tucky, a group of interested persons worked on the first draft of the Statement of Belief for a new organization, the Creation Research Society. The growth of the organization has been much greater than we expected, and we have never found it necessary to consider changing the Statement of Belief.

The Bible-Science Association with headquarters at Caldwell, Idaho was formed in 1963. This organization publishes a newsletter and sponsors sale of a wide variety of creationist literature. And the Bible-Science Association sponsored a four-day meeting of all creationist groups in the United States at Milwaukee, Wisconsin, October 10 to 13, 1972 which was well attended and set a mile post of progress.

In conclusion, let us consider how the characteristics of the present decade, 1963-1973, are unique. The century-old discussion of creation versus evolution centered in disagreement between scientists and religionists; but as a news writer has well stated, the present argument is between two groups of scientists. Although spokesmen at educational institutions were scarce in the 1920 decade, today there are hundreds of such leaders.

While present creationist organizations have endorsement from many theologians, the outstanding creationists today are scientists. Many of them are young men and women who have detected for themselves the mistakes in evolution, and see that divine creation is a more valid world view.

References

[1]Snyder, L. H., and P. R. David. 1957. Principles of heredity. Health, New York, p. 348.

[2]Moment, G. 1958. General zoology. Houghton Mifflin, Boston, p. 20.

[3]Iltis, Hugo. 1932. Life of Mendel. Norton, N. Y., p. 178.

[4]Nelson, Byron. 1952. After its kind. Augsburg Publishing House, Minneapolis, MN, p. 106.

[5]Price, G. M. 1971. Report on Evolution. C. Wm. Anderson, Editor. Christian Evidence League, Malverne, N. Y., p. 124.

[6]Personal statement of Price to the present author.

[7]Scopes, J. T., and J. Presley. 1967. Center of the storm. Holt, Rinehart & Winston, N. Y., pp. 33 and 67. Scopes taught algebra, physics, and chemistry and coached football. He was substitute teacher of biology for a little while.

[8]A more complete report: Tinkle, W. J. *Proceedings of Indiana Academy of Science*, 65:200 f.

[9]Sturtevant, A. H. 1965. History of genetics. Harper & Row, N. Y., p. 59.

[10]Smith, A. E. W. 1970. The creation of life. Harold Shaw Publisher, Wheaton, Ill., pp. 17 and 74 ff.

THE CREATIONIST AND CONTINENTAL GLACIATION

WILLIAM A. SPRINGSTEAD*

This is a review of both catastrophic and uniformitarian writings about numerous facets of glaciology. While the author discusses literature covering many viewpoints, he concludes that the data have best fit with a monoglacial action of reduced scope following the flood of Genesis.

Introduction

The Biblically oriented creationist espouses catastrophism. Recognizing the present process rates in their relationship to part of earth's previous history, he is also convinced that there is evidence for global catastrophes in the past. As a Biblical literalist he holds that a devastating flood of global proportions made radical changes in earth's biotic life and crust. Similarly he holds that glaciation produced by catastrophic agencies also occurred, drastically changing parts of the earth.

Frequent criticisms of doctrinaire uniformitarianism have been published in recent years. Articles have appeared in scholarly journals and from the pens of competent scientists calling for new and modified definitions.[1] A new school of geological thinking, termed neo-catastrophism, has risen. Its proponents recognize evidence for unprecedented process rates in the past.[2] It may be predicted that the adherents of this school will increase in numbers as scholarly research continues to uncover new evidences of catastrophism.

In appraising creationist views on continental glaciation numerous treatments will unfortunately be overlooked. Secular treatments of the subject alone are voluminous. Perhaps more articles have been written on Ice Age geology than on all the other geological ages combined. The reviewer trusts that creationists will therefore take a sympathetic position relative to the task undertaken. He further trusts that readers will make note of any articles overlooked and make them known by subsequent correspondence to the editor and this author.

A major difference between creationists and secular scientists lie in their interpretation of the

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extent, time, and duration of the ice age. Many creationists subscribe to only one major glaciation, rather than to the classic view of four glaciations. They associate the time of the continental glaciation as being either concurrent with or following the time of the global flood.

Creationists themselves differ as to the causes, extent and effect of the ice caps. Some hold to the theory that the ice was introduced by either an astral dump or the breaking up of an ice canopy encircling the earth. Still others hold to glaciation being produced by cold following collapse of a water canopy. Other creationists believe the causes may be found in the study of climatological and geological phenomena. Glacialists have advanced around 60 explanations for the appearance of ice caps. None of these explanations to date has received general acceptance. It is this reviewer's opinion that creationists should therefore be both cautious and nondogmatic as to the cause. Neither Scripture nor scientific investigation has revealed the exact cause of this remarkable period.

Many creationists believe that continental glaciation followed the flood. Whitcomb and Morris, Harold Armstrong[3] and this reviewer are among those who do. Donald Patten is an exception. He writes, "It is here proposed that the cause or causes of the Ice Epoch did not follow the Flood. They were one and the same catastrophe."[4] Those who espouse the theory of an ice canopy encircling the earth, also believe that its breaking up occurred simultaneously with the Flood.

A. The History of Modern Glaciology

As a result of studying the movements of glaciers in the Alps, Swiss born Louis Agassiz wrote two books projecting a startling new concept to the then current geological thinking. The books were entitled, *Studies of Glaciers* and *The Glacial System.* In these works, appearing in the middle of the 19th century, Agassiz propounded the theory of continental ice caps in which he envisioned "great sheets of ice, resembling those now existing in Greenland, once covered all the countries in which stratified gravel (boulder drift) is found."[5]

Agassiz himself had formerly been a partisan of Lyell's theory of transport by icebergs and ice rafts. When Agassiz visited the British Isles in 1840, he along with William Buckland "extended the glacial doctrine to Scotland, Northern England and Ireland."[6]

The ice caps postulated by Agassiz were vast indeed. Writing of Europe he said, "We have to do with sheets of ice five to six thousand feet in thickness covering the whole continent."[7] He wrote of the ice, that it "extended at least from the North Pole to the Mediterranean and Caspian Seas."[8] Elsewhere he stated, "It extended beyond the shore lines of the Mediterranean and of the Atlantic Ocean, and even covered completely North America and Asiatic Russia."[9] Fifty years later Dawson was to appraise such a concept: "The glacier theory of Agassiz and others may be said to have grown till, like imaginary glaciers themselves, it overspread the earth."[10]

Multiple glaciation did not gain widespread acceptance until about the turn of the 20th century. Penck and Bruckner, after studying the forms and deposits of glaciation in the Bavarian Alps, wrote a three volume work entitled, *The Alps in the Ice Age.* In this work they popularized the concept of four phases of glaciation and labeled them Gunz, Mindel, Riss and Wurm. The work has become a classic among proponents of polyglaciology.

Monoglaciology was the generally held view of geologists for nearly a half century. One of its most able supporters was J. W. Dawson of Canada. Clark wrote the following eulogy of this great scientist, "He did more by precept and by spoken and printed word to further the progress of geology and education in Canada during that period than did any other person."[11] Flint was to note of Dawson's view rejecting polyglaciology, "The last scientific opposition to it in North America died in 1899 with J. W. Dawson."[12]

But scientific opposition to polyglaciology did not die with Dawson. The renowned, though controversial, American anthropologist, Ales Hrdlicka refused to accept geological indications for a succession of four glaciations in Europe. Alimen writes of French Paleontologists, "who admit only one glaciation in the Quaternary, viz, the Wurm."[13] The late Richard Lougee contended, "Reduction of the ice age to 'unity' shortens geologic history and nullifies the meaning of the terms Nebraskan, Kansan, Illinoian, Wisconsin and the several interglacials." Lougee wrote, "Deposits formerly attributed to four or five separate Pleistocene glaciations are deposits of a single glaciation."[14] Monoglaciology still persists today. Nor is the number of glaciations completely agreed upon by those espousing polyglaciology.

B. The Extent of Continental Glaciation

Evidence of continental ice caps in the northern hemispheres is generally accepted today. Cornwall has summarized: "Though there are still plenty of grounds for disagreement and controversy over questions of Pleistocene geology, the glacial origin of the Drifts in the middle latitudes is fully established today."[15] There is however widespread variancy of opinion as to the extent of the land glaciation. Agassiz may well have been prophetic for others when he wrote,

"I am certainly far from having said the last word about glaciers."[16]

It is widely held that nearly 30% of the earth's surface was formerly covered by ice, and that most of this ice was in North America. Woodbury states, "In Europe the extent of the ice was no more than one-third of its extent in Canada and the United States."[17] Patten states, "The ice mass extended from Eastern Alaska to Central Europe, and from the fringes of Siberia to the central United States."[18] A high school science text specifies, "In Europe the ice sheets covered most of Scandinavia, the British Isles, Denmark, Belgium, northern France, and the Baltic countries, and extended far into Germany and Russia."[19]

But creationists ought to be aware of qualifying statements. Ley has written, "In the Arctic, the last great ice sheets of the ice age never covered the North Pole at all but spread from centers hundreds of miles to the south."[20] Lindroth writes, "Alaska was little affected by the land ice, the major part of it remained ice free throughout the entire Pleistocene period (Flint, 1952) as did the opposite part of eastern Siberia."[21] Farb includes western Canada along with most of Alaska and much of Siberia as having been ice free during the last part of the last glacial advance.[22] Ewing and Donn postulate, "The facts about early man in the Americas support the idea of an ice free Arctic during Wisconsin time and hence during earlier glacial stages."[23]

The extent of glaciation in Europe is also debated. West thus writes, "The evidence suggests the survival in southern Britain during the glaciations of open vegetation with a flora of many northern and montane plants."[24] Hibben states, "A land bridge between Great Britain and the European continent existed all through the Pleistocene period."[25]

Turning to the European mainland, Alimen states, "France escaped the Pleistocene continental glaciation."[26] Flint specifies, "No part of Belgium was glaciated at any time."[27] Rankama wrote about "The continuous marine deposition in the western Netherlands."[28] Some glacial students have placed the southern edge of maximum glaciation in London and Leipzig. Can it be demonstrated that the glaciation in the Swiss Alps was any more extensive than one of a more localized nature? One thing is now quite certain, the ice caps never approached the extent postulated by Agassiz and others of his day. Creationists should be wary upon hasty acceptance of glaciation estimates.

C. The Catastrophic Nature of Continental Glaciation

Numerous creationists are convinced that glaciation occurred suddenly by catastrophic agencies. Agassiz had argued for this in writing, "The ground of Europe, previously covered with tropical vegetation and inhabited by herds of great elephants, enormous hippopotami, and gigantic carnivora became suddenly buried under a vast expanse of ice covering plains, lakes, seas and plateaus alike."[29] Rejecting uniformitarian concepts, he said, "Therefore all the hypotheses of a gradual cooling of the earth, or of a slow variation either in the inclination, or in the position of the globe's axis are invalid."[30]

Dawson held that the rapidity of ice melt following glaciation was responsible for widespread destruction of life. He wrote, "that Post-glacial flood, which must have swept away the greater part of men, and many species of great beasts, and left only a few survivors to repeople the world."[31] Perhaps the extensive fossil remains on the continental land shelves argue for rapidity of flooding due to swift ice melt.

It may be noted that a few uniformitarians are themselves using the term catastrophic, or synonyms, for glaciation. Smith writes, "The arrival of a glacial period must therefore have been a cataclysmic event."[32] Eiseley writes of the Ice epoch, "It was a world of elemental extravagance, assigned by authorities to scarcely one percent of earth's history and labeled 'geo catastrophic'."[33] Asimov notes, "There were catastrophes after all."[34]

D. The Vast Extinction of the Northern Animals

The dramatic extinction of untold millions of animals in the frozen muck beds of Alaska and Siberia has puzzled and invited explanations from scientists beginning with Agassiz and continuing to those of the present. Hapgood writes of their great numbers, "Yet we know that along with the millions of mammoths, the northern Siberian plains supported vast numbers of rhinoceroses, antelope, horse, bison, and other herbaceous creatures, while a variety of carnivores, including the saber tooth cat, preyed upon them."[35] Resorting to a neo-catastrophist explanation Hapgood postulates the following cause of their great extinction,

> In conclusion, it appears to me that the whole mass of the evidence relative to the animal and plant remains in the Siberian tundra, interpreted in the light of the evidence from North America, sufficiently confirms the conclusion that there was a southward displacement of Siberia coincident with the southward displacement of North America at the end of the last North American ice age."[36]

Patten (a creationist) espouses a phenomenal astral ice dump as the cause of extinction. He states, "a great dump of astral ice, possibly 12,000,000 cubic miles, dumped over the mag-

netic poles, simultaneous in timing with the Flood, involving ice at temperatures approaching zero."[37] He then notes, "The mammoth carcases were frozen rapidly, perhaps at temperatures below −150° F."[38]

The chief problem with accepting Patten's, and similar views, is that the areas of the greatest extinctions in the north, were never glaciated. The remains are found in frozen muck or permafrost. Permafrost consists of deeply frozen soils and subsoils. Sanderson thus writes, "The really puzzling thing is that this permafrost in Alaska and Siberia contains enormous quantities of animal bones and flesh, half-decayed vegetation, wood, and other remains of living things that, in some areas, together constitute a sizable percentage of the whole."[39] Permafrost is quite different from either land or sea ice in composition.

Hapgood's suggestion of shifting poles poses difficulty. Such extinctions had to occur suddenly and dramatically. There had to be quick coverage along with sudden deep freezing. A pole shift occurring over several hundred years would hardly be sufficient.

Is there a possible solution to the puzzling situation? One is reminded of an excellent comment by Morris. He states, "In fact, there seems no way of accounting for most of the great fossil beds of the world, especially of vertebrate fossils, except in terms of very rapid burial and lithification, such as posited by the Biblical deluge, with its accompanying volcanic and tectonic activity and its inferred subsequent glaciological phenomena."[40] The greatest cause of extinction was the Genesis Flood. Genesis 7:21 thus records, "And all flesh died that moved upon the face of the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the earth, and every man."

But if all life was killed by drowning, how do we account for the deep freezing of the mammoths and other animals in Alaska and Siberia? Daly offers the following explanation, "As soon as the protecting vapor canopy fell, the heat radiated into space and the mammoths froze, 'suddenly . . . as of a single winter's night', as Dana expresses it, and knew no relenting afterward."[41] Elsewhere he states, "That the collapse in temperature occurred, and the ice age began, exactly at the time of the flood when the canopy collapsed as proved by the frozen mammoths."[42] Daly then postulates extinction by freezing concurrent with the Flood.

Patten's view is that there was an astral dump of ice by reason of another planet approaching close enough to earth to empty its load. He proposes that the "mammoths were encased suddenly in ice." He holds that their frozen condition "support the proposition that the Flood and the Ice Epoch were simultaneous global catastrophes (or rather, differing phases of the same catastrophe.)"[43]

Is there any alternative to Daly's and Patten's view that the mammoths were killed by the causes they have postulated? In the first place it would be quite erroneous to think that the great beasts are usually found intact and in well preserved condition. Often the remains are torn asunder and intermingled with wood and vegetal debris. When the remains are exposed they are often in a half decayed condition. Further, half of the remains occur in Siberia, where the permafrost is "riddled with plant and animal remains aggregating untold millions of tons."[44]

The coldest spot on earth today is in Siberia. Temperatures drop to 90° below zero. Summer temperatures in the same area may rise to 60° above. There then can result a temperature change of 150° from summer to winter. Besides this drop of temperature, there is the chill factor resulting from the wind. Author of a recent article on Alaska notes, "The sixty-mile-per-hour winds whipping across the slope's 76,000 square miles at just twenty-three degrees below would create a chill factor equal to 101 degrees below. In this environment unprotected flesh freezes in less than thirty seconds."[45] A chill factor of 150° below is not unlikely even today in either Alaska or Siberia.

Following the Flood, Genesis 8:1 informs us, "God made a wind to pass over the earth, and the waters asswaged." The nature and duration of this wind is said to have been a determinate factor in causing the flood waters to subside. Is it possible that this wind was also accompanied by a temperature drop in such places as Alaska and Siberia?

This reviewer would ask indulgence in suggesting the following cause of the vast frozen remains in these northern regions. The Flood itself was accompanied by overwhelming turbidity mud flows which both drowned and covered the mammoths and other life in the North. This was soon followed by an extreme drop in temperature and winds of great force. The winds caused the flood waters to subside and in turn deep froze the mud with its vast animal remains. The freezing was provided as a result of the chill factor produced by the winds. The effect was a vast area of permafrost which in some areas is around 1500 meters deep. The permafrost became the great graveyard for untold millions of drowned animals.

E. The Theory of Ice Rafted Debris

Sir Charles Lyell was among those earlier scientists who espoused ice-rafting, rather than glacial movement, to account for foreign rock debris in England and on the plains of Germany. Agassiz noted of Lyell's view, "He assumed that

the transportation of angular boulders had taken place on top ice rafts carried by water currents, in the same manner as the northern ice transports boulders, which are finally deposited along the northern shores of Europe."[46] Dawson was to comment later, "His views as to the combined agency of land ice or glaciers, of floating fragments of glaciers or icebergs, and of field ice are, or ought to be known; but I must say that they have been unfairly stated."[47]

Agassiz had confessed unfamiliarity with the effects of floating ice, "Also I have not had as yet a chance to examine the influence on shore lines of great bodies of water with floating ice; however I doubt that their decision should be different than that of ordinary water."[48] But Flint, a modern glacial specialist writes, "Not all striations on rocks are of glacial origin; agencies other than glacier ice makes striations. A common glacial agent in high latitudes is floating ice in rivers, lakes and the sea."[49] Daly points out, "The ice age was an age of icebergs. The oceans had not yet receded off the continent."[50]

There is accumulating evidence of broad misinterpretation of action by glacial movement. Ton-sized rocks were dropped in Missouri by means of floating icebergs. Lougee states, "Iceberg rafted erratic stones and boulders became grounded on the submerged topography of northern Kentucky, southwestern Missouri, and eastern Iowa."[51] These ice raftings would undoubtedly result in striations such as was mentioned by Flint.

Gansser points out, from personal observations, "The author has seen many desert fanglomerates which, except for the absence of clearly striated boulders, could hardly be distinguished from glacier boulder beds, and certain mud flows can have striated pebbles unrelated to glaciation."[52] Fairbridge has also pointed out, "Careful reexamination of the evidence in recent years, however, has rejected many of these ice ages; formations once identified as glacial moraines have been reinterpreted as beds laid down by mud flows, submarine landslides, and turbidity currents."[53]

F. The Duration of the Ice Age

Students of ice age history are aware of widespread variance and disagreement over the duration of the glacial ice. Cornwall speaks for one group when he states, "The Pleistocene period is now reckoned to be some 2-3 million years long, including a longer earlier portion known as the Villafranchian."[54] Yet such a view is by no means uniform and has no general acceptance. Gilluly points out, "One of the most controversial items in geochronology is that of the duration of the Pleistocene epoch."[55]

Haldane represents another quite prominent group when he states, "Indeed recent work suggests that the Pleistocene period only lasted for about 300,000 years.[56] The reader should note that this estimate is a mere one-tenth of Cornwall's estimate. Springstead cites estimates held by a few geologists for a duration of only 10,000; 30,000; and 100-150 thousand years.[57]

The chief method of dating the Ice Epoch has been in respect to postulated multiple glaciations and lengthy intervals. Krober has noted that the chief means of dating the Pleistocene is in terms of associated ice ages.[58] Springstead has pointed out, however, that the polyglacial view is faulty due to the lack of field evidence.[59]

Only three mountain ranges in the United States provide evidence of more than one glaciation. Evidence of only one glaciation has been found in such mountain areas as the Apennines, Sierra Nevadas, Atlas Mountains, Anatolia, and the Balkans. One glacial stage only is known for Australia, Tasmania and for the Pontic and eastern parts of Turkey. Finally, polyglaciation cannot be demonstrated for many areas of glaciated land.

It must be kept in mind that all Swiss glaciers are "valley glaciers" and are in contrast to the extensive, more stable, continental glaciers found in Greenland and Antarctica. The Penck-Bruccner formula for using Swiss glaciations to postulate glaciations elsewhere is fraught with error. Kurten has noted, "Many authors suggest that the Alpine nomenclature should not be used except in the Alps."[60]

G. The Close of the Ice Age

A notable breakthrough was made in estimates of the duration of the Ice Age when it was discovered that its close was much more recent than had been previously estimated. Many authors suggest that its close has been within the last ten thousand years.

According to Bryan and Gruhn, "Some geologists argue that the Wisconsin ended when the last Laurentian ice melted about 6,000-5,000 years ago; this was based on the fact that the sea level apparently stopped rising abruptly about that time. (Frye and Willman 1960)"[61] Hapgood, although a polyglacialist, writes of, "The last one, which ended only about 8,000 years ago."[62] Watson and Sisson write, "The major eustatic rise of the ocean level, which ended about 5,500 years ago (Godwin and Willis, 1961, 1962) restored the North Sea to approximately its present stage. . . ."[63] Although such estimates can be no more than relative, they point out the recency of the ice melt in the Northern hemispheres. They are not far removed from some estimates for the Flood.

Through his study of the maps of the ancient sea kings, and through Dr. W. D. Urry's isotope core dates, Hapgood argues for a warm period in

Antarctica only a little more than 6,000 years ago.[64] Artifacts found by archaeologists on the frozen shores of the Arctic argue for the recency of the arctic ice. Both of these factors call for recency and rapidity of glaciation in those areas. In noting the rapidity of recent glacial demise in Alaska, Sanderson significantly comments, "Perhaps forty days and forty nights of snow or rainfall could bring on an 'ice age' or a flood."[65]

Conclusion

In conclusion, this reviewer would uphold the view taken by those creationists who are convinced continental glaciation followed the Genesis flood. In so doing, he would adhere to Dawson's conviction that the glaciations were smaller than those popularly conceived.[66]

While such a view dramatically reduces the duration of the ice age, and also postulates its occurrence within historic time, the reviewer sees nothing incongruous in holding such a concept. Catastrophic occurrences may be reasonably demonstrated for several significant events. Only a catastrophe, covering one-fifth of the world's land area, can account for the enormous animal extinctions in Alaska and Siberia. The recency of their extinction is a matter of record. The rapidity of glaciation in the Arctic and in the Antarctic, within the last ten thousand years, also provides grounds for postulating catastrophic glacial processes elsewhere.

When the extensive field work to substantiate polyglaciology is carefully studied, the case for monoglaciology is strongly enhanced. And the duration of the ice age is seen to be much shorter. The Genesis Flood provided the water needed for consequent continental glaciation. The flood, not glaciation, was the chief agent of ice age extinctions.

Flooding had a much more prominent place, even during the ice age, than students of the subject have imagined. In fact, it would be much more appropriate to designate the over all time period as the Pluvial Age, instead of the Ice Age. Glaciations were much more localized than have been generally postulated.

References

[1]Valentine, James W. 1966. The present is the key to the past, *Journal of Geological Education*, XIV(2):59. April; and Krynine, Paul D. 1956. Uniformitarianism is a dangerous doctrine, *Journal of Paleontology*, 30(2): 1003-1004.

[2]Corliss, Wm. R. 1970. Mysteries beneath the sea. Thos. Y. Crowell Co., N. Y., pp 135, 156, 157

[3]Armstrong, Harold 1972. Comments on scientific news and views, *Creation Research Society Quarterly*, 8(4): 275. March.

[4]Patten, Donald Wesley. 1966. The Biblical flood and the ice epoch. Pacific Meridian Publ. Co., Seattle, WN, p. 99.

[5]Encyclopedia Brittanica. 1970. Agassiz, Jean; Louis, Rodolphe, Vol. 1. Encyclopedia Brittanica, Inc., Chicago, p. 320.

[6]Agassiz, Louis. 1967. Studies on glaciers. (Translated and edited by Albert V. Carozzi). Hafner Publishing Co., N. Y. and London, p. XXVII.

[7]*Ibid.*, p. XXXV.

[8]*Ibid.*, pp. XVII-XVIII.

[9]*Ibid.*, p. 195.

[10]Dawson, J. Wm. 1893. The Canadian ice age. Wm. V. Dawson, Montreal, p. 289.

[11]Clark, T. H. 1964. Pioneers of Canadian science. R-6, Society of University of Toronto Press, p. 101.

[12]Flint, Richard Foster. 1957. Glacial and pleistocene geology. John Wiley and Sons, Inc., N. Y., p. 5.

[13]Alimen, Marie Henrietta. 1967. The Quaternary of France. (in) The geologic systems: the quaternary, 2. Rankama, Kalervo, John Wiley, N. Y., p. 207.

[14]Daly, Reginald. 1972. Earth's most challenging mysteries. The Craig Press, Nutley, N. J., p. 166, 149.

[15]Cornwall, Ian. 1970. Ice ages. Humanities Press, Inc., N. Y., John Baker, Ltd., London, p. 14.

[16]Agassiz, *Op. cit.*, p. LXXI.

[17]Woodbury, David O. 1962. The great white mantle. The Viking Press, N. Y., p. 100.

[18]Patten, *Op. cit.*, p. 114.

[19]Namowitz, Samuel N., and Donald Stone. 1972. Earth science, Fourth Edition. American Book Co., N. Y., Cincinnati, p. 174.

[20]Ley, Willy. 1962, 1971. The poles. Life Nature Library, Time-Life Books, Time. Inc., N. Y., p. 11.

[21]Lindroth, Carl H. 1957. The faunal connections between Europe and North America. John Wiley and Sons, Inc., N. Y., Almquist & Wiksell, Stockholm, p. 293.

[22]Farb, Peter. 1968. Man's rise to civilization. E. P. Dutton & Co., Inc., N. Y., pp. 193-194.

[23]Ewing, Maurice and William L. Donn. 1956. A theory of the ice ages. *Science*, 123(3207):1064. June 15.

[24]West, R. G. 1967. The quaternary of the British Isles. The Quaternary, Vol. 2, Kalervo Rankama, Interscience Publishing Div.. John Wiley & Sons, N. Y., p. 66.

[25]Hibben, Frank C. 1958. Prehistoric man in Europe. University of Oklahoma Press, Norman, Oklahoma, p. 19.

[26]Alimen, Marie Henrietta. 1967. *Op. cit.*, p. 205.

[27]Flint, Richard F. *Op. cit.*, p. 406.

[28]deJong, Jan D. 1967. The geologic systems. The Quaternary, 2, Rankama, Kalervo, John Wiley, N. Y., p. 317.

[29]Agassiz, *Op. cit.*, p. 169.

[30]*Ibid.*, p. 168.

[31]Dawson, J. Wm. 1894. Some salient points in the science of the Earth. Harper and Brothers, N. Y., p. 465.

[32]Smith, Anthony. 1970. The seasons. Harcourt Brace Janovich, Inc., N. Y., p. 79.

[33]Eiseley, Loren. 1969. The unexpected universe. Harcourt, Brace & World, Inc., p. 98.

[34]Asimov, Isaac. 1964. A short history of biology. Natural History Press, Doubleday, p. 67.

[35]Hapgood, Charles H. 1970. The path of the pole. Chilton Book Co., Philadelphia & N. Y. & London. (Revised edition of *Earth's Shifting Crust*, 1958), p. 255.

[36]*Ibid.*, p. 279.

[37]Patten, Donald Wesley, *Op. cit.*, p. 141.

[38]Patten, Donald. 1966. The ice age phenomena and a possible explanation. *Creation Research Society Quarterly* (Annual Issue), 3(1):64. May.

[39]Sanderson, Ivan. 1961. The continent we live on. Random House, Inc., N. Y., p. 52.

[40]Morris, Henry M. 1971. Proposals for science framework guidelines, *Creation Research Society Quarterly*, 8(2):150. September.
[41]Daly, Reginald. 1972. Earth's most challenging mysteries. The Craig Press, Nutley, N. J., p. 236.
[42]*Ibid.*, p. 237. (Yet see contra p. 142, "There could not be a universal flood without a glacial age following.")
[43]Patten, Donald. 1966. *Op. cit.*, p. 63.
[44]Sanderson, *Op. cit.*, p. 53.
[45]Hawkins, Robert. 1972. The invisible cities. The American West, American West Publishing Co., Palo Alto, Calif., p. 40.
[46]Agassiz. *Op. cit.*, p. 155.
[47]Dawson, J. William. *Op. cit.*, p. 3.
[48]Agassiz. *Op. cit.*, p. 161.
[49]Flint, Richard Foster. 1957. *Op. cit.*, p. 57.
[50]Daly, Reginald. *Op. cit.*, p. 165.
[51]*Ibid.*, pp. 165-166.
[52]Gansser, Augusto. 1964. Geology of the Himalayas. John Wiley & Sons, N. Y., p. 50.
[53]Fairbridge, Rhodes W. 1960. The changing level of the sea, *Scientific American*, 202(5):70. May.
[54]Cornwall, Ian. 1970. Ice ages, their nature and effects. Humanities Press, Inc., N. Y., p. 57.
[55]Gilluly, Jas., Aaron C. Waters, and A. O. Woodford. 1968. Principles of geology, Third Edition. W. H. Freeman and Co., San Francsico, Calif., p. 284.
[56]Haldane, J. B. S. 1967. Quoted (in) Culture and the evolution of man. Edited by M. F. Ashley Montagu, Third Printing. Oxford University Press, p. 71.
[57]Springstead, Wm. A. 1971. The dying of the giants, *Journal of The American Scientific Affiliation*, 23(1):23. March.
[58]Kroeber, Alfred Louis. 1923. Anthropology. Harcourt, Brace & Co., N. Y., p. 648.
[59]Springstead, William A. 1971. Monoglaciology and the global flood, *Creation Research Society Quarterly*, 8(3): 177. December.
[60]Kurten, Bjorn. 1968. Pleistocene mammals of Europe. Aldine Publishing Co., Chicago, Ill., p. 19.
[61]Bryan, Alan Lyle and Ruth Gruhn. 1963-4. *American Antiquity*, 29:307.
[62]Hapgood, Charles H. 1966. Maps of the ancient sea kings. Chilton Books Publishing, Philadelphia and N. Y., p. 98.
[63]Watson, J. Wreyford and J. B. Sissons. 1964. The British Isles—A systematic geography. Nelson, University of Edinburgh, p. 149.
[64]Hapgood, Charles H. *Op. cit.*, p. 98.
[65]Sanderson, Ivan. *Op. cit.*, p. 64.
[66]Springstead, William A. 1971. *Op. cit.*, p. 177. (Reference No. 59)

SHOULD MACROEVOLUTION BE TAUGHT AS FACT?

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The title question of this article is examined in light of evidence from morphology, classification, natural selection, mutation, biogeography, and anthropology. The author concludes that evolution theory is inadequate and certainly cannot be considered as a "fact." The author did not have the objective of thorough discussion of special creationism, but numerous "leads" to creationist literature are supplied during review of each topic.

A teaching professor in a college biology department has an awesome responsibility, for science is a "sacred cow" in our science-oriented civilization, and he influences the minds of numerous students. Many students may perhaps never seriously question the validity of what they are taught; most of them have preconceived ideas that have not been examined critically.

Students tend to accept the ideas they are taught if such ideas are said to be basic to a particular discipline. However, certain ideas can be said to explain reality; and yet, after further analysis and questioning. these ideas may be demonstrated to be contrary to reality. Therefore, the student faces the alternatives—acceptance or rejection, and as stated in an earlier paper:

> Therefore when a student of the sciences is presented a controversial principle or [explanation of a] phenomenon or the interpretation of [data], he should expect the presentation to be as close to truth (reality) as is humanly possible and that if there are two opposing views, both will be presented with the evidences for and against. If this is done, the student is then in a position to contemplate (one of the finest of all human endeavors) and attempt to draw his own conclusions. Unfortunately in many cases, the student is presented only one side of the picture and often the view is quite distorted.
>
> If two interpretations of a principle are of such importance that both affect almost all other endeavors, the student should at least be presented both sides of the story. He may then be at such an angle to see beneath the reflections of the surface of the pool into the deeper more clear waters.[1]

Let us consider the essence and implications of a controversial concept—evolution. It is a complex of ideas which is widely accepted and is said to be a basic principle of science; and, moreover, even an established fact upon which rests the very structure of science, especially the disciplines of the life sciences and historical geology. The importance and influence of this idea is concisely stated by Savage:

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