As creationists and Christians, we must raise even more critical questions and therefore resist this power. We may have the technological ability to be new creators, but we are not the One Creator of the universe. We are sinful creatures (Rom. 3:23) affected by the fall of man (Gen. 3). It is arrogant to believe that we can overthrow the Creator and become re-creators of this earth.

A Christian View of Genetic Engineering

Does genetic engineering have a place in a Christian world view? Should we reject all of it or can aspects of genetic engineering be redeemed by fallen man? In order to answer these questions we must distinguish between two types of genetic research.

The first type of research is what we might refer to as *genetic repair.* This research attempts to remove or treat the 1600 or so genetic diseases that afflict mankind. It also includes various forms of minor genetic manipulation for the benefit of mankind. Part of God's command to us is to subdue the earth (Gen. 1:27) and we can do this through the wise and ethical use of technology. This is very different from the second type of research many evolutionists are advocating.

The second type of research involves the *creation of new life forms.* Many scientists seek rDNA techniques in order to restructure and *vastly* alter existing life forms. This is something that Christians cannot support. It is one thing to add one gene or a short gene complex to an organism and modify it slightly to allow it to produce a useful product. It is quite another to create life forms that do not fit in existing niches and that may create havoc with the biosphere. If we are rightly concerned about environmental deterioration through human intervention then we should be even more concerned about human restructuring of life forms on this planet.

Further, we should resist any scientist's desires to redesign human nature. Edward O. Wilson has said, "We will have to decide how human we wish to remain."[9] We are created in the image of God (Gen. 1:27) and attempts to make man in his own image cannot be allowed. Already many are fearful of recent attempts to breed highly intelligent progeny from sperm provided by Nobel prize winners.[10] Human engineering is but one step away from the crazed dreams of building a superior human race.

Once again the creation model provides not only predictive capability but research guidelines which can prevent a new technology from leading us to disaster. There is nothing to fear from genetic engineering itself. Its application and the world-view which guides it are what should make us anxious. If an evolutionary world view prevails, then is Huxley's *Brave New World* too far on the horizon?

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(Editor's note.) May I add two quotations? The first is by Sherlock Holmes: "When one tries to rise above nature, one is liable to fall beneath it." (In the story, *The Adventure of the Creeping Man*).

The second is by Aristotle, in commenting on the Spartans, who, above all other ancient people, went in for eugenics; but at Aristotle's time had declined sadly: "We should judge the Spartans not from what they used to be, but from what they are." (*Politics,* Book VIII, Chapter 4.)

THE FLOOD ON AN EXPANDING EARTH

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Born's lattice theory is used to prove that a change in the permittivity of free space would cause a differential expansion of the earth and yet allow for compressive forces necessary to account for various geologic features.

One of the most outrageous hypotheses in geology is the suggestion that the earth's radius has expanded. It has never achieved widespread acceptance because of the lack of a mechanism which will explain the compressional features of the earth. This paper will propose a mechanism which is hoped will overcome this objection to an expanding earth.

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The model of an expanding earth will explain several features on the earth. As noted in a previous article[1] the sediment distribution cannot be explained on the basis of a flood which occurred on an earth of the present radius. There is a thicker layer of sediment on top of the continental platforms which are topographically higher than on the ocean floor which is topographically low. This feature violates the second law of thermodynamics if one assumes that the

sediments are the result of a worldwide flood on an earth of the present size. This problem, however, disappears if the flood can be assumed to have occurred when the earth was nearly half of the present size.

The geometric fit of the continents is good if one assumes that the earth were once smaller. The continental platforms have been shown to fit together if the earth were only 55% of its present radius.[2] The continental platforms would then form a solid sialic covering for the earth.

Other problems for current interpretations, both secular and creationist, are easy to find. Owens has shown that wedge-shaped pieces of ocean, which occur on reconstructions on the present radius of the earth, disappear when the continents are recurved and reunited on a smaller earth.[3] Meservey has presented a brilliant topological disproof of current ideas of how the continents drifted. He concludes,

> "The only hypothesis that has been suggested thus far that resolves the paradox described above is that in the past the earth's interior has expanded considerably. . . ."[4]

In a previous paper it has been shown that continental drift by convection current is too slow to fit into a creationist time-frame. If some other means could be found for speeding up the drift to fit into the Biblical time span, the heat due to friction would destroy the earth.[5]

Another advantage to the expanding earth model is that it explains why all the ocean basins are young. This conclusion must be accepted if one believes in any form of relative dating. No paleozoic sediments are found in the ocean basins, and they should be there if the basins were in existence at the time of the flood. The term paleozoic is used to describe sediments with certain characteristics which are determinable regardless of whether one is a creationist or a uniformitarianist.

Other items seem to support the idea of an expanding earth rather than continental drift. There is a north-south ridge both east and west of Africa as well as a north-south rift in East Africa (see Figure 1). There is no subduction in between the three parallel ridges. The usual answer to this problem is to claim that the two outer convection cells are moving away from the central rift. Physically this is hard to justify.

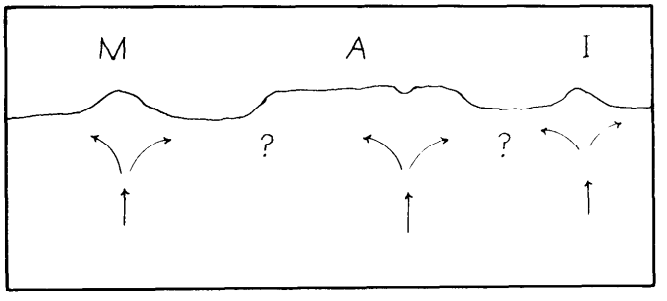

Figure 1. Three parallel ridges with no subduction in between. This is indicative of an expansion of the earth's radius. M, A, and I indicate respectively the Mid-Atlantic ridge, the African rift, and the Indian Ocean ridge.

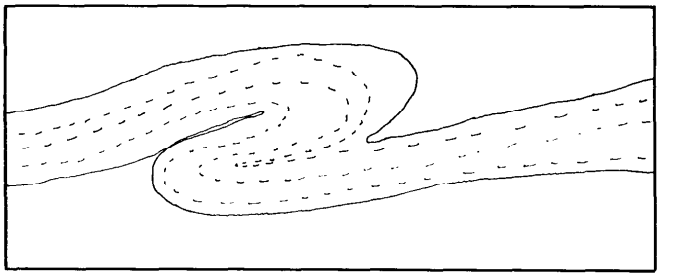

Figure 2. A type of nappe, or fold in the strata.

Antarctica is in even worse shape as far as drift is concerned. This southernmost continent is completely surrounded by a ridge which encloses twice the area of the continent. There seems to be no evidence of subduction at the center of Antarctica.

C. H. Barnett has pointed out that the petal-like shapes of all the southern continents is better explained by the assumption of expansion.[6]

The main reason that the expansion hypothesis has not been accepted is as mentioned above, the problem with compressional forces. Adrian Scheidegger explains,

> "However, there is one fundamental difficulty. This is that in an expansion theory, it is no longer easy to account for the observed crustal shortening as there is no reason for the 'skin' of an expanding sphere to be crumpled up. It would therefore appear that all the expansion could create, is a pattern of fissures through which the liquid 'magma' below could rise to cause mountains. There seems no possibility of explaining nappes and similar phenomena."[7]

Thus it would seem to be crucial that any expansion mechanism be able to explain nappes (Figure 2), thrusts, and other compressive features such as the Benioff zone. (Figure 3)

The Mechanism

This author has proposed that God miraculously changed the permittivity of free space, i.e., the coefficient going along with electrical forces, and has used that postulate to explain a variety of problems associated with Noah's flood. It has been shown that the condensing water vapor would give off enough heat

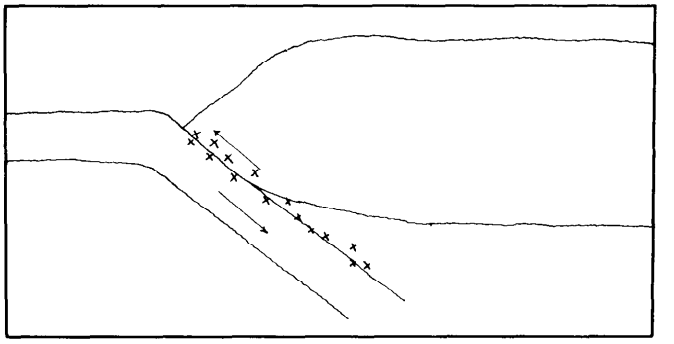

Figure 3. The usual explanation of the Benioff zone, according to plate tectonics. The Benioff zone is the plane along which the earthquake foci, indicated here by the x's, are observed.

to destroy all life if somehow it could be forced to condense over a forty day period. What would in fact occur is that it would cease raining long before the forty days were completed. The frictional heat generated by an expansion of the earth, albeit not as great as the heat generated by separating the continents by other means, would still need accounting for. A mechanism is proposed for absorbing this heat.[8]

Another item explained by this proposed change in the electric force is the rainbow.[9] The Bible seems to indicate that it was a new phenomenon after the flood and a change in the electric force would change the index of refraction.

The distribution of radioactive isotopes is anomalous as far as creationists are concerned. The change of permittivity would allow an easy explanation for this distribution[10] as well as the correlation of the biostratigraphic position with radiometric age.[10]

The present proposal has been a fruitful hypothesis in terms of explaining the facts of the earth from a creationist position. However, until this time it had not been illustrated that the change in the permittivity would cause a differential expansion in the earth. The reason for the requirement that the expansion must be differential is that if the expansion were uniform, meaning everything expanded the same amount, there would be no noticeable change in anything. Thus, if this theory is to be successful, the expansion must occur non-uniformly.

The expansion mechanism will come out of Born's lattice theory which is well known in the study of solids. Consider two ions such as Na^+ and Cl^- separated by an infinite distance. As we bring the two ions close together we find that the attractive potential varies thus: $U^+ = -e^2/\epsilon_0 r$, where e is the electric charge, ϵ_0 is the permittivity and r is the distance separating the two ions. One can see that there is no minimum value for the attractive potential (Figure 4).

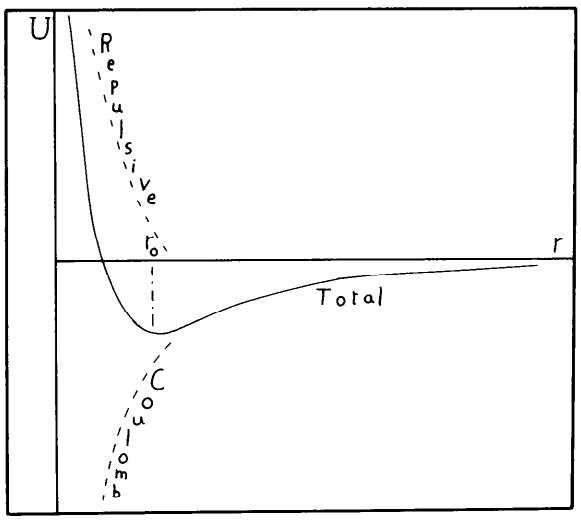

Figure 4. The potential well for ionic bonding. The repulsive potential, i.e. potential from which the repulsive force would be derived, decreases in absolute value with distance r more quickly than the attractive, Coulomb, potential. Thus the potential passes through a minimum—a "well"—at $r = r_0$. At that distance the force, which is given by the gradient of the potential, is zero; the arrangement is in equilibrium.

The closer the two ions get to each other the greater is their mutual attraction. Mendel Sachs observes of the situation,

> "Let us now suppose that the only forces present are those due to the classical electrostatic interactions between the array of charged ions, and let us determine the magnitude of the interatomic spacing at equilibrium. Since the coulomb force acting between any pair of ions is inversely proportional to the distance between the ions, it is clear that, because of the lack of a minimum value for the electrostatic potential as a function of the interionic spacing, the supposition of the existence of electrostatic forces alone leads to the result that there will be no equilibrium value for the interionic spacing and that the entire crystal will collapse in towards the origin."[11]

After presenting another argument concerning the inadequacies of the electrostatic forces alone, Sachs concludes,

> "It is seen from these arguments that it would be impossible to maintain a stable ionic crystal under the action of electrostatic forces alone."[12]

The source of the repulsive potential was not understood until the advent of quantum mechanics. Sachs continues,

> "The need for a repulsive potential in order to maintain a stable crystal was recognized long before the discovery of quantum mechanics, and in order to facilitate the computation of the cohesive energy of ionic crystals, many of the early workers adopted an empirical repulsive potential of the form $b\,|r_{ij}|^{-n}$, where b and n were taken as constants to be determined by the condition of thermodynamic equilibrium of the crystal lattice. However, the source of a repulsive potential was not discovered until the advent of quantum mechanics and the requirement of the Pauli exclusion principle."[13]

There have been several proposals for the precise mathematical form of the repulsive potential. Sachs proposes an exponential form. Orson L. Anderson, in a 1970 paper, defends the earlier power law function.[14] Thus the potential function for the ionic bond is $U = -Ae^2/\epsilon_0 r + b/r^n$ where A is the Madelung constant.

Setting the derivative of U with respect to r equal to zero, allows us to solve for r_0 the equilibrium interionic spacing, obtaining $r_0 = (bn\epsilon_0/Ae^2)^{\frac{1}{n-1}}$. In order to determine whether r_0 will change if the permittivity changes we need to examine each term in the expression on the right. b must be independent of the permittivity since it is a constant of proportionality for a non-electrostatic force. A, the Madelung constant, is based upon the crystal lattice structure. n is also independent of the permittivity as Anderson proved.[15] Therefore, r_0 is proportional to the $n-1$ root of the permittivity.

The importance of this relationship to an expanding earth is not appreciated until it is realized that n is a different value for each mineral and because of this different minerals will expand differently for a given change in the permittivity.

In order to evaluate the expansion, we need to determine how much ϵ_0 has changed in the past. In a previous paper it was shown that the isotope distribution implies that the permittivity has changed significantly.[16] In fact it would appear that ϵ_0 before the flood was approximately 1676 times smaller than the present value. Assuming this to be true one can calculate how much a given mineral expanded. Table 1 shows the value of n and the postflood size of the mineral compared to the preflood size.

The absolute value of an expansion is of little import in explaining the compressive features of the earth. The relative change in size between two minerals is significant as will be seen.

Explanation of the Earth's Structure

In the expansion as it is being postulated, different parts of the earth's crust would expand at slightly different rates due to slightly different combinations of chemicals each part contained. This is the suggested answer to the problem of the compressive forces.

The first structure which will be examined is the Benioff zone since it has often been used as an objection to the expansion and support for plate tectonics. The Benioff zone is a zone of earthquake foci which is noticed at some plate boundaries. The earthquake foci or locations of the source of the earthquake are always located along an approximate 45° sloping plane. Further to complicate the problem for an expansion model is the fact that the movement determined from seismic records is what would be expected if a plate of oceanic crust were being driven under the continent. (Figure 3) This in fact is the explanation which arises from plate tectonics. The suggested explanation of these facts within an expansion model is shown in Figure 5. Assuming that the material in the oceanic crust expanded more rapidly than the earth as a whole then tension would build up as shown in 5a. Ultimately this tension would cause a reverse fault as shown in 5b. Continued expansion would cause the oceanic crust to be driven under the continent. Movement along the fault would be the same as is deduced from seismograms. The trench would be formed at the contact of the oceanic and continental plates.

Table 1

Mineral	Repulsive Term, n	Relative Expansion	Reference
LiF	8.4	2.72	14
NaF	8.6	2.65	14
NaCl	8.8	2.58	14
KCl	9.0	2.52	14
KBr	9.7	2.34	14
KI	12.5	1.90	14
RbBr	12.6	1.89	14
CsCl	9.9	2.29	14
CsBr	9.2	2.47	14
CsI	9.7	2.34	14
Garnet	9.3	2.44	14
CaO	8.7	2.62	14
ZnO	7.4	3.18	14
BeO	9.5	2.39	14
CaF_2	7.7	3.02	14
BaF_2	8.2	2.79	14
MgO	6.5	3.85	14
Al_2O_3	5.0	6.37	14
Fe_2O_3	6.6	3.75	14
Mg_2SiO_4	6.5	3.85	14
$MgAl_2O_4$	5.6	5.00	14
LiCl	8.0	2.88	21
LiBr	8.7	2.62	21
NaBr	9.5	2.39	21
He	5	6.37	21
Ne	7	3.44	21
Ar	9	2.52	21
Kr	10	2.28	21
Xe	12	1.96	21
SiO_2	11.2	1.93	14

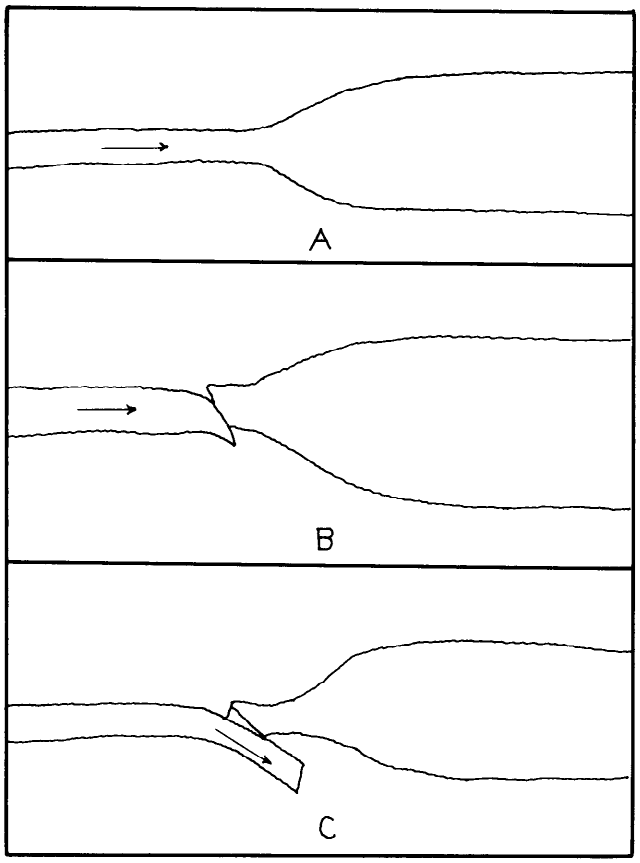

Figure 5. The development of the Benioff zone on an expanding earth. The significance of the stages A, B, and C is explained in the text.

Nappes (Figure 2) are another difficult problem for expansion theories. Clark notes a problem for all in explaining nappes. He says,

> "If the coefficient of friction between the nappe and the underlying rock is similar to that observed in the laboratory for dry rocks sliding across each other, it is easy to show that the maximum possible length of a nappe is about 10 km. In the case of a longer nappe, friction would completely inhibit the motion, and the rock of the nappe would be crushed. Yet nappes are commonly observed to be much longer than 10 km."[17]

Hubbert and Rubey have suggested a mechanism which would explain overthrust (and nappes) but this author believes that their mechanism is very improbable.[18] In any event the maximum distance which their theory will allow for overthrusting is 137 km. The Alps are believed to have been compressed by 150 to 450 km.[19]

As noted above the problem with thrusting is that the strength of the rocks wouldn't allow them to be shoved 450 km. In a portion of the crust which is expanding more rapidly than average, nappes would form because part of the sediments would be longer than the surface upon which it lies and so it must fold over onto itself. This process is similar to the fold which occurs in a throw rug when it is pushed on one end.

Overthrusts are generally treated as being fictitious by creationists.[20] Some overthrusts may be fictitious but it is this author's opinion that at least some of them are real. (Figure 6) As has been pointed out, the major problem with the overthrusts is that the rocks do not appear to have been rigid enough for them to have been thrust as far as they have been. If the hypothesis of a change in the permittivity is correct, then the bonding between the atoms of the rock would have been greater, giving increased strength to the block as it was thrust. Cotton and Wilkinson give an expression for the cohesive energy.[21] It can be shown that the ratio of preflood bonding to postflood bonding is $\overline{U}/U = (\epsilon_0/\bar{\epsilon}_0)^{\frac{n}{n-1}}$ where $\overline{U}$ is the preflood bonding, U is the postflood bonding, $\bar{\epsilon}_0$ is the preflood value of the permittivity and ϵ_0 is the postflood value. As can be seen if the permittivity was nearly 1700 times smaller before the flood, then the strength of bonding would be over 1700 greater. This should allow for a block of material to be thrust further than is possible today.

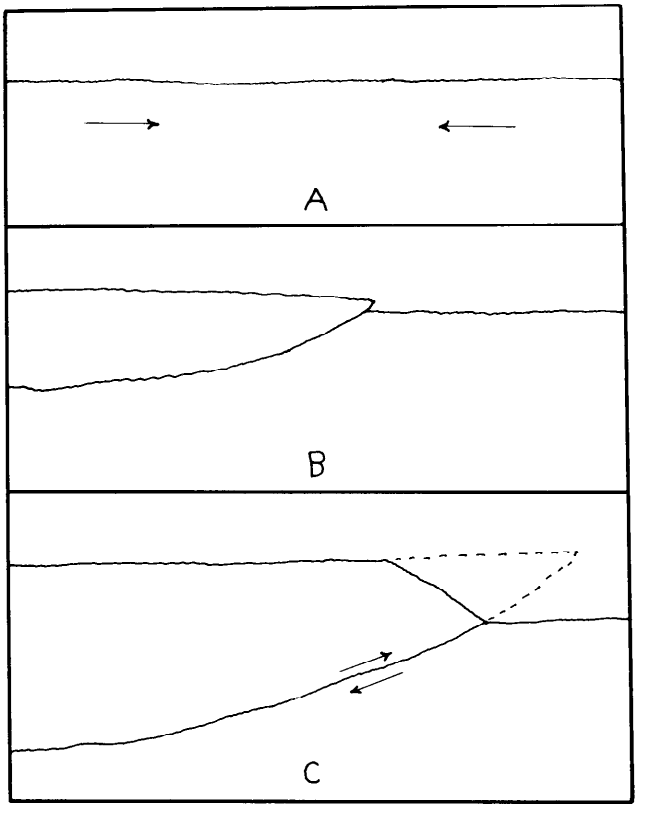

Figure 6. The development of an overthrust. The significance of the stages A, B, and C is explained in the text.

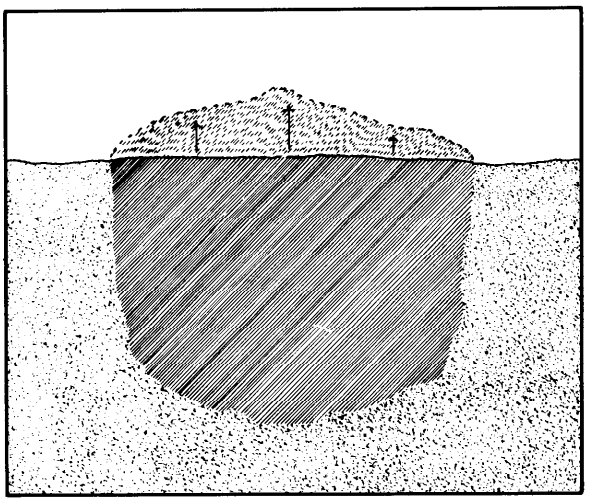

Figure 7. An explanation of uplift. The cross-shading shows the more expansive material before the expansion; the broken cross-shading the more expansive after. The dotting shows the less expansive material. The horizontal line represents the antediluvian surface.

A certain amount of uplift can be explained as shown in Figure 7. If a more expansive material is trapped in a less expansive bowl, then the only way for the pressure to be relieved is for upward movement to occur.

Thus it is concluded that since different areas of the crust contain slightly different mixtures of minerals, some areas will expand more rapidly than the earth as a whole causing compressional features while other areas will expand more slowly than the earth as a whole causing tensional features.

Proposals

This theory if substantiated would help one to explore for minerals by considering which minerals expand faster or slower than average. The importance of a theory's ability to predict phenomena is obvious to all acquainted with the history of science. There is a paucity of creationist theories which are capable of making numerical as well as qualitative predictions, while at the same time explaining in a positive unified manner the facts of the world. Creationists have little reason to expect secular science to pay serious attention to them until they can present such a unified numerical theory. It is felt that the theory presented here is such a theory.

Further development of this idea will require more theoretical as well as experimental work in order to present a numerical model of the earth to verify or refute this proposal. This author has no access to a computer and is basically a theoretician rather than an experimental scientist. Therefore the substantiation of this idea with models will await the effort of others.

Postscript

One of the necessary features of this proposal is that the granitic continental platforms must expand less than the interior of the earth. The expansion proposed by this theory is indeed in the proper direction. Granite is made on average of 70 percent quartz (SiO_2). As can be seen from the Table 1 SiO_2 would only have a relative expansion of 1.93. The mantle of the earth is believed to be primarily composed of a mineral called dunnite. Dunnite contains only 40 percent quartz but is high (25-55 percent) in MgO, a mineral which would have a relative expansion of 3.85. Granite contains less than 5 percent of MgO. Thus the best knowledge available concerning the make up of the earth's mantle and continental platforms shows that the interior of the earth would approximately double in size in relation to the granitic platforms—precisely the needed amount.

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[15]*Ibid.*; see Equation 52. It does not actually matter whether n is or is not a function of the permittivity, since in either case there would be a differential expansion.

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[17]Clark, Sydney P., Jr., 1971. Structure of the earth. Prentice-Hall. Pp. 13-15.

[18]Hubbert, M. King, and William W. Rubey, 1959. Role of fluid pressure in mechanics of overthrust faulting. *Bulletin of the Geological Society of America* 70 (2):115-166. They suggest that water, under high pressure, supported the weight of the overthrust block. But once the fault plane cut the surface the pressure would be lost.

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PANORAMA OF SCIENCE

Sandstone and Atmospheric Pressure

There have been suggestions that formerly the atmospheric pressure may have been considerably greater than it now is. Some Creationists have considered that the weight of the canopy, which they believe formerly encircled the Earth, would have compressed the underlying air. Others have doubted whether some of the extinct flying reptiles could ever have flown in air at the present pressure, and suggested that the pressure must have been greater when they were alive and active.

An argument has been offered on the other side.[1] There are, in many places, sandstones. If, as is commonly supposed, they were formed from sand which had been deposited by the wind, there should be evidence, in details of their structure, about the atmospheric pressure at the time when they were deposited. It appears, in fact, that they were deposited under conditions not much different from those existing at present.

If, on the other hand, it is established that formerly the pressure was greater, then perhaps the argument can be turned around. Maybe, in that case, it is a mistake to suppose that the sand was deposited by wind. Might it have been deposited by water? It would seem that such a thing might easily have happened during the Flood.

Mr. Darwin and Mr. Blyth

Some readers of the *Quarterly* may wish to become familiar with a skeleton in the closet of Darwinian memorabilia. What I am referring to is Darwin's appropriation without acknowledgement of the natural selection idea from a certain Edward Blyth, a zoologist. The case is presented by the evolutionist and humanist Loren Eiseley,[2] who advances convincing evidence that Darwin had read two articles published by Blyth in 1835 and 1837 (Darwin began *The Origin of Species* in 1837) in *The Magazine of Natural History* in which he discussed natural and sexual selection. Darwin was not one to give credit to others; although in fact, all of his work, except for a book on barnacles, is a reiteration, in scientific terminology, of his grandfather Erasmus' work. The obvious reason why Darwin could not acknowledge Blyth was because Blyth's concept of natural selection was one of a conservative force which would eliminate any deviations from the norm, consequently, preserving the *status quo*. Darwin perverted Blyth's concept of natural selection and made it a creative force.