially if the problem should be something out of the ordinary.

It is proposed that there is a "Biological Uncertainty Principle," something like Heisenberg's in quantum theory. This, of course, is because

the very act of observation changes the thing being observed, in living things even more than in non-living. The same thing might be said, even more strongly, about psychology; and likewise of the "social sciences."

The author, however, is reluctant to admit some of these latter studies, and also such things as economics, to be sciences at all; he maintains that they are really special parts of history.

He argues also that the opinion that the advice of those skilled in history, or in economics, about what to do in a given situation, is especially valuable, is quite wrong. For by the very fact that these studies are history, they are concerned with what happened in the past; and there is no guarantee that history will repeat.

There are some comments on the teaching of science, and on schools generally. These are made in terms of, or from the viewpoint of, the British system, as might be expected. Much local control of schools is held up as a desirable thing; too much central control makes it too easy for fanatics to get control and to do great harm. Most creationists, I fancy, would agree heartily.

There is a chapter called, "Science and Religion"; and in other parts of the book, too, the relation of science to religion and also to philosophy is discussed. The conclusion seems to be in favor of at least some kind of deism, for any mechanistic theory of things is really self-destructive, by casting doubt upon its own premises.

The author seems not to have considered that a sort of system of rational deism has been tried, in England in the eighteenth century (and elsewhere too, about the same time), and that it was found wanting. It is admitted that science has nothing to say about the possibility of miracles; for science has to do with what happens always or for the most part, while by definition almost a miracle is that which happens only once or rarely.

The author does not write as a creationist, and he blames Christians in the last century for opposing such things as the theory of evolution; yet he writes in another place: "If man's mind is capable of discovering truth the reason for this is more likely to be found in the first chapter of Genesis than in *The Origin of Species*."

He makes the interesting point that science is arrogating to itself the same authority as religion did in earlier times, and that there may well be the same kind of backlash. Indeed, we can probably see something of the sort now, only three or four years after the words were written.

There is something on the question of free will, but it can not be said that anything really new is offered. It is repeated that any system of determinism is self-destructive; for if it is true,

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the arguments by which it is supported are determined by something else, and have no particular connection with truth. The "problem of pain" is touched on briefly; the conclusion proposed is that pain is partly needed as a warning system, and that partly it is bound up with the matter of free will.

In conclusion, anyone interested in the relation of science both to the world of philosophical ideas and to the world of practical affairs will find something of interest in this book.

☆ ☆ ☆

The Survival of the Unfit by Arthur C. Custance. 1971. Published by the author at P.O. Box 291, Brockville, Ontario, Canada. 34 pp. Price \$1.00.

Reviewed by Harold Armstrong.

Many readers will already know of some of Dr. Custance's *Doorway Papers* (in which series this book is no. 53), and other writings; and they will know that the author can always be counted upon to have something interesting to say in defense of the Christian position.

There are, no doubt, some points on which a difference of opinion is legitimate. All readers may not agree with Dr. Custance when he touches on some points; but they will agree that (as was said once of Samuel Johnson), he has presented well the arguments for his view.

In this paper he has undertaken a serious investigation of the catch-phrase (for really, in most cases that is all that it is), "survival of the fit." It can, of course, be rejected on logical or dialectical grounds; for either "fit" means "surviving," and then it is just a tautology; or else it would have to be shown that those that have survived were, in some fairly apparent way, "fitter" than their rivals. But the rivals are extinct, by the hypothesis; and we simply have not enough information about their way of life to know whether or not they were "fit."

The work contains some comments on considerations of this sort; it points out also how writers on evolution often are reduced to repeating, as a sort of refrain, "evolution has occurred." People who adopt such tactics might be reminded that in times past, as would appear from Aristotle's writings, anyone who, in a discussion, was reduced to babbling, that is to saying the same thing over and over, was considered to show thereby that he had lost the argument.

But "survival of the fit" may be attacked on other grounds. Some reasonable meaning being granted to it, is it in fact true? Is all nature constantly engaged in a struggle for existence, as Darwin maintained; and do creatures which we should beforehand judge to be "fitter" actually

survive over their neighbors? This work contains evidence to show that the answer to both questions is "no."

Incidentally, it might be noticed that anyone who takes Scripture seriously would surely have doubts about "survival of the fit," which seems to be flatly denied by such passages as Psalm 37:11, quoted in St. Matthew 5:5; and Ecclesiastes 9:11.

There is, in fact, much evidence to show that nature is not in a continual state of warfare; that creatures live, for the most part, in at worst a state of "peaceful coexistence."

One great source of information about the way in which animals live together peacefully is the book, *Mutual Aid*, by Prince Petr Kropotkin. It is reported here that that work has been reprinted by Extending Horizons Books, Boston. There are many other observers; and their testimony is that animals do not struggle among themselves always or even usually; neither do they overpopulate their territory. Those who find themselves unwanted in their native territory merely move elsewhere.

(It might be argued, incidentally, that this consideration shows that the effect of any competition that there may be would be just the opposite of what evolutionists propose. For it would be the "unfit" who would be driven out of the home territory. But on the edge of a territory, where the population is scattered, is where inbreeding, and the fixing of variations, would be most likely. Thus the result would be survival of the unfit.)

Territory plays a very important part in the behavior of many animals. It could be said that they are very "fit" in their own territory, in driving out trespassers; but relatively "unfit" in someone else's territory. One is reminded of the Biblical ideal: every man under his vine and under his fig tree, as in 1 Kings 4:25; and Micah 4:4.

Not only are creatures not engaged in a violent struggle; in many cases they cooperate. A number of examples of this are noted: in some cases animals help one another more or less casually; in other cases creatures live together in symbiosis. Clearly, the partners in symbiosis did not arrive at their present state by competing with each other; but, if they did not compete with those who were most closely associated with them, what reason is there to suppose that they did with anyone else?

As for the second question that was asked, it is easy to mention creatures which we should surely judge to be "unfit," but which have survived, which in some cases even flourish. Examples include the shrew, the koala, and the opossum. On the other hand, there are fossils, such as the glyptodon of South America, which would

have been judged beforehand to be "fit" against anything.

As a matter of fact, even within a kind, animals that would be judged "unfit," such as those which are mutilated, deformed, or crippled, often survive. Again, consider such creatures as tropical fish, many of which have features which surely do not make them "fitter"; which, in fact, are surely handicaps. Yet these, again, survive and often flourish.

These are some of the themes which are developed, with many references, in this book. It is well worth reading.



A Symposium on Creation III. 1971. Edited by D. W. Patten. Baker Book House, Grand Rapids, Michigan. 150 pp.

Reviewed by Harold Armstrong.

Two volumes in this series have been published previously, and a fourth is proposed in due time. Since the work consists of independent sections by different authors, it will be convenient to comment on the sections separately.

In "Theories About Life and Its Origin," by W. H. Tier, he begins by noticing that while formerly those who did not like creation could fall back on spontaneous generation, Pasteur's work put an end to all that, or should have done so. In fact, we still hear talk of spontaneous generation, albeit not by that name; but it remains true that the evidence is all against it.

Most of this section is devoted to an investigation of some notions which must be considered along with life; and to the distinctions between such terms as "life," "soul," and "spirit." Spirit seems to be associated with such activities as perception and thought, and thus to be connected with the difference between the life of a plant and that of an animal or man. The soul seems to be that in which spirit inheres.

What we have here, in fact, is some work on a distinctly Christian psychology. Creationists have devoted much of their attention to biology and geology, for obvious reasons; but there are other studies which are in need of reformation, and psychology is one of them. There was, of course, some Christian psychology in the Middle Ages, and the Dutch school has been active at that matter lately; but there is still work to be done.

S. E. Nevins, in "Stratigraphic Evidence of the Flood," shows that the nature of sedimentary rocks is understood much better by admitting that it was deposited quickly, under catastrophic conditions. The evidence includes trees buried upright, and large animals buried whole; also the

nature of the stratification and bedding points to fast deposition.

There are geological materials, such as dolostone and chert, which are not forming today; clearly the present is not the key to the past. Coal and conglomerates, to mention just two examples, seem to have been made from material which was transported considerable distances; and such transportation on such a scale would never happen under uniformitarian conditions.

It is pointed out that it is important in geology to consider strata as rocks—not just as holding-places for fossils. Then it will be clear that material was deposited over wide regions, under catastrophic conditions. Of course, some of what was deposited was later eroded away; this accounts for the erroneous notions of basins of sedimentation. In this connection it is noted that some limestone formations which have been called reefs, such as the Capitan limestone in Texas, are not really reefs at all.

Thus there is clear evidence of one or more catastrophes. But one may apply Ockham's razor, and conclude that there is no reason to look for many such events when one—the flood—for which there is also historical evidence, is enough to explain what is actually found.

F. W. Cousins has contributed two sections: "The Alleged Evolution of the Horse," and "The Alleged Evolution of Birds." Both of these draw on H. Nilsson's "Synthetische Artbildung," a work which it is to be hoped may yet be translated into English.

As for the alleged three divisions of the descent of horses, the Eohippus was more like the present-day Hyrax; there is no evidence that it had anything to do with horses. Nor is it at all evident that the so-called middle horses are really related by ancestry to today's horses. And when we come to the third division, there is considerable variety among animals of the horse variety living today. So small differences from today's common horses prove nothing.

A perhaps stronger argument may be advanced about the birds, because there is really so little evidence. There are, apparently, three fossils of *Archaeopteryx*. Indeed, those fossils show that, whatever it was, it was no connecting link; for all of its characteristics which are supposed to be peculiar can be matched in birds still living. So we have nothing more than a somewhat unusual bird which is now extinct. Indeed, the three fossils could have been freaks of some kind.

B. Davidheiser has written on "The Scopes Trial." He has set the record straight, pointing out that most accounts have been distorted—and it is hard to believe that the distortion was accidental. Those who were on the side of evolution, it would appear, were more interested in propa-

ganda for their own views than in having justice done.

It might yet be worthwhile for someone to take another look at somewhat similar cases which have arisen in other places and times. Has the argument between Bishop Wilberforce and Huxley been reported truthfully? I should not be surprised to find that the common accounts have been distorted.

How about Galileo? Certainly the story told of him in almost every book on mechanics is probably false, as Cooper has shown in his book, *Aristotle, Galileo, and the Tower of Pisa*. In fact, most writers on this subject, if they were Christians at all, have been members of reformed churches, and thus had, perhaps, a certain sympathy for Galileo. But his own writings, I suggest, show him as a bit of a know-it-all.

R. D. Shaw's contribution is on "Fossil Man: Ancestors or Descendants of Adam?" He points out that of the fossils supposed to be evolutionary stages, the Australopithecines, alleged to be the most primitive, are found around the periphery of the Old World. *Pithecantropus*, considered to be intermediate, while still toward the rim, is rather more closely connected with the center of the Old World, i.e., about Mesopotamia. But the Neanderthals, considered to be much like modern men, while widely scattered are close to the center.

In general, then, the more primitive (or degenerate), a fossil is, the farther it is from the center. Does this not indicate migration and degeneration rather than evolution? People living on the edge of the inhabited world would tend to be isolated in small groups. There would then be much inbreeding. And that could very well lead to degeneration.

It is suggested that some, at least, of these kinds of human fossils may well date from the time of the flood, or even before. While the mark placed on Cain is not mentioned, it is possible that it might have had something to do with these matters? In any event, it is proposed, this view of the matter could fit in with a chronology which would have the flood about 3,000 B.C., the creation about 5,000.

In his section on "The Cell," D. Tilney discusses the amazing complexity of the cell. He shows the extreme absurdity of supposing that such a structure could have arisen by chance or accident. As someone has remarked, the early evolutionists supposed that the cell was about as complex as a ping-pong ball. Now, thanks largely to the electron microscope, we are still learning about its complexity. For instance, it is only recently that microtubules, which give the cell its own circulatory system, were discovered.

In summary, then, this book presents much useful evidence to show the truth of the Scriptural account, both of the creation of the earth and its inhabitants, and of the destruction of the original earth in the flood.

☆ ☆ ☆

I Believe Because . . . A Study of the Evidence Christian Faith by Batsell Barrett Baxter. 1971. Baker Book House Company, Grand Rapids, Michigan. 284 pages. Hardcover \$5.95; Paper back \$3.95.

Reviewed by T. Robert Ingram.*

This is an important work which hopefully marks another advance toward the recovery of sound reason and doctrine in the professing Christian community, starting with acceptance of the historical truth of the Biblical account of creation.

Creationists have launched this movement by their strong analysis of the evidences for creation from the data of scientific studies and deserve great credit for opening the question to public discussion once again. Admittedly, however, the fields generally called scientific are inadequate to the whole task and what must come along is support from morals, philosophy, law and religion.

Thus it is significant that Dr. Baxter has undertaken to bring under examination the reasonableness of all the central doctrines of Christian Faith beginning with creation. It is all the more significant in view of his roots in those religious circles which have long looked narrowly at reason as a support for faith, and have often condemned out of hand any of the great religious writings either before the Reformation or out of post-Reformation Romanism. He has no hesitation in calling on the masterful logic of Thomas Aquinas, for example, and thus encourages a return to the thinking of those warriors who won great victories for faith in times long past.

Over half of the book centers on the question of creation and evolution, and while the author makes use of the work of modern scientific creationists, the great weight of argument rests upon the ancient and traditional "proofs" for the existence of God. Lines of reasoning associated with Augustine, Anselm and Aquinas are summarized and modernized. The discussion of evolutionary thinking, of course, is limited largely to modern scientific thinkers since it is only in recent times that systematic disbelief in creation has been entertained at all publicly.

The author assumes a relaxed, arm-chair approach with the aim of appealing to a calm sense

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of reason. He presents arguments for and against the articles of belief of the Christian Faith, acknowledging a certain reasonableness on both sides but always concluding that the weight of evidence must tip the scales in favor of belief. While Dr. Baxter leaves no doubt that he himself is firmly convicted of the truth that is in Christ, he restrains any tendency toward dogmatism, presumably since dogmatism has such a bad name in current intellectual circles.

It may be that the attempted stance of detachment and sober analysis is the best approach to today's college students and in such a case the "proof of the pudding must be in the eating." It is worth asking the question, however, as to whether this approach really carries the force of bold, unhesitating attack.

In a book as broad in scope as this one, seeking to cover the whole range of Christian doctrine in its essentials, it is to be expected that many readers will miss a more penetrating presentation. Particularly unsatisfactory is the treatment of the two natures in the one Person of Jesus Christ, which could have been strengthened by reference to the Athanasian Creed, and also the interpretation of the resurrection as proof of divinity. Central as is the resurrection, it hardly seems to prove divinity except as it puts the seal of God on Christ's offering of himself in life and in death and thus indirectly authenticates all that is involved.

However, the principal argument, and rightly so, is for a historical, special creation and rejection of evolution. Here Dr. Baxter betrays the same carry-overs from popular evolutionary thought that crop out so often, even in the most astute creationist circles, and which do more than a little to undo the whole carefully constructed argument.

Most important of these is the failure to face up to the immensely important matter of chronology. It is altogether incorrect to take the position that the Bible does not provide a chronology and therefore does not regard it as important. Quite the opposite is true, as is well demonstrated by the studies of Philip Mauro, Alfred M. Rehwinkel, and particularly Edwin R. Thiele.

This careless treatment of chronology cannot but violate universal principles of reason. Chronology and history are inseparable, and the very meaning of revelation is the historical testimony of an eye witness. Admittedly Bible scholars have long had difficulties with chronology, but the difficulties, as Dr. Thiele has so dramatically shown, lie with the scholars, not with the inspired penman.

A return to the ancient Biblical writers and their concept of time would go a long way to correct this notion, as well as the willingness to

allow great eons of time to the age of the earth. In regard to the age of the earth, much more could be made of studies such as that of Dr. Harold Slusher on the question of the time it takes for light to reach the earth from a star at a distance of mathematical infinity (17.5 years).

Other slips, common still in creationist circles, include the reference to savage peoples as "primitive," thus equating savagery with the first state of man in opposition both to Scripture and reason and the findings of archaeologists. In this same subconscious line of thought, ancient writers are spoken of as ignorant, especially Biblical authors. This would seem inexcusable.

It is also discouraging to see the doctrine of survival of the fittest accepted, especially since so much recent thinking has exposed both the fallacy of the idea and the deadly moral implications involved.

These at least questionable aspects of Dr. Baxter's book by no means overbalance the powerful highly encouraging general approach of giving proper weight to the reasonableness of the traditional Christian arguments from philosophy, and recognition of the need to deal with faith as always reasonable. "Blind faith" is a slander and falsehood. Christians have never believed what can be contrary to reason. One of the worst disservices rendered by enthusiastic advocates of the truth of justification by faith alone is their divorcement of faith and reason.

Christians also have sung of "blind unbelief," and have in our heritage a vast arsenal of truth and logic to carry us from faith to faith. It is true, as Augustine insists over and over again, quoting from the Septuagint of Isaiah 7:9, "If ye believe not, neither will ye at all understand," But understand we do, and that with reason.

☆ ☆ ☆

Darwin Retried: An Appeal to Reason by Norman Macbeth. 1971. Gambit Incorporated, Boston. 165 pages, index and bibliography. \$6.95.

Reviewed by John W. Robbins*

Norman Macbeth earned his B.A. at Stanford and his J.D. at Harvard Law School. He is a lawyer by profession, and discusses Darwinian and neo-Darwinian theories primarily in a logical-philosophical manner, rather than empirically. His book has earned a tribute from Sir Karl Popper, on whose work in scientific methodology Macbeth relies heavily in his critique: "An excellent and fair, though unsympathetic retrial of Darwin. I regard the book as most meritorious and as a really important contribution to the debate . . . a truly valuable book."

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The motive for publishing this book seems to be a desire to inform the public exactly what a shambles evolutionary thought is in; Macbeth regards the blind faith of the common man in evolution as at least in part a product of deliberate misrepresentation by Darwinists, who are unwilling to reveal the plenum of contradictions and vacuum of evidence called Darwinism.

Macbeth, however, is not a Christian ("We say not proven to Darwin's suggestion as to how and why, but we do not return to fundamentalism."); he is a skeptic. He argues, "The proponents of a theory, in science or elsewhere, are obligated to support every link in the chain of reasoning, whereas a critic or skeptic may peck at any aspect of the theory, testing it for flaws. He is not obligated to set up any theory of his own or to offer any alternative explanations." All of which is quite true.

Macbeth seems to make a serious error, however, by affirming his belief in agnosticism as a third position between theism and atheism; and his correlative belief in the possibility of philosophical neutrality. Agnosticism, however, is not a third position, but the evasion of a position; it does not result in philosophical neutrality, but the implicit acceptance of a position one denies explicitly. Those who eschew the study of origins in the name of science, just as those who seek to avoid metaphysics in the name of science, are playing a deadly and futile game of evasion.

Macbeth distinguishes between evolution and Darwinism (or any other theory purporting to explain the mechanics of evolution) and says, "I am not denying evolution in the large sense." He is merely denying classical Darwinism and the synthetic theory. This distinction strikes me as unwarranted and logically inadmissible, if one accepts any standard definition of "evolution."

Thus we find that Macbeth seems to believe in some vague theory resembling Richard Goldschmidt's "hopeful monster" suggestions, or Velikovsky's "catastrophic evolution" as explaining the mechanism of evolution. This is, to say the least, a leap of faith worthy of any skeptic-mystic; it is a belief in miracles without a Miracle-Worker.

Macbeth also offers a new definition of "evolution in the large sense": "the fact that change has taken place and that species have appeared and disappeared," a "definition" apparently quite compatible with Genesis, yet he refuses to accept the Genesis account. What Macbeth represents is a trend among evolutionists to admit the facts, e.g., that the gaps in the geological record are really there, and to account for these facts on the naturalistic ground of miracles *sans* Miracle-Worker.

Arthur Koestler, for instance, is apparently returning to Lamarckism, while others speak of

"quantum evolution," "systemic mutation," and "catastrophic evolution." What this signals is the investment of nature with magical properties.

To be sure, the doctrine of evolution has had magic at its core since it was propounded. It is only the superstructure of theory (uniformitarianism, mutations, etc.) that submerged the magic for one century. Now that the evidence clearly corroborates Genesis and not Darwin, the theoretical "scientific" superstructure is being razed and the magical foundations are revealed.

Despite his errors, Macbeth does present an excellent and sometimes humorous critique of the Darwinian and synthetic theories. He includes (among other things) discussions of the failure of evolutionists to furnish phylogenies; the ontological difficulties in considerations of species; the fallacy of "proving" macro-evolution by micro-changes; the fallacy of extrapolation; the lack of transitional forms; genetic homeostasis; the uselessness (or usefulness) of natural selection as an explanation for anything; the tautological nature of "survival of the fittest" and "adaption"; probability; Darwinian religion; and the fallacy of future evidence.

Macbeth's bibliography shows no trace of twentieth century Christian research in the study of origins, an inexcusable, but understandable omission, given his position. His book is well worth reading, both for Christian and non-Christian, but his premises should be kept constantly in mind.

☆ ☆ ☆

Report on Evolution by George McCready Price. Christian Evidence League, Box 173, Malverne, N.Y. 1971. 125 pages, paper back. \$2.50.

Reviewed by Clifford L. Burdick*

George McCready Price was undoubtedly the pioneer "Creationist" or Flood Geologist of the Twentieth Century, as Martin Gardner¹ described him: "Head and shoulders above all others . . . he is in fact the last and the greatest of the antievolutionists . . . the name of this remarkable man is George McCready Price."

Price had a keenly analytical, photographic mind. He was a voracious reader and a voluminous writer, being the author of some 25 books and booklets. He was the inspiration for many fundamentalists and non-evolutionary scientists. Price was sharp enough to call attention to present day illogical geology with its *reasoning in a circle*. It is to the field of geology that evolutionists turn for their main support.

Price tried to explain how so many competent scientists could come face to face with all the mounting evidence against evolutionary science and still remain evolutionists. "Man," said Price,

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"is not a logical but an emotional creature." (p. 7) Price, a little later in the book summed up this concept:

I have learned that man is not a rational creature. Even professors of geology and biology do not seem to be any more governed by cold logic and objective facts than other people . . . Perhaps 99% of all the serious blunders of scientists have been due to faulty reasoning, rather than faulty observations. (p. 11, and 19)

In his analysis of history, Price traced the development of evolutionary geology through such scientists as Count de Buffon, (1707-1788); A. G. Werner, (1749-1817), with his *Geognosy*; William (Strata) Smith, the so called father of English geology; and the great Baron Cuvier (1769-1832), who was largely instrumental in "selling" the scientific world on the absurd fossiliferous onion coat theory which became the foundation of Charles Darwin's science of evolution. Price then explained:

The man who really put the new form of geology before the world was Charles Lyell (1797-1875), who was knighted by Queen Victoria and was finally buried in Westminster Abbey. He took over the fossiliferous or biological form of the onion coat theory as he found it, but he added to it the theory that all the geological changes of the past must be explained by the present day actions of the oceans, the rivers, and the winds, denying that any great catastrophe had ever happened to our globe in the past. Thus we have the full modern geological theory of *uniformity*, as it is called, in contrast to the theory of *catastrophism*. (p. 21)

Price summed up Darwin by saying:

These theories were in reality based on unsound reasoning from facts that had long been known, so that the theory of evolution (now proved to be a blunder) was in reality a piece of slipshod reasoning from the very beginning. (p. 20)

Professor Price next alluded to Louis Agassiz, born about 1807 and a brilliant young scientist, who made his early reputation on the study of fishes, living and fossil. Agassiz wrote²: "I have succeeded in expressing the laws of succession and of the organic development of fishes during all geologic epochs." Thus the birth of *recapitulation*, "ontogeny repeats phylogeny." Price quoted from Dr. Percy Davidson³ who summed up Agassiz's work on classification:

As his interest broadened to include the systematic classification of the whole animal world, Agassiz relied more and more upon the facts of embryology to make good the deficiencies of fossil remains and to prevent the

confusion, inevitable as he believed, from an examination of anatomical differences alone. In 1857 Agassiz wrote, "I satisfied myself long ago that embryology furnishes the most trustworthy standard to determine the relative rank among animals." (p. 28)

What were the bottom Rocks? The ideal geologic column diagrammed in the geology textbooks usually show the Cambrian resting on the basement complex or Precambrian rocks, because the Cambrian is assumed to exhibit the lowest forms of animal life in the fossil state. However, Price pointed out that most any age group may lie directly on the basement rocks:

It is one of the elementary facts of geology that each stratified formation is of only limited horizontal extent. That is, instead of encircling the globe, like a universal onion coat, each formation occurs only as mere scattered patches here and there. For instance, the Triassic and Jurassic rocks are absent over most of North America; while over the larger part of Asia there are no Cretaceous strata. The Tertiary beds also are absent from most of Asia. In many localities these Triassic, Jurassic, Cretaceous or Tertiary rest directly on the Archean or old crystalline rocks. Over the larger part of northeastern America the Pleistocene, or "drift" reposes directly on the Archean. Large areas of South America, and practically all of the great interior of Africa, have no fossiliferous rocks at all, nothing but the Archean or Primitive. How then can we fix on certain typical fossils which are really older than all others? How then can we know for sure where to start the geologic column? (p. 51)

Upside Down Rocks This is the theme Professor Price emphasized the most. Evolutionary geology stands or falls on the order of the fossils found in the geologic column; if the evolutionary order is observed as we go up in the geologic column, macro-evolution might be defensible. On the other hand it would not take many cases of the fossils observed in some other order to upset and practically destroy the theory. Price called attention to the well known Lewis Thrust Fault in Montana and Alberta, Canada, and described the anomaly:

At least 10,000 square miles in extent and perhaps twice this size, but with old Paleozoic and Algonkian rocks on top, resting in apparent conformity on Cretaceous beds! That is, the "older" rocks are on top, and the "younger" are below, but with every physical appearance of having been laid down in this order. In other words, the rocks are wrong or the theory is wrong; but the contact line, as observed in so many widely scattered localities, is so perfectly natural, so highly "deceptive,"

that no one would possibly think of there being anything wrong, if it were not for the fossils found in the various formations . . . (p. 57)

Then Professor Price maintained that the so called thrust block is about 500 miles long from south to north and 30 to 40 miles wide. Glacier National Park is included in this area, and embraces some of the most gorgeous scenery in the world around Banff, and Lake Louise, and such outliers as Chief Mountain, Crowsnest Mountain, and Mount Assiniboine, the Matterhorn of the Rockies.

Considerable research work completed recently seems to corroborate Price's contention, that the Lewis "overthrust" is merely a "paleontological convenience." Many supposed thrust plane contacts have been examined that are perfect sedimentary contacts, with none of the physical evidences of a thrust, such as ground up rock, brecciated rock along the contact, and slickensides. There are of course many authentic thrusts, but the Lewis does not appear to be one of them. I recall a doubting remark that Dr. Leith, University of Wisconsin geologist once made in class, that he often wondered what giant lubricator was used to grease the Lewis thrust block.

Geike⁴ described the thrust faults of Scotland:

Had these sections been planned for the purpose of deception they could not have been more skillfully devised . . . and no one coming first to this ground would suspect that what appears to be a normal stratigraphical sequence is not really so.

Sir Archibald Geike among many others have examined the wrong order of fossils in the Alps. Overthrusting has been used to explain the "wrong order" without upsetting the evolutionary sequence.

James D. Dana⁵ described the Alps: "The thrust planes look like planes of bedding, and were long so considered." This upside down order of the fossils is repeated in many places all over the world. Each case must be considered on its own merits.

Professor Price quotes Lotsy⁶: "Reconstruction of what has happened in the past is no science, but a product of fantastic speculation." (p. 95) Recent work in palynology in the Grand

Canyon has practically eliminated evolutionary speculation as far as the plant kingdom is concerned. Dr. Chester Arnold⁷ of the University of Michigan has written: "As yet we have not been able to trace the phylogenetic history of a single group of modern plants from its beginning to the present."

Like Topsy, modern geology just "grewed," without much logical design or planning, and Price was sharp enough to call attention to the illogical geology, with its "reasoning in a circle."

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- ⁵Dana, James D. Manual of Geology, Fourth Edition. p. 534.
- ⁶Lotsy, Dr. *Nature*, October, 1922. p. 18.
- ⁷Arnold, Chester A. 1947. An introduction to paleobotany. New York, McGraw-Hill Book Co. p. 7.

☆ ☆ ☆

History of the Earth's Magnetic Field by D. W. Strangway. 1970. McGraw Hill. 168—viii pp. \$6.95.

Reviewed by Harold Armstrong*

This book is not at all a creationistic work; the author assumes the usual uniformitarian viewpoint. However, the book does contain a lot of information about the subject of paleomagnetism. Since this topic is connected with the alleged ages of geological formations, it is one which creationists will encounter from time to time. Since forewarned is forearmed, any collection of information, even though not sympathetic to the creationist viewpoint, can be useful. Incidentally, while the book is uniformitarian in outlook, it is not radically so; difficulties in the uniformitarian interpretation of natural phenomena are mentioned in several places.

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LETTERS TO THE EDITOR

Necessary Time for Stalactite Formation

In a recent *Quarterly* article Willis E. Keithley¹ suggested that it may not take so long a time for stalactites to form as is generally believed. This letter strengthens the point of view of Keithley.

The City of San Francisco gets most of its water from Hetch Hetchy. Hetch Hetchy is an artificial lake north of Yosemite Valley made by damming up the Tolumne River. The water is then transported to San Francisco through an underground conduit.

This conduit had to be tunneled under the hills near the south end of San Francisco Bay. It took 20 years to tunnel through these hills.

Professor Fred Buss was teaching geology at San Jose State College at that time. As soon as the tunnel under the hills was finished Professor Buss took his geology class through the tunnel. In there they found freshly formed stalactites 5 inches long. Obviously these stalactites had to be formed in less than 20 years.

I was teaching chemistry at San Jose State College and Professor Buss told me all about it.

I also remember that in *Science* about 30 years ago, there was an account of a stalactite 8 inches long hanging from a flume in Georgia. It was estimated that this stalactite could not have been longer than 100 years in forming.

No doubt many people have noticed where stalactites could not have required more than 100 years in formation. But since these people did not place any importance in the fact, it never got into print.

Reference

- ¹Keithley, Willis E. 1971. Note on stalactite formation, *Creation Research Society Quarterly*, December, page 188.

Signed,
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Answer to a Letter

With reference to the brief letter by Mr. David Watson, in the CRSQ, June, 1972, p. 84, I should like to make the following remarks.

I suppose there is indeed little to be gained by flogging a dead horse, especially if the flog itself is a poorly designed weapon. Mr. Watson's treatment of the word $\delta\epsilon$ unfortunately contributes little, if anything, to a question that has proved difficult enough even for the experts. He has vastly over-simplified the problem.

Thayer's treatment is, to my mind, the most thorough, for the biblical scholar. He is quite emphatic. Its primary meaning is *adversative*. He says it is used:

(1) universally by way of opposition and distinction, it is added to statements opposed to a previous statement.

(2) with $\mu\epsilon\nu$, as *certainly . . . but*

(3) after a negative sentence, as *but* or *but rather* (German, *wohl aber*)

(4) joined to terms which are repeated with a certain emphasis as in Rom. 3:21, "*But now* the righteousness of God . . . *even* the righteousness of God which is by faith."

(5) it serves to mark a transition to something new; by this use of the particle, the new addition is distinguished from and, as it were, opposed to what goes before.

(6) it introduces explanations and *separates* them from the things to be explained: John 3:19 lit: "However, this is the condemnation . . ." and I Cor. :12. "But this I say that each one of you is saying:

"I indeed am of Paul"

"But I am of Appollos" [says another]

"But I am of Cephas" [says another one]

"But I am of Christ." [says a fourth]

This is how Rotherham has set up the text.

(7) after a parenthesis or an explanation which has led away from the subject under discussion, it serves to take up the discussion again. [In English one might say, "However, to return etc. . . ." ACC]

(8) $\kappa\alpha\lambda$. . . $\delta\epsilon$ —*but also, yea and, moreover also*. It is particularly difficult to translate $\delta\epsilon$ in this kind of situation since it appears merely as an appendage to $\kappa\alpha\lambda$. Since the LXX did not use $\kappa\alpha\lambda$. . . $\delta\epsilon$ in Gen. 1:2 the problem need not concern us here.

(9) it introduces the consequent clause of a conditional sentence and, as it were, *opposes* it to the introductory clause of the conditional sentence.

In so far, therefore, as Watson's observations have reference to New Testament usage, the situation seems to be reasonably clear. The *primary* and *usual* meaning of $\delta\epsilon$ is specifically *disjunctive*.

In Watson's reference to Acts 6 the translation of $\delta\epsilon$ in verse 1 would very logically have the significance of *but*, since this new chapter clearly marks a change in the "climate" of the early fellowship. Indeed, Rotherham so renders it.

And with respect to Gen. 2:12, the very fact that the gold of Havilah is said specifically to be "good" implies a comparison somewhere with gold that was known to the writer *not* to be so good. Since the Book of Genesis has a number of little editorial comments of this kind appended here and there (such as when an ancient place is identified by its later name, cf. Gen. 14:8) there might be very good reason to render it "*but*

the gold of that land is good." At any rate, it is not unequivocal: and to say, as Watson does, that the adversative sense here is "impossible" is surely exceeding the evidence.

In his final sentence Watson somehow confuses the question as to whether $\delta\epsilon$ was used in the LXX to mean *but* or *and* with the meaning and tense of the verb "to be." Since my book (*Without Form and Void*) occupies some 100,000 words essentially on this question, and makes only two very brief references (possibly 100 words in all) to the LXX use of $\delta\epsilon$ in Gen. 1:2, it would seem not only that Mr. Watson has not read the book (and can hardly claim to know what its method

of attack really is), but he has been misled by Dr. Whitcomb's review into supposing that my thesis hinges on the word $\delta\epsilon$! This suggests that the original review itself may also have missed the point.

I do hope readers of this correspondence will look into the volume for themselves. My thesis could be true, after all. . . .

Signed,

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A PHILOSOPHICAL NOTE

(Continued from page 171)

tually most people gravitate toward one or the other theory.

Students are often impressed with the following logic: Let us suppose the evolutionist is right, that there is no God, that at death we each die for eternity. If that is true, none of us will ever know it. The evolutionist can never say, "I told you so."

But, suppose the creationist is right, that there is a Creator-God, that there is life after death.

If so, the evolutionist has rejected God and lost out on eternal life. Thus, the one theory gives man nothing, not even hope. The other gives him hope of eternal life.

As a related point, I often say to students that the unrest on our campuses can be traced to the need students feel to have a "cause," to have something worth living and dying for. Evolutionary teaching has largely destroyed belief in a meaningful God, but it is through belief in God that life is given real purpose today and hope for tomorrow.

Membership Voting membership is limited to scientists having at least an earned graduate degree in a natural or applied science. Dues are \$7.00 (Foreign, \$8.00 U. S.) per year and may be sent to Wilbert H. Rusch, Sr., Membership Secretary, 2717 Cranbrook Road, Ann Arbor, Michigan 48104. Sustaining membership for those who do not meet the criteria for voting membership, and yet who subscribe to the statement of belief, is available at \$7.00 (Foreign, \$8.00 U. S.) per year and includes subscription to the Annual Issue and Quarterlies. All others interested in receiving copies of these publications may do so at the rate of the subscription price for all issues for one year: (\$10.00 (Foreign, \$11.00 U.S.).

Statement of Belief Members of the Creation Research Society, which include research scientists representing various fields of successful scientific accomplishment, are committed to full belief in the Biblical record of creation and early history, and thus to a concept of dynamic special creation (as opposed to evolution), both of the universe and the earth with its complexity of living forms.

We propose to re-evaluate science from this viewpoint, and since 1964 have published a quarterly of research articles in this field. In 1970 the Society published a textbook, *Biology: A Search for Order in Complexity*, through Zondervan Publish-

ing House, Grand Rapids, Michigan 49506. All members of the Society subscribe to the following statement of belief.

1. The Bible is the written Word of God, and because it is inspired throughout, all its assertions are historically and scientifically true in all the original autographs. To the student of nature this means that the account of origins in Genesis is a factual presentation of simple historical truths.

2. All basic types of living things, including man, 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 an historic event worldwide in its extent and effect.

4. We are an organization of Christian men of science who accept Jesus Christ as our Lord and Saviour. The account 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 Saviour for all mankind. Therefore, salvation can come only through accepting Jesus Christ as our Saviour.

