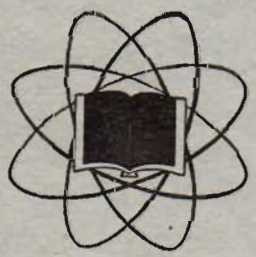
JOURNAL

of the

AMERICAN SCIENTIFIC AFFILIATION



The fear of the Lord is the beginning of wisdom. Psalm 111:10

Volume 6 **March, 1954** **No. 1**

The American Scientific Affiliation

(INCORPORATED)

The American Scientific Affiliation was organized in 1941 by a group of Christian men of science. The purpose of the organization is to study those topics germane to the conviction that the frameworks of scientific knowledge and a conservative Christian faith are compatible.

PUBLICATIONS

The Journal of the American Scientific Affiliation is issued quarterly. Its contents include primarily subjects both directly or indirectly related to the purpose of the organization, news of current trends in science (including sociology and anthropology), and book reviews.

Modern Science and Christian Faith, is a 316-page book containing ten chapters on nine fields of science, each written by a person or persons versed in that field.

A series of *Monographs* as follows:

No. 1. *Christian Theism and the Empirical Sciences,* by Cornelius Jaarsma, Ph.D. A 10-page booklet. "The data of the sciences are given their true structure when integrated in the unity of Christian thought based on revelational presuppositions."

No. 2. *Creation and Evolution,* by Russell L. Mixter, Ph.D. A 31-page booklet covering various aspects of the subject, and showing that limited creation is a reasonable belief.

No. 3. *The Eye As An Optical Instrument,* by Frank Allen, Ph.D. A 16-page illustrated booklet discussing the intricate marvels of the eye.

Other Monographs are planned for publication in the near future.

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1121 East 81st Street
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435 Robinson Street
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The Journal of the American Scientific Affiliation is published quarterly, March, June, September, and December by the American Scientific Affiliation. The publication office is located at 107 West Plymouth Avenue, Goshen, Indiana. The subscription price is $3.00 per year. Single copies may be obtained at a price of $1.00 each. Copies of back issues may be obtained at the price of $3.00 per volume. Send all communications regarding editorial matters to the editor, Delbert N. Eggenberger, 1121 East 81st St., Chicago 19, Ill. Entered as second class matter January 23, 1952, at the post office at Goshen, Indiana, under act of March 3, 1879, as amended by the acts of June 11, 1934, and October 30, 1951.

EDITORIALS

Membership in The Royal Society has been for nearly three centuries one of the top, if not the ultimate, honors accorded scientists. In a *Nature* editorial comment of Sir Edward Appleton's Presidential Address to the British Association in 1953, it is interesting to note the reason for founding the Royal Society. Dr. C. E. Raven in his history of the Society says that the founders sought not so much of mankinds benefits but to find more accurately the Creator's will and to live in it.

A good appraisal of the moral responsibility of scientists and Christian men is recorded in *Nature* (Vol. 172, 517 (1953)) by Most Reverend and Right Honorable Cyril F. Garbett, Archbishop of York. There is really little, if any, that has not been written before. But the fact that a sermon, as this was, with emphasis on the love of God and so forth, is published as a major article in a prominent scientific periodical, is noteworthy.

David Livingstone, the well-known missionary and explorer in Africa was honored last October through the unveiling of a statue of him at the Royal Geographical Society House in England.

The Roman Catholic view of genetics was discussed by Pius XII in the September 9, 1953 issue of *L'Osservatore Romano*. In essence the thesis was that the study of genetics should be encouraged; evolution, however, is to be considered only one hypothesis which is not shared by all.

For those interested in references to glass in the Scriptures, an interesting article "Glass in the Biblical Literature" by E. R. and A. Silverman appeared in the *Journal of Chemical Education* 30, 415 (1953). Listings of both Old and New Testament references are made as well as those in apocryphal literature.

News Notes

New Officers of the A. S. A.

As a result of the recent election, Professor Hendrick J. Oorthuys of Purdue University was elected a member of the Executive Council. We wish to thank Dr. J. Laurence Kulp for his faithful work on the council during the past five years.

The officers of the A. S. A. for 1954, as the result of regular council election, are:

President: Russell L. Mixter

Vice-President: Brian P. Sutherland

Secretary-Treasurer: H. Harold Hartzler

Delbert N. Eggenberger continues as Editor of the *Journal*.

At the Evangelical Theological Society's annual meeting in Chicago in December 1953, the work and aims of the A. S. A. was presented by President Russell L. Mixter in a short account at their evening banquet.

The seventh annual Hilding Ahlstrom Memorial Lectures at Trinity Bible Institute and Seminary were given by Russell L. Mixter. The topic was "Creation and Evolution" presented in a series of five lectures. Digests of these were published in several issues of the denomination's weekly, the *Evangelical Beacon*.

The W. H. Griffith Thomas Memorial lectures at Dallas Theological Seminary for 1951 were given by Allan A. MacRae on the subject "The Scientific Approach to the Old Testament." The lectures are appearing serially in the 1953 issues of *Bibliotheca Sacra*.

The following quotation is from a letter to President Mixter from Jon. H. Rouch: "It recently occurred to me that perhaps you and the A. S. A. would like to know of a very small French counterpart of a similar organization . . . the 'Association des Amis de Science et Foi.' For some time I have received their little paper 'Certitudes' and it seems consistently soundly evangelical. I do not know if there is a connection with the Victoria Institute. The work of this association has been for the most part publishing brief apologies on Biblical points of interest in science and also in showing the films of Moody Institute of Science . . . " The address listed is P. Lequatre, St-Marcellin C. C. Postal Paris 10-85.

An article entitled "Rapid Precipitation of Barium Sulfate" by Robert B. Fischer and T. B. Rhinehammer appeared in *Analytical Chemistry* 25, 1544-8 (1953). Also Dr. Fischer presented a paper entitled "Decomposition of Inorganic Specimens During Observation in the Electron Microscope" at the annual meeting of the Electron Microscope Society of America.

A series of articles on "Studies in Low Concentration Chemistry" with George K. Schweitzer as

senior author have appeared in recent issues of the *Journal of the American Chemical Society.*

Those appearing in 1953 include "III. The Radiocolloidal Properties of Yttrium-90" with B. R. Stein and W. M. Jackson, "IV. The Radiocolloidal Properties of Beryllium" with J. W. Nehls, "V. The Spontaneous Deposition of Silver-III on Various Metals" with D. L. Wilhelm, and "VI. Some Propperties of Tracer Gold in Solution" with W. N. Bishop.

J. Laurence Kulp has an article "Dating with Carbon 14" in the *Journal of Chemical Education* 30, 432 (1953). Also, along with Lansing E. Tryon, he has issued a Publication Board Project Progress report on the same general subject.

New Members

Henry K. Bacon, 17829 Brinson St., Wyandotte, Mich., is a chemical engineer with the Pennsylvania Salt Mfg. Co. He received his bachelor's degree from Temple University.

Wilford S. Bailey is a Professor in the Department of Pathology and Parasitology at Alabama Polytechnic Institute's School of Veterinary Medicine. His address is 119 Cox St., Auburn, Ala.

Willyla Bushnell is instructor and head librarian of Southern California Bible College, Costa Mesa, California. She has her B.A. from Northwest Nazarene College, and an M.A. from Pasadena College.

John M. Ellis is Associate Professor of Science at Cascade College. Has B.S. degree from Seattle Pacific College, M.S. from Univ. Southern California. Resides at 5626 N. Kerby, Portland Oregon.

Wallace A. Erickson, 7332 Ridge Ave., Chicago 45, Ill., is President of Wallace A. Erickson and Co. He has a B.S. and a Ph.D. from University of Chicago, majoring in chemistry.

Edwin Fast, 1120 East Ninth St., Idaho Falls, Idaho, is Senior Physicist with the Phillpis Petroleum Company, Atomic Energy Division, Research and Development Department. Degrees of M.S. and Ph.D. were granted by University of Oklahoma.

William D. Fulton is a Junior Engineer with North American Aviation, Inc., Columbus, Ohio. He holds a B.S.E. from the University of Michigan and B.D. from Fuller Theological Seminary. Home address is 121 W. Southington, Worthington, Ohio.

Frederick H. Giles, Jr. is a research assistant at the University of Illinois, from which he received the M.S. in Physics. He is a Wheaton College graduate, home address is 252 South Central Ave., Marshfield, Wisconsin.

E. Randall Horton, Jr. is an Osteopathic physician at 214 E. DeWald, Fort Wayne, Indiana, Indiana. He graduated from Wheaton College and receeived his D.O. from the Chicago College of Osteopathy.

Russell W. Maatman is a senior technologist in Socony Vacuum Oil Co.'s research and development department. He has an A.B. from Calvin College and Ph.D. from Michigan State. Home address: 50 Winding Way, Haddonfield, New Jersey.

Paul Peachey is Associate Professor of sociology and church history at Eastern Mennonite College, Harrisonburg, Va. He holds the A.B. degree from this institution. and Ph.D. from the University of Zurich.

Norman D. Lea, 5291 Prince of Wales, Montreal, P.Q. He is a Soils Engineer and Vice-President of Gonite and Waterproofing, Ltd., a subsidiary of the Foundation Company of Canada, Ltd. A graduate of University of Toronto, he also has a degree in soils engineering from Harvard.

E. Boyd Shannon, 603 North College, Bethany, Oklahoma, is Professor of Chemistry at Bethany-Peniel College. He is a graduate of this institution and also has a M.Ed. degree from University of Oklahoma. He also serves as mayor of the city of Bethany.

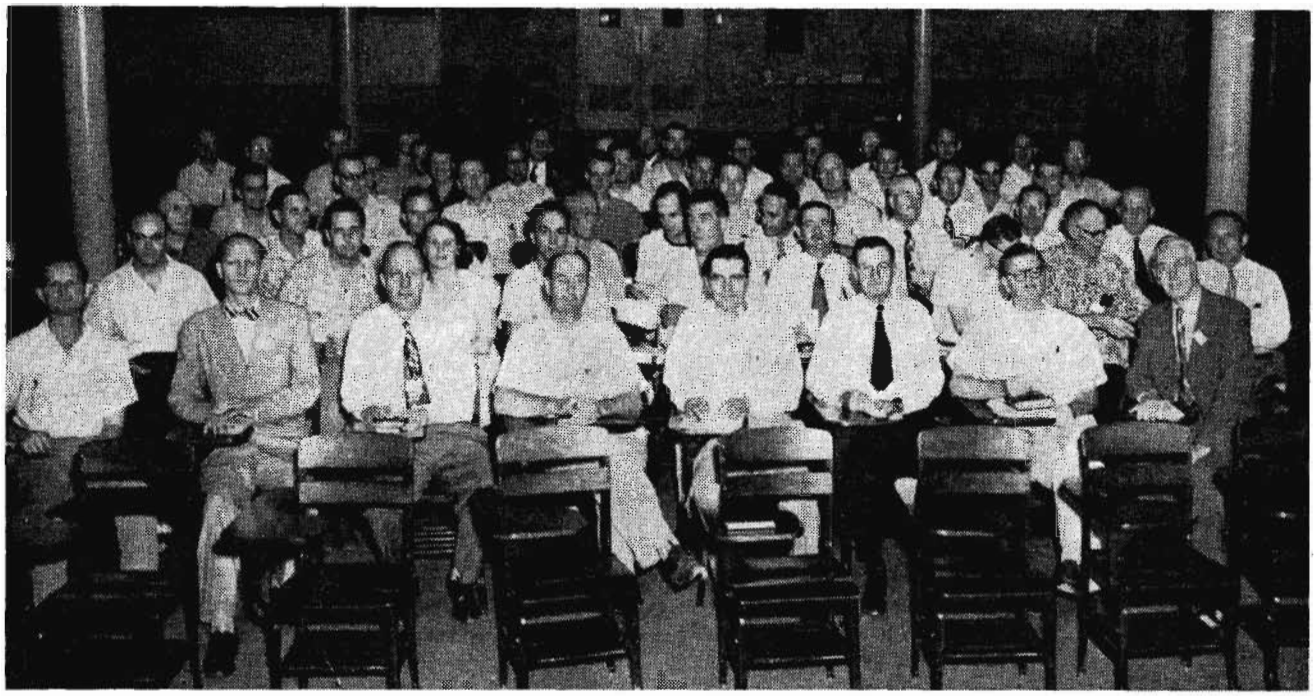
Paul Swartzendruber, a graduate of Goshen College, is a student and teaching assistant in the Department of Organic Chemistry at University of Minnesota. His home is at Middlebury, Indiana.

Charles W. Taylor is a physician and surgeon residing at 703 47 Ave. S.W., Calgary, Alberta, Canada. He received the M.S. degree from Northwestern University, M.D. from University of Toronto.

Oliver G. Titrud is Associate Professor of Biology and Chairman of the Science at Northwestern Schools, Minneapolis. He has the B.S. degree from Bemidji State Teachers College, M.S. from University of Denver. Home address: 7421 Stevens Ave. So., Minneapolis, Minn.

Weldon Troyer serves in the La Plata Mennonite Hospital in Puerto Rico, is a graduate of Goshen College. Mailing address: Box 1018, Aibonito, P.R.

Mary Eby Weaver (Mrs. Henry D., Jr.) 211 Cleveland Ave., Elkhart, Indiana, is employed as a laboratory technologist. She holds an A.B. from Goshen College, and M.T. (ASCP) from George Washington University Hospital.



SESSION OF EIGHTH ANNUAL CONVENTION OF THE AMERICAN SCIENTIFIC AFFILIATION

EXECUTIVE COUNCIL

Left to right:

Delbert N. Eggenberger, Editor
Russell L. Mixter, President
H. Harold Hartzler, Secretary-Treasurer
Paul R. Bauman, Chairman of Local Committee

*On the Work of the Swiss Zoologist Adolf Portmann**

A. VAN DER ZIEL, Ph.D.
University of Minnesota
Minneapolis, Minnesota

1. **Introduction.** It is with hesitation that I as a physicist speak today about the work of a zoologist; the justification is that I seem to be the only one in our group who has come across Dr. Portmann's books and that the language barrier is much smaller for me than for most of you.

Dr. Portmann is professor of zoology at the University of Basel, Switzerland and is considered to be one of the most prominent zoologists living in Europe. He has devoted his research to brain studies and studies of the animal form. He has written a book on the comparative morphology of the vertebrata, and a book on the animal form; closely related to this work is his book on anthropology in which he shows how large the gap is between man and the most highly developed mammals. In addition to this he has given many radio lecture series on biological problems of general interest, most of which lectures were afterwards published in book form.

His radio talks excel in understandability, in clarity of expression and in their sound scientific level. Dr. Portmann shows great concern about the misuse of biological concepts and theories and the harmful effects of such misuse in politics and in society. His views are well-balanced and show a much more critical attitude than is encountered in some other biologists. It is gratifying to find a well-known scientist who is willing to devote part of his time to this kind of work.

In the available time I can give only a few highlights of his work. The largest part of my talk is therefore devoted to Dr. Portmann's book on anthropology and to his views on evolution. I hope that this may induce some of you to read his books more thoroughly; I am convinced that they deserve your careful attention.

2. **Biologische Fragmente zu einer Lehre vom Menschen** (B.F.L.M.) (Biological fragments of an anthropology), 2d Ed., 1951.

Dr. Portmann came to this problem from careful morphological studies in birds and mammals. Part of that work can be found in his book: Einfúhrung in die vergleichende Morphologie der Wirbeltiere (Introduction to the comparative morphology of the vertebrata). He first compares his approach to anthropolgy with other biological approaches to the same problem.

In most cases the main aim is to show the animal basis of our human existence. Though it is of course necessary to know the common basis of human, animal and plant life, the method, cannot show the peculiarity of the individual forms of organic life. Dr. Portmann therefore wrote his book to bring out the peculiarity of the human form of life.

In most cases the higher mammals are used as the standard of comparison in order to arrive at that part of the human being that can be studied by biological methods. A complete understanding of the higher forms of life in terms of the lower ones is impossible, however, since some aspects of these higher forms do not have their counterpart in the lower forms; only a careful *comparison* of both forms of life can show the peculiarities of each form. If, for example, the higher mammals are used as a standard of comparison in an endeavor to understand man, the human spirit is separated from the human body. A good understanding of the human form of life can only be obtained if the separation between body and spirit is not made; man should be studied in his totality.

Most biological approaches to anthropology are based upon the theory of evolution. Dr. Portmann does not accept this basis, not so much because he is opposed to a truly scientific descendence theory but because such a theory can only be used to explain the peculiarities of the human form of life that are found by studying man in his totality. Before applying a descendence theory one has to know *what* this theory has to explain. By an a priori fitting of the investigations into a certain framework one may lose the most important aspects of the human form of life; for that reason such a framework should be avoided.

Dr. Portmann's discussion is based upon a correlation of the level of organization, form of existence and way of development of the higher mammals.

*Paper presented at the Eighth Annual Convention of the American Scientific Affiliation at Winona Lake, Indiana, September 1-3, 1953.

Mammals can thus be divided into two well-known groups:

	Group I	*Group II*
level of organization	low	high
development of brain	small	large
structure of body	little specialization	much specialization
duration of gestation	very short (e.g. 20-30 days)	long (more than 50 days)
number of offspring per litter	large (22-5)	mostly 1 - 2 (rarely 4)
state of offspring at birth	helpless at birth, no hair; does not resemble adult; nose, ears, and eyes closed; development of the arm nerves further advanced than that of the leg nerves	independent at birth, except for food; resembles adult in miniature; nose, ears, and eyes open; nerves in arms and legs in same advanced stage of development.

Some mammals, like cats and dogs have their offspring in a stage intermediate between group I and II in agreement with their position in the system of mammals. Mammals of extremely specialized organization but little brain development (bats, anteaters) show the characteristics of group II.

It is a characteristic of nearly all mammals that the development of the embryo goes through the same cycle. They all have closed nose, ears, and eyes during some period of their development; if the instant of birth falls during that period the animals belong to group I; if it falls after that period they belong to group II.

How do primates fit into this scheme? Young apes are very dependent upon their mother, but this is not due to the fact that their development is not far enough advanced; it is caused by a very strong instinct driving them to cling to their mother. The same holds for anthropoid apes. They all belong therefore to group II.

The condition of a new-born human baby differs in this respect from all mammals, including the anthropoid apes. It meets the conditions of group II except two of them. First it is quite helpless at birth in some respects; second, it does not resemble an adult in miniature at birth.

Its nervous system is in an advanced state of development and it can move its arms, legs and fingers very freely; in other respects it is quite helpless, however, and remains so until it is about 1 year old. For these reasons some biologists have classified man in group I. Dr. Portmann shows that this is not the case, but that in comparison with the higher mammals a human baby is born about one year too early.

In many respects the way of development of a human baby differs from the way of development of all other mammals. Only when the baby is about 1 year old does it start to show the characteristics of the adult such as erect posture, beginning of speech, etc. Moreover, only at the age of about 1 year, does the baby look like an adult in miniature. Portmann backs this up by showing that the ratio

$$\frac{\text{length at maturity}}{\text{length at birth}}$$

is about the same for arms, legs and the rest of the body in the case of a chimpanzee, whereas in the case of a human baby the ratio is much larger for the arms and legs (especially the legs) than for the rest of the body. This is even more pronounced if the human embryo is compared with the embryo of the anthropoid apes. It then is found that the apes reach the *relative* proportions of the adult very early in their embryonal development, whereas in man, due to unknown hereditary reasons, the relative proportions of the adult are reached only *long after birth.* This is remarkable since the duration of the pregnancy in the anthropoid apes is about the same as in man.

The body weight of the human baby is much larger than that of the new-born anthropoids. The latter all weigh about 1500 grams at birth, whereas the average weight of the former is 3200 grams (this latter value is almost the same for strongly built and tenderly built races). This large weight of the human baby corresponds to the large weight of its brain, for the ratio

$$\frac{\text{weight of body}}{\text{weight of brain}}$$

is about the same for apes, anthropoid and man at the time of birth: it only varies from 8.6 to 11.5 (for the adult the ratio varies much more widely viz. 49 for man, to 213 and even more for a gorilla). And still, despite this, the new-born human baby is much less ready than any one of the primates.

Dr. Portmann attributes these circumstances to the much higher brain development and shows by comparison with other animal groups that man is unique in this respect: In the birds of lower organization the newly hatched birds are very independent just as in the next lower group, the reptiles. For the birds of higher organization and larger brain development a longer period of development is needed than

can be provided by the hatching period; these birds are therefore at first very helpless and the parents have to carry out the function that the young bird cannot carry out itself. In the mammals of lower organization we have conditions similar to those found in the more highly developed birds. In the higher mammals the long period for the development of the brain and the nervous system could be obtained by a short gestation period and an even more intensive care of the young for a longer period. Actually the development is much different: after a much longer gestation period the animal is born at a time when it is very well developed. By analogy, the much higher brain development in man should lead to a pregnancy of even longer duration than in mammals, so that the new-born baby would be born with the ability to stand and to speak. Dr. Portmann shows with the help of many examples that this would not be biologically impossible. The actual development found in man is much different, a relatively short duration of the pregnancy coupled with an intensive care for the young baby after birth.

The most important characteristics of man develop during the first year:

1. *Erect posture* (erect posture is more fundamental than erect gait; walking is simple after erect posture is obtained).
2. *Speech.* This is much more than producing sounds; if sound production and speech are equated, one cannot understand the particularity of human speech. Animal sounds lead only to the corresponding human sound, the cry.
3. Insight, understanding of relationships.

The early contact with the world is not necessarily the *cause* of the adult characteristics but indicates a close *correspondence* between the way of development and the adult form of existence. In contrast to animals, which are bound to their environment and are guided by their instincts, man is open to the world and guided by tradition and by his own decisions. This openness to the world corresponds to this early contact with the richness of the world. Development, form and behavior of man are inseparable. Often the human body is considered as a "vessel" of the human spirit; but in fact our development shows a much closer relationship; body and spirit form an unbreakable entity.

Dr. Portmann then compares human growth after birth to the growth of the higher mammals. All mammals develop very fast and reach their maturity quite early. In contrast, a human baby grows very fast *only* until the somatic and psychical conditions for the establishment of many-sided social relationship have been created. (The growth of the brain is similar, however, in all higher primates and in man; most of the growth occurs when only the milk-teeth are present; after that the jaws of the anthropoid apes grow and form a characteristic snout, which does not occur in man). The slow growth after the first year is a peculiarity of man only; even the anthropoid apes, which develop more slowly than all other mammals, reach the adult stage before they are 10 years old. The large growth during puberty also occurs *only* in man; the differences in height between the various races are due mainly to this growth. Also the life-span of all higher mammals is much shorter than for man; even the anthropoid apes do not live much longer than 30 years.

The final conclusions of Dr. Portmann's research are the existence of a large gap between man and the most highly developed mammals (the anthropoid apes), and the close relationship between individual development and social behavior. A number of ontogenetic peculiarities such as the duration of the pregnancy, the early mass development of our body and the state of development at birth can only be understood in relationship with the way in which our social behavior is formed.

3. Dr. Portmann's attitude towards the theory of evolution.

Dr. Portmann's attitude towards many aspects of this theory is a critical and reserved one. In his own words the idea of evolution is at present the only way to link together the successions of animal figures and of plant forms which are so impressively demonstrated by palaeontology and as such it will be of great value in the future. (*B.F.L.M.* p. 15)

But even though it is well-known that animal figures may change radically, due to mutations, how far can these changes go? Is it possible that a sufficient number of small changes might finally lead from fish to amphibia and from reptiles to birds? Dr. Portmann thinks that such an extension goes far beyond what can be verified experimentally. He finds it also hard to understand how an image-forming organ as an eye can be formed by gradual step-wise changes from an eyeless initial stage; only after such an organ has been formed due to causes unknown to us, we can understand how mutations can change this organ. He thinks it extremely unlikely that the observed ordered conditions could be due to a sufficient number of undirected mutations. This holds even more strongly for the idea that ascribes to dead molecules the power for the formation of the simplest forms of life; such an idea is as unproven as its very opposite, he says. (*Probleme des Lebens,* p. 110)

Admittedly the theory has great appeal; without assuming unknown forces, it explains the presence of

all extinct and existing organisms. But the power of its argument is disputable in Dr. Portmann's eyes, and he advises more reserve. To maintain that we know already the essential facts of such an immense phenomenon as the origin of organisms, indicates in his opinion that such ideas are fed from sources outside the sphere of science. He favors the idea that mutations can explain only part of the facts of evolution and thinks that other factors play a part, the nature of which is as yet unknown. The research continues, and nobody knows the results of future science (*Probleme des Lebens* pp. 110-111).

Here follow a few direct quotations:

"It is a wide-spread belief that in the ontogenesis the embryo passes through the various levels of the organic kingdom, so that man after having passed the lower levels of organization in rapid succession finally becomes a mammal, a primate, an anthropoid, and, after passing the chimpanzee-age, finally becomes human. That these ideas appear in the form of a scientific truth—often under the big name of fundamental law of biogenetics—should not lead us to forget that they have their origin in a creed." (*B.F.L.M.* pg. 83)

"The developing embryo on its way to its final form is not ready and reminds us of other possibilities of deployment. But even so, though it reminds us of it, it is in such stages of development not a fish, nor a reptile, nor an ape. Only he will obtain a deeper understanding of the human embryo, who sees in all its stages the genesis of a man, an organism with a unique erect posture, with the exclusive characteristics of openness to the world and of a social world of culture formed by speech." (*B.F.L.M.* pg. 85)

"The idea of development in the study of organic nature explains the relationship between organisms and the succession of their forms in the various geological periods as the result of a real kinship, as a genesis of many different figures from few simple basic forms. On the other hand the study of history also uses an idea of development; man then appears as a succession of generations, each generation giving the results of its work to the next generation. With each generation an initial condition arises that is completely new—even though this situation is not influenced by a hereditary change in man nor is causing such a hereditary change." (*B.F.L.M.* pg. 16)

"Every fact of prehistory that the biologist can explain by descendence of one type of man from another one and by organic progress can also be explained by the historian by immigration, exchange of goods, mixing of races etc. Both arguments have the same power, both have the same defect, viz. that they are results of our inventivity. He who once takes the time to dig into the various interpretations of the disputed Neanderthal man, will soon be convinced of the insoluble double aspect of our explanations." (*B.F.L.M.* pg. 18)

"If biological and historical research penetrate into the darkness of prehistory, then one should not wait too optimistically for a meeting of these two forms of investigation. In reality both ways of investigation lead into a dark zone of silence, the extension of which nobody knows. He who follows the efforts of both sides with an open mind, will be deeply impressed by the silence and the darkness of this borderland, in which we, guided by the light of both ideas of development, search for the traces of the origin of man." (*B.F.L.M.* pg. 19)

"Today the prehistoric research sees its objects of research in a changed light. The discoveries of prehistory appear now in an increasing degree as historical documents; the finds show more and more clearly, even in the oldest traces, something characteristically human (e.g. indications of fire, tools from bone or stone); again and again we sense in these traces the full man, who caused them. Thus the field of human social development is wrested from the realm of organic development and the dark zone of the mystery that shrouds our origin becomes more apparent." (*B.F.L.M.* pg. 124)

4. **Problems of "view of man" and "world view".**

Dr. Portmann is also interested in the problems of our view of man and our world view, and in his interest he is much more broad-minded than some other biologists. His book on anthropology was written as a small contribution to our "view of man". A "small" contribution only, for Dr. Portmann doubts whether biological methods are the most appropriate tools for arriving at such a view.

He is equally sceptical about a "scientific" world view. Even if the results of all sciences are put together then the total contribution is "fragmentary" and of "modest certainty". Fragmentary, because we only know in part and of modest certainty because these results may be modified by new work. But fragmentary knowledge and modest certainty is not enough to guide our actions, we need a "view of man". To such a view of man many forces contribute, not only the forces of scientific thought *but also the forces of artistic and religious inspiration in equal measure.* Views of man that have the power to guide and direct the actions of individuals and of large population groups are the consequence of such a cooperative effort. (*B.F.L.M.* pg. 129)

5. **Conclusion.**

I have tried to give a faithful representation of some of Dr. Portmann's ideas. Unfortunately, time

does not permit me to discuss his ideas on the misuse of biological concepts in political and social life and in problems of world view, more thoroughly.

He speaks as a biologist, he does not show any apologetical interest. We can learn from him that many so-called "scientific" views of the world and of man have their roots not in science but in a faith. Not the Christian faith of course, but a faith nevertheless; this explains the religious fervor with which these views are presented. Dr. Portmann shows that one way to answer those views is to expose their roots; to show a more critical and reserved attitude toward science; and to distinguish more clearly between facts, theories, hypotheses, and mere speculations.

Books Written by Dr. Portmann:

1) *Einfuhrung in die vergleichende Morphologie der Wirbelbiere,* Verlag B. Schwabe, Basel 1948.
2) *Biologische Fragmente zu einer Lehre vom Menschen* 2d Edition, Verlag B. Schwabe, Basel 1948.
3) *Die Tiergestalt,* Verlag Friedrich Reinhardt, Basel 1948.
4) The following radio lecture series appeared in book form:
   (Verlag Friedrich Reinhardt, Basel)
   a) *Aus meinen Tierbuch.*
   b) *Aus Noah's Arche.*
   c) *Grenzen des Lebens.*
   d) *Vom Ursprung des Menschen.*
   e) *Natur und Kultur im Sozialleben.*
   f) *Vom Bild der Natur.*

A Reading Course In General Anthropology

JAMES O. BUSWELL, III, M.A.
Assistant Professor of Anthropology
Shelton College, Ringwood, N. J.

II. Introductory Literature

Before commencing a discussion of introductory readings there are four books which were omitted from the survey of general texts in installment I. They are *An Introduction to Anthropology* by Wilson D. Wallis, 1926; *An Introduction to Social Anthropology* by Clark Wissler, 1929; *Social Anthropology* by Paul Radin, 1932; and the University of Chicago's symposium *Human Origins: An Introduction to Anthropology,* 1945.

Wallis's book was a fairly comprehensive attempt to sum up the field as completely as possible at that time. He realized that no such text had been undertaken since Tylor.

Wissler treated only what would now be called cultural anthropology. Emphasizing social organization, religion, and geography, he devoted considerable space to the discussion of kinship systems, and to the culture area concept which was introduced earlier by himself (*The American Indian,* 1922; *Man and Culture,* 1923) and later refined by Kroeber (*Cultural and Natural Areas of Native North America,* 1939) and others.

Radin's presentation of material culture was especially commended by reviewers (see Goldenweiser, 1933) for its clarity and accuracy. Other points of note were his carefully selected studies of individual tribal state, law, economic, and industrial organization; his survey of the history of ethnological theory in the first chapter; and the development of his main interest, religion and mythology.

The Chicago symposium was gotten up by the University for its own classes, and then distributed, somewhat in the same manner as Kroeber's and Waterman's *Source Book.* The chapters on physical anthropology and the origin of man are, of course, out of date; nevertheless the volume remains a valuable collection of important papers.

Introductory readings in anthropology are numerous. One could recommend the first chapter of any of the current standard texts and the question "What is anthropology all about?" would be satisfactorily answered.

There are two entire volumes, however, which are particularly outstanding in presenting the field as a whole. One is a popularization of anthropology for the non-specialist. The other is a symposium of papers written by carefully selected authorities. They are, respectively, Clyde Kluckhohn's *Mirror For Man: The Relation of Anthropology to Modern Life,* and *Anthropology Today, An Encyclopedic Inventory* prepared under the chairmanship of Professor A. L. Kroeber.

Mirror For Man won for its author a ten-thousand-dollar award given by Whittlesey House, a branch of McGraw-Hill Book Company, for the best presentation of a scientific field to the lay reader. Like Franz Boas's *Anthropology and Modern Life,* (1928), it is an attempt to present in clear, understandable terms the scope, methods, and present concerns of anthropology. Kluckhohn has a lucid style, unhampered by technical jargon. He presents, expertly, the concepts of culture, race, prehistory, and personality. His chapter on language is one of the choice parts of the entire book, revealing the insights possible into a culture and a personality gained by a knowledge of the language and the significance of the linguistic categories to the study of any society. *Mirror for Man* is the book to loan to colleagues and friends who want to know what an anthropologist does.

Anthropology Today is certainly not a popularization, yet it presents, perhaps better than any other one book published in the past fifty years, the scope of anthropology in all of its various pursuits, and the conclusions to which expert opinion has come at the present time. Geology, folklore, personality, government, prehistory, language, evolution, style and value concepts, and many more subjects are discussed, with a careful presentation of methods, results, and theory.

The section on applied anthropology presents, in addition to chapters on body measurements, growth, and medicine, valuable discussions of anthropological viewpoints and methods in government as applied to Africa and aboriginal America, as well as Holland, and territories administered and aided by the United Nations.

While this volume is not on the popular level, it is largely non-technical, so that it is a most valuable source reference in which to discover the present state of anthropological thought in almost every aspect

of the field.

The assigning of introductory material for a class in general anthropology is usually made easy because of the numerous standard texts referred to above. However there are some which stand out above the rest as being particularly worth while.

One of the best is the chapter on "The Scope and Aims of Anthropology" by the late Ralph Linton in his symposium volume *The Science of Man in the World Crisis.* He carefully and clearly defines the field and how it developed as a sort of "synthesis" of other sciences in its preoccupation with mankind. The major divisions of physical and cultural anthropology are discussed with a run-down of many of the specialties included under each.* The treatment of the subscience "ethnology" contains a valuable paragraph or two on why anthropologists study primitive peoples. An understanding of this basic point is vital to any further study.

A primitive society, being small in size and homogeneous in culture, comes the closest to laboratory conditions in the study of mankind. The comparative point of view is primary. As in any other scientific problem there are "constants" within which a "variable" must be analyzed. In the study of primitive society, the first constant is man as an organism. This basic assumption is one of the major conclusions which anthropology, as a science, has impressed upon our present century. All men, everywhere, despite racial differences, can be expected to possess for all practical purposes, like physical or organic natures, and equal mental or psychological potentialities.

Another factor, which can many times be called a constant, or, at least, whose effects can be defined and isolated, is the geographical environment. Such societies as the native peoples of Central Australia, and those of the Kalahari desert of South Africa, for example, or the Eskimos and the aboriginies of northern Siberia, can be compared, respectively, as human societies living in almost identical geographical environments.

What does this leave then, as the variable, the central problem of anthropological investigation? The culture: that which is the learned part of mans' behavior, including all material designed by him, and the institutions of his society within and by which it functions.

Such a comparative proposition which, in one respect or another, is involved in all ethnological investigation, invalidates any arguments for biological, environmental, economic, social, or indeed, cultural determinism as explanations for all of man's behavior. The astonishing variety of ways man has devised to do things under any and all circumstances, has been one factor in causing anthropological theorists to despair long since of pursuing universally applicable theories of cultural causality. Such theories, though plentiful in the history of ethnology, cannot long be maintained in the face of the vast amount of ethnological data accumulated by anthropologists over the past seventy-five years.

Another outstanding and thought-provoking introductory chapter is in A. L. Kroeber's *Anthropology,* (1948). Professor Kroeber draws a clear distinction between the organic and the "sociocultural", as well as between society and culture.

The necessity of differentiating between organic evolution and cultural development is also emphasized. Early anthropologists theorized in terms of cultural stages which evolved out of one another. The fields of religion, marriage, inheritance of property, social control, and other aspects of culture, each had various champions for this or that theory of origin and evolution, stage by stage until, for example, monogamy, or monotheism had evolved, the present stage being the end product of the process. All others throughout space and time were lower on the evolutionary scale in proportion to their degree of difference from the "end product". But more of these schools of thought in another context.

Besides these two valuable introductory references, those in the general texts by Herskovits, Gillin, Beals and Hoijer, and Jacobs and Stern, are perhaps of equal merit, though differing in approach and emphasis.

*Linton has been criticized by linguists for the treatment, or lack of it, given linguistics in this chapter:

> " . . . the subscience of linguistics is, at present the most isolated and self contained. The study of languages can be and largely has been carried on with little relation to other aspects of human activity . . . That linguistics ultimately will be of great value for the understanding of human behavior and especially of human thought processes can hardly be doubted. However, work along these lines has hardly begun and linguistics is still unable to make any great contribution toward the solution of our current problems. For that reason is has been ignored in the present volume."

This has piqued a good many linguists, especially those who have, even before 1945, been engaged in the study of ethnolinguistic problems and theory, and the practical aspects of their application in inter-cultural relationships. It is hard to understand, for example, how the value of the Armed Forces language training programs, directed by many anthropologically trained linguists, could have escaped his notice as one "solution to our current problems". However, criticism of Linton must be tempered by remembering that his aim was to present the anthropological point of view specifically applied to the sociocultural problems of a world at war, into which context linguistics, as Linton was acquainted with it, would not have contributed what he was looking for. The book was allegedly "a report from the frontiers of research, the outposts of science rather than its settled hinterland". The problems of race, psychology, and culture, and culture contact dealt with are evidently included in the former; linguistics in the latter category, or, as he implies, beyond even the outposts!

Gillin includes a valuable historical resume of man's studies of himself, and the outstanding scholars from the early Greek cultural fluorescence to the present time. Jacobs and Stern provide a needed word about scientific terminology. Beals and Hoijer focus attention on the practical aspects, and applications of anthropology in the world today. Herskovits analyzes each department of the subject and its relation to the whole, with emphasis upon anthropology's relation to other disciplines, highlighting its historical, psychological, and philosophical aspects.

Two other noteworthy introductory references not included in the list of general texts are the article on "Anthropology" by Franz Boas in the *Encyclopedia of the Social Sciences,* and his two essays "The Aims of Anthropological Research" and "Advances in Methods of Teaching" in the volume *Race, Language, and Culture* containing sixty-three of his anthropological papers. These are "dated" and yet, in a sense, Boas's writing is "dateless". It was he more than any other man who defined American anthropological theory and practice. His students are the heads of our leading anthropology departments in universities and museums and the noted authors in the field.

So far we have included only literature written by non-Christian authors who take it for granted that Christianity is just one of many religious systems, wholly explainable in cultural and psychological terms. In the absence, so far, of an authoritative text written by a Christian, it is considered important to assign without bias, the reading which best represents the present anthropological position, by authors who have themselves done the original investigation. Classroom lectures and collateral reading can present the Christian interpretations and applications of the subject. The instructor cannot then be accused either of "sheltering" his students from non-Christian theories, or advocating them exclusively. I am convinced that this is the only scholarly way to proceed at the present time.

There are, however, certain important references written by Christian anthropologists which should not be overlooked. Some of these are specialized research papers in the fields of linguistics and physical anthropology. These will be mentioned in the context of their specialty.

Foremost among the rare general introductions to the field is the chapter on "A Christian View of Anthropology" by William A. Smalley and Marie Fetzer, in the American Scientific Affiliation's symposium volume *Modern Science and Christian Faith.* Comprising nearly one third of the entire volume, this chapter contains sections on Race, Culture, Language, and Human Paleontology. It includes valuable discussions of many Biblical subjects related to the field such as morality and the consciousness of sin, the flood of Noah, missionary methods and applications, and the origin of man. One of the most valuable concepts introduced is that of the "Supercultural". The authors urge that care and discrimination be exercised in analyzing just what is "cultural" in Christianity, and therefore relative in value, and what is "supercultural" in Christianity, and therefore absolute in value and applicable to any and all cultures.

The discussion brings into focus the necessity of presenting the "supercultural" gospel in the cultural terms of those to whom it is being presented, not in terms of the culture of the missionary. This chapter should be required no matter what general text is chosen for the introductory course.

The only other books written by a Christian author and devoted to anthropology are even less general. Primarily missionary volumes, they are Gordon Hedderly Smith's *The Missionary and Anthropology,* and *The Missionary and Primitive Man.* These, while they do contain value in their emphasis and viewpoint, deal with many topics which tend in some cases to be rather distorted due to outdated source material, or else from the very brevity of their treatment.

If there are any other works on anthropology written by Christian authors, I would be very happy to be advised of their existence and to mention them in future installments.

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CORRECTIONS

In the article "A Reading Course in General Anthropology" by James O. Buswell III, in the December, 1953 issue of the *Journal*, the 4th paragraph should begin "In 1933 Kroeber's *Anthropology* . . . "

In the membership list, also in the December, 1953 issue, Mr. Buswell should be listed as receiving his M.A. degree from the University of Pennsylvania instead of from Columbia.

The National Interest and Foreign Policy

S. R. KAMM, Ph.D.
Wheaton College, Wheaton, Illinois

When is a foreign policy not a foreign policy?

When the framers of foreign policy refuse to accept the "national interest" as their guide.

This, in brief, is the thesis that a group of American scholars and publicists have been hammering into the thinking of their mid-twentieth century countrymen. Foremost among this coterie of professors and diplomats is Hans J. Morgenthau, professor of Political Science at the University of Chicago. Under his leadership a vigorous attack has been levied upon recent American foreign policies. Official pronouncements, he claims, reveal a disconcerting lack of realism in political thinking. Three books by Morgenthau, as well as a number of articles in popular and professional journals, serve to document the charge.[1] Supporting evidence is contained in a recent report from the Center for the Study of American Foreign Policy, a research group organized at the University of Chicago by Professor Morgenthau.[2]

Morgenthau and his group of research specialists are not alone in their contention. Shortly before Professor Morgenthau gave his first lecture on American foreign policy at the New School for Social Research in New York City in the late summer of 1940, the American theologian-scientist, Reinhold Niebuhr, had written a number of articles which laid the groundwork for this attack. In that same summer Professor Niebuhr issued several of these articles, together with chapters of earlier origin, under the title, *Christianity and Power Politics*.[3] The entire book endeavored to point up the shortcomings of what he called "modern Christian and secular perfectionism" as a basis for foreign policy.

More recently, George F. Kennan, the famous "Mr. X" of State Department and *Foreign Affairs* fame who was later to be recalled from the American ambassadorship to Russia by request of the latter government, has joined in the attack by charging that American diplomacy is becoming increasingly subservient to a "legalistic-moralistic approach to international problems"[4] which he considers far inferior to the traditional policy of balance of power. All of these gentlemen serve to focus attention upon pure power politics as proper basis for American foreign policy. This, they say, is the only sound foundation for policy determination in a bi-polar political world where two great empires contend for world domination.

Contentions of this sort do not go without challenge. Thomas I. Cook and Malcolm Moos of Johns Hopkins University have joined hands to show that idealism in foreign relations can be very real, and that American fashioners of foreign policy have always followed a concept of international interest which was safely grounded in the primacy of national interest.[5] Robert Tucker of San Francisco State College is disturbed with the ambiguities in Morgenthau's published statements, and cannot bring himself to accept the illogical position which Morgenthau frequently occupies in trying to condemn American foreign policy solely on the basis of its rational foundations when Morgenthau also proceeds to evaluate matters in terms of certain rational presuppositions.[6] Frank Tannenbaum of the Department of History at Columbia University disagrees violently with Morgenthau. For Tannenbaum the acceptance of Morgenthau's thesis of "power politics" would lead the American people, to cease to be "both a Christian and a democratic people."[7] Such statements suggest that very vital issues are at stake in this debate. In order to evaluate them properly it will be necessary to examine Professor Morgenthau's reasons for disagreeing with the policies which have governed American foreign policy, and to come to some understanding of why he believes that a policy of "political realism" is more tenable.

What is the nature of Professor Morgenthau's disagreement with American foreign policy? Perhaps his own statement before the Fifty-sixth Annual Meeting of the Academy of Political and Social Science, delivered on April 18, 1952, will give us the key:

> One of the great weaknesses of American foreign policy in recent decades has been its inability to follow consistently certain standards of action and judgment in its conduct of foreign affairs. We were against Italy because of its aggression against Ethiopia, but we were against Franco because of his fascism. We seemed to like Mussolini because he made the trains run on time, but when he made an alliance with Hitler we did not like him any more. We did not like Stalin either; but when he was attacked by Germany and was defeating the German armies, we thought he was a somewhat uncouth democrat, essentially not so different from ourselves; and finally we turned full circle, and regard him now as the incarnation of evil.

It seems to me this stumbling from one extreme

Editors Note: This paper was forwarded to the Journal by Mr. Frank Houser in place of his column on Sociology.

to the other, this inability to steer a clear course in foreign affairs, undisturbed by emotional preferences, results from the lack of recognition of the national interest as the only standard for judgment and action available to a great nation if it wants to pursue a successful and rational foreign policy. So from all points of view I conclude that there is no other standard of action and of judgment, moral and intellectual, to which a great nation can repair, than the national interest.[8]

If one dips further into Morgenthau's writings one finds that he believes that we have slipped our moorings in international relations as laid down by Federalists such as Washington and Hamilton, and even such early Democratic Republicans as Jefferson and John Quincy Adams. Woodrow Wilson, charges Morgenthau, was the American president who led us away from the sure light of "national interest" to the will-of-the-wisp of international morality. To be thus diverted from safeguarding our national security to the fulfilment of a crusading mission for the destruction of any nation whose political ideology is in conflict wth ours, is, in the opinion of Morgenthau, the present hazard of American foreign relations. This is particularly true in a politically bi-polar world in which Russia presents an ideological contradiction to our own and an "power" challenge in terms of military potential. In other words, Morgenthau fears that continued commitment to the Wilsonian principle of international relations will surely lead us into a military crusade against Russia thus precipitating a third world war.[9]

What credence are we to give to Professor Morgenthau's contentions? Is it true that we have abandoned our earlier principles in the conduct of foreign relation? Are we following an "idealist" or "legal-moralist" approach to international relations which will eventually lead us into war? These and other questions deserve careful consideration. But, before we proceed to an evaluation, let us examine the foundations of Morgenthau's thought. In this he is very explicit. America has come into this confusion of purpose and practice because of a long-standing conflict in the national mind. " . . . wherever American foreign policy has operated," writes Morgenthau, "political thought has been divorced from political action . . . We have acted on the international scene, as all nations must, in power-political terms; we have tended to conceive of our actions in nonpolitical, moralistic terms . . . " Because of the optimistic and utopian rationalism with which we have viewed all matters of political import we have come to believe "that the struggle for power on the international scene is a mere accident of history . . . destined to disappear with the triumph of democracy throughout the world; and that, in consequence, conflicts between democratic and non-democratic nations must be conceived not as struggles for mutual advantage in terms of power but primarily as a contest between good and evil . . . "[10]

What Professor Morgenthau is fundamentally opposed to is the scientific rationalism which underlies our democratic culture. His indictment of this aspect of American culture is devastating:

The philosophy of rationalism has misunderstood the nature of man, the nature of the social world, and the nature of reason itself. It does not see that man's nature has three dimensions: biological, rational, and spiritual. By neglecting the biological impulses and spiritual aspirations of man, it misconstrues the function reason fulfills within the whole of human existence; it distorts the problem of ethics, especially in the political field; and it perverts the natural sciences into an instrument of social salvation for which neither their own nature nor the nature of the social world fits them.[11]

These rationalistic presuppositions lead men to conceive the social world and the physical world as identical. If physics declares that the world of nature operates on the basis of fixed and determinate laws of universal application and constancy then the social world also operates upon such laws. If the physical world is conceived as atoms living in an ordered relationship one with the other, then men are to be conceived as sharing the possibility of a similar type of ordered relationship. It makes little difference to Morgenthau whether one proceeds along deductive or inductive lines of thought, whether he uses mathematics and physics, or biology to demonstrate his thesis, the fundamental error is still there—man has conceived the physical universe to exist within the limits of his own imagination and the social universe must therefore correspond. This optimistic illusion leads men to strive for the complete fulfilment of their scientific dream in this life and to become "perfectionist" in all of their social ambitions including that of international politics. Man's mind has tricked him into believing that the unreal is the real. He struggles through life in the vain attempt to bring to actuality that which does not exist.

Whence this doctrine by which Morgenthau seeks to justify his contention that the national interest is the only governing principle of foreign relations and the medium or instrument of power politics the only means of action? Morgenthau professes to find justification for it in his own theory of irrationalism. To him the theories of quantum physics point the way to a reliable guide for human action. Of these he writes:

The new physics shows, indeed, that there exists a close correspondence between the human mind, on the one hand, and nature and society, on the other. Modern scientific thought re-establishes the

> unity of the physical and social world to which the modern age aspired in vain. However, the common element of which mind, nature, and society partake is no longer reason pure and simple but reason surrounded, interspersed, and underlaid with unreason, an island precariously placed in the midst of an obscure and stormy ocean.[12]

Reason is no longer determinant in human life. It has become the servant of passion. Its only function is that of harmonizing human action.[13] It is therefore subjective, an instrument of the individual person. It has no outer relationship either with a rationally conceived natural law or a divinely revealed will of God. It is consequently free to determine its own course of action in response to its own inner urgings. Applying this mode of reasoning to the nation state, it is inferred that the only issue which can be real to the directors of foreign policy is that of the nation's own inner feeling concerning its security. Since mind is confined to the particular and is in no sense universal, then the only means of establishing relationships between individual persons or nations is through the sensorily perceived means of force.

It is now possible to identify the sources of Professor Morgenthau's methodology. If one will examine his analysis of liberalism as a governing methodology in social science and his contention for irrationalism as the mainspring of human action, he will find it paralleling to a large degree the existentialism of Kirkegaard and the neo-Calvinism of Reinhold Niebuhr. All of them would agree in the basic elements of their epistemology.[14] For Kirkegaard and for Neibuhr there would be greater emphasis upon personal religious experience. This places Professor Morgenthau with that group of thinkers who have sought to find the answer to human motivation in man's response to crisis. For them there is no universal sanction for ethics, not even Herbert Agar's individualized version of natural law.[15] Thus released from the obligations of a transcendent ethics, man is free to follow his own interests as he conceives them. Politics—the process whereby conflicting interests are to be resolved in compromise—are not to be depreciated. It is the universal lust for power that is the determinant of man's actions. Therefore, any means, but particularly means of power, that can be used to curb this sinful drive is to be commended. Power politics, then, becomes the accepted means of solving all problems of human relations whether internal to the state or external. Standards of justic then become relative to the power complex. The security of human societies is to be found in an internal balance of forces and an external diplomacy which leads to the same end. Means then become ends and the perspective of life is reduced to a monistic pattern of power relationships.[16]

It is by reasoning from this basis that Professor Morgenthau disagrees with what he describes as the typical American tendency to present to the world the "ideal of a free, peaceful, and prosperous world, from which popular government had banished power politics forever"[17] while acting in terms of power politics. What really annoys him, then is the fact that the American people have presented a picture of normative action which they have been unable to realize fully themselves in their national life and which, often, has no cultural or ideological basis in the life of other nations. His present annoyance leads to a number of charges:

1. That the United States sought to supplant the practices of power politics and the principle of the balance of power in international relations in promoting the adoption of the United Nations.

2. That the United States sought to establish the rule of law among nations through the instrumentality of the United Nations rather than to maintain a balance of power among nation states through the channels of diplomacy.

3. That the Truman Doctrine, although sound in its definition of natural interest in some parts of the world, notably Turkey and Greece, is misleading in its sentimental tendency to demand the support of every under-dog nation irrespective of its relation to the national interest of the United States.

4. That the containment policy directed against Russia is misleading because it leads people to believe that a powerful nation can be resisted indefinitely purely on the basis of strengthened outer bastions of defense, whereas, the real deterrent to Russian offensive action is the inner power of the United States measured by the possession of the atomic bomb.[18] Professor Morgenthau disagrees with these present policies because he believes that a realistic appraisal of the international political scene must be predicated upon these basic principles:

1. The universal lust for power as a characteristic of the life of all men.[19]
2. The "iron law of international politics, that legal obligations must yield to the nation interest,"[20] which leads to the axiom that each nation will denounce its treaty obligations whenever the national interest demands it.
3. The doctrine of absolute and indivisible sovereignty of each nation state which gives to each political unit claiming independence the right of independent action in all matters affecting its interest.

Professor Morgenthau's presuppositions are simple almost to the point of quaintness. It is impossible to escape the conclusion that in his eagerness to destroy the opposition he has over-stated his case. If one is to admit historical evidence as a basis of judgment, it is

doubtful if his analysis of internatonal politics will stand careful scrutiny. Each of his political axioms savor of the mathematical eractness of the very rationalism which he disavows. The only satisfactory answer to his contentions lie in the assumption that his basic pessimism has led him to the same conclusions as the positivists—that there is no normative theory for human action. In adopting this position he has parted company with the early American tradition which he professes to be restoring. American politics, even in the hey-day of the Enlightenment of the Eighteeneth Century, never forgot its Calvinistic heritage.[21] A type of realism was developed which retained two perspectives derived from the classical and the Christian heritage of European peoples:

1. The doctrine of original sin as a universal characteristic of human life.
2. The concept of human reason which gave man power over his passions and identified him with his Creator.[22]

These presuppositions led the founders of the American republic to conceive of a political society which professed to follow certain norms of social life and at the same time to guard against the destruction of those norms through an elaborate system of political devices which were designed to protect the republic against the storms of human passion. To find Morgenthau appealing to the principles of this era in American history as a pattern for the present, but denying the political philosophy of its leadership is disconcerting.

But what of Professor Morgenthau's own statement of human nature as the basis of his metholology? Very early in his argument he committed himself to a tri-partite view of human nature: biological, rational, spiritual. He disagreed with the liberals because they had elevated man's reason to the place of the determinant in human action. But, what has he introduced in its place? A political monism based upon the primacy of the biological. In his attempt to rescue man from the pitfalls of scientific rationalism he has lost him in the morass of irrationalism. It is not surprising then to find Professor Morgenthau urging that man's political decisions must be left in the hands of the statesman. " . . . the statesman," he writes, "is indeed the prototype of social man himself; for what the statesman experiences on his exalted plane is the common lot of all mankind. Suspended between his spiritual destiny which he cannot fulfill and his animal nature in which he cannot remain, he is forever condemned to experience the contrast between the longings of his mind and his actual condition as his personal, eminently human tragedy."[23]

Professor Morgenthau is now endeavoring to distinguish between the science of politics, which is conceived in irrational terms, hence, analagous to the physical universe as viewed through the insights of quantum physics, and the task of the statesman who must employ the arts of politics in directing the relations of his state with others. By so doing he introduces a consideration of politics at another level. His all-inclusive generalizations concerning the nature of politics, based upon the assumption that all political action is to be understood in terms of power relationships, now undergoes some qualification. Instead of projecting his personal ethical standards, which he believes to be universal in claim, into the determination of national or international political policies, the statesman will recognize the limitation of a "realistic" standard, namely, that of the individuals over whome he is placed or the currently expressed standard of a nation or nations with whom he is negotiating. "He will distinguish with Lincoln," explains Morgenthau, "between his *'official* duty' which is to protect the national interest and his *'personal* wish' which is to see universal moral values realized throughout the world."[24] Thus, the strength of a statesman's position would be measured by his ambivalence in the power complex rather than by his fixation upon any rationally conceived, mathematically structured, standard of political action. To put it in the language of classical political concepts: The philosopher king must give way to the statesman. The man who would rule by the art of rational knowledge must give way to the man who would rule by the art of experience.

Morgenthau's statesman would be guided by these principles in the determination of foreign policy:

1. The principle of humility in assessing the moral evaluation of the actions of other states.
   > "To know that states are subject to the moral law is one thing; to pretend to know what is morally required of states in a particular situation is quite another."
2. The principle of balance in evaluating the morality of the actions of other states.
   > " , , , (he) must guard against the two extremes either of overrating the influence of ethics upon international politics or else of denying that statesmen and diplomats are moved by anything else by considerations of material power."
3. The relation between universal moral principles and political action.
   > " . . . the state has no moral right to let its moral disapprobation of the infringement of liberty get in the way of successful political action, itself inspired by the moral principle of national survival."

4. The complexity of moral choice in the political sphere.

> " . . . the realist recognizes that a moral decision, especially in the political sphere, does not imply a simple choice between a moral principle and a standard of action which is morally irrelevant or even outright immoral."

5. The principle of distinction between private and national ethics.

> " . . . the political realist distinguishes between his moral sympathies and the political interests which he must defend."[25]

Professor Morgenthau's contention boils down to this: since there are no universally accepted moral or legal principles that are recognized as binding throughout the world, a nation cannot base its foreign policy on the assumption that those principles which it conceives to be right are to be employed as the basis of its negotiations with other nations. It must be content to shelve all such guiding principles and employ only those considerations which can be backed by its superior power at the time of a given action or decision. The man or men responsible for the formulation of foreign policy and its successful conduct, likewise, must keep in check personal ideals or even group standards, and mnst labor to bring about decisions only upon the basis of a calculated judgment that recognizes the power complex existing at a given time between groups within the state or between nation states. Politics is thereby effectively divorced from ethics, even though Professor Morgenthau denies emphatically the charge that he has, along with Hobbes, dismissed the influence of universal moral principles.[26]

It is difficult to escape the conclusion that Professor Morgenthau seeks to introduce upon the American scene what has often been identified as a European view of international relations. There the tradition of "power politics" and of "Realpolitik" has held sway for several generations. Considerations of universal morality among European states in the modern period early gave way to formulations based on the immediate interests of states or groups within the states. Diplomacy became absorbed in the "naked" struggle for security. The conduct of diplomatic relations fell into the hands of those who sought to emulate Machiavelli's Prince who, according to the Italian diplomat, must imitate both the lion and the fox. This is in direct conflict with the American tradition in foreign relations which has sought to be guided by ethical norms even though frequently forced to accept settlements based upon a given set of "power" relations then prevailing. This would be true of the original American claim for independences and the settlement with Britain in 1783 as well as the American contention for the principle of self-determination in 1919 and the Versailles Treaty of that same year. Even though Professor Morgenthau is disturbed about the gap between American announcements of policy aims and the actual terms of settlement, it seems to this observer that the American tradition is more "realistic" than that for which he contends. American realism puts the emphasis upon ethical aims in foreign relations, although often forced to settle for partially recognized objectives. Morgenthau would have the United States give up the profession of aims, based upon a concept of universal moral principle, and be content with no pronouncements save those based upon power realities. Instead of trying to bat 1,000 per cent in baseball or run the four-minute mile we must be content with aspiring only to improve the immediate record without any ultimate goal in mind.

Professor Morgenthau's fate is the fate of all those who abandon the Christian revelation as the basis of thought and action. He has taken from Christianity its tripartite analysis of the nature of man: body, soul and spirit. He has immolated it by trying to find in man the governing principle. Long ago Augustine pointed out that man's nature is integrated only as the creative and redemptive relationship of God in Christ is recognized as determinant. It is then that man's spiritual, his mental, and his physical life become a unity—a unity that is brought about through the creative and redemptive relationship of the Triune God to the human person. Looked at from this perspective man's irrational life has meaning, not only in the immediate, but in the broader perspective which is visible to mind as part of that universal property of man "made in the image of God," and in the eternal perspective of the spirit. We may admit the contention that man is responsible for the preservation of the biological, the physical, but in the light of this perspective we cannot admit that it is determinant. Higher values must be considered, the values of the mind and of the spirit. Thus we may say that in the analysis of our present foreign policies we must give attention to the factors of comparative population strength, of comparative natural resources, of comparative industrial potential, of the so-called "guns and butter" capacities of all states involved in the international relations of the present. But we are also obligated to give attention to the matters of the mind, the ideologies which grip and motivate the life of men. If Professor Morgenthau is right in his contention that we must advocate no ideology which has not yet been fully realized, or has not been accepted in some fashion as part of the culture of some people, then we commit ourselves to the abandonment of all myths or governing visions for the life of man. To eliminate this factor

from public life, either in the internal or external relations of his political experience is to consign him to the life of the animal. The Communist ideology is potent in our time exactly because it has captured the imagination of peoples who long for release from the burdens of human existence. For the United States to refuse to use ideological weapons in its claims for national existence is to renounce one of its most effective instruments of international relations. Indeed, the whole sense of mission which characterizes the Christian church and the Christian community would be lost. It may be that no nation, as Professor Morgenthau points out, is justified in forcing another to accept its ideology, but this is a far cry from advocating the adoption of an ideology in which it believes.

For the Christian there is a still higher scale of values which is involved in the determination of political action. This is the realm of the spirit. If there is one thing which the Bible teaches about human life it is that all of life is not embraced in either the physical or the mental. It is the spiritual conflicts in the world which are often determinant in the affairs of men. This does not mean, as the ancient peoples of the Near East contended, that all political action is determined by the gods. It does mean that God is sovereign, and that the present conflict of nations is carried on within the limits of his permissive will. We may not at this age be able to identify fully the forces of evil with particular and individual governments; Professor Morgenthau is probably right in his caution at this point. But we can be assured that when any nation disobeys the laws of God in its dealings with its citizens or in its relations with foreign powers, that it must at some time meet with the judgment of God. Lincoln saw this clearly as he looked at the progress of the Civil War through the language of his second inaugural address. For him the war was in part God's judgment upon the North and the South for direct violations of His law.

What then can be said about the acceptability of Morgenthau's thesis to the Christian? Briefly, we can acknowledge the helpfulness of his analysis of the danger of depending upon a purely rational approach to foreign policy, a danger which I believe he greatly over-rates. But we cannot accept his conclusions which advocate the national interest as the sole determinant of our foreign policy and the instrumentality of power politics as the only device whereby we can maintain our national security. To do so violates the Scriptural revelation of the tri-partite nature of man, a view which Morgenthau himself accepts, and the obligation which arises out of this view to recognize a hierarchy of values and means which govern the life of men.

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6. Robert W. Tucker, "Professor Morgenthau's Theory of Political 'Realism'," *American Political Science Review* 46:213-223.

7. Frank Tannenbaum, "The Balance of Power versus the Coordinate State," *Political Science Quarterly* 67:175; "The American Tradition in Foreign Relations," *Foreign Affairs* 30:31-50.

8. Hans J. Morgenthau, "What is the National Interest of the United States?" *Annals* 282:6-7.

9. Hans J. Morgenthau, *In Defense of the National Interest,* 88-89.

10. Hans J. Morgenthau, "The Mainsprings of American Foreign Policy," *American Political Science Review* 44:836, 839.

11. Hans J. Morgenthau, *Scientific Man vs. Power Politics,* p. 5.

12. Hans J. Morgenthau, *Scientific Man vs. Power Politics* pp. 144-145.

13. *Ibid.,* 157-158.

14. Cf. F. H. Heinemann, *Existentialism and the Modern Predicament* (Adam and Charles Black, London, 1953), especially pages 39-40; Reinhold Niebuhr, *Christianity and Power Politics, passim.*

15. "It is the impluse within us to make our conduct conform to truth. It is the object and the motive of conscience. It shows the road to fulfilment. It is discovered, not invented, for it is built into the universe." *Declaration of Faith* (Collins, London, 1952), p. 127.

16. Hans J. Morgenthau, *Scientific Man vs. Power Politics,* 9-10, 199-200, *Politics Among Nations,* p. 17; Cf. Reinhold Niebuhr, *Christianity and Power Politics,* 26-27. There is an increasing body of literature on the problem of power and "power politics." Among the more recent contributions are Bertrand de Jouvenal's *On Power: Its Nature and the History of Its Growth* (The Viking Press, New York, 1949); *A Study of Power* (Free Press, Glencoe, Illinois, 1950) which embrades a symposium of three books: H. D. Lasswell, "World Politics and Personal Insecurity," C. E. Merriam, "Political Power," and T. V. Smith, "Power and Conscience: Beyond Conscience;" Joseph Haroutunian, *The Lust for Power* (Scribner, New York, 1949), as well as such articles as are contained in a recent symposium "Political Science and Political Power," to be found in the American Political Science Review, 44:693-723.

17. Hans J. Morgenthau, "The Mainsprings of American Foreign Policy," *American Political Science Review* 44:839.

18. Hans J. Morgenthau, *In Defense of the National Interest,* 91-138; 182-183.

19. Hans J. Morgenthau, *Scientific Man vs. Power Politics,* 9.

20. Hans J. Morgenthau, *In Defense of the National Interest,* 144.

21. Louis Hartz, "American Political Thought and the American Revolution," *American Political Science Review* 46:324-325; Cf. Reinhold Niebuhr, *Christianity and Power Politics,* 58-59.

22. See James Madison, *The Federalist,* No. 55 (Sherman F. Mittell, ed., National Home Library Foundation, Washington, D. C., 1937), 365.

23. Hans J. Morgenthau, *Scientific Man vs. Power Politics,* 221.

24. "Another 'Great Debate': The National Interest of the United States," *American Political Science Review* 46:987.

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The Bible and Physical Research*

CARL S. WISE, M.S.
607 Bigelow Street, Peoria, Illinois

Karl Turekian (7) has made the statement that correlation of Scriptural details with the physical sciences has not been universally convincing. This is an important viewpoint which merits further comment, both con and pro. But in dealing with this matter, it is worth-while to start out by discussing the slightly different but still related topic, namely, the widespread belief that the correlation is negative.

A very recently published apparent belief in negative correlation is by a scientist, N. T. Gridgeman (2). In his article on circumetrics he says that Solomon used an "unwisdomly three" value for the transcendental ratio pi. The Scriptural passage he quotes is 2 Chronicles 4:2. (It also occurs in 1 Kings 7:23.)

"Also he made a molten sea of ten cubits from brim to brim, round in compass, and five cubits the height thereof; and a line of thirty cubits did compass it round about."

Now to the unbeliever this passage seems to mean that Solomon lived in an unscientific age and the Bible is incorrect, since the circumference should be a little more than 31 cubits, instead of only 30. This verse reminds one of the remark of Peter concerning Paul's epistles, "in which are some things hard to be understood, which they that are unlearned and unstable wrest, as they do also the other scriptures, unto their own destruction." (2 Peter 3:16) But as members of the American Scientific Affiliation we believe that there can be no discrepancies between Biblical statements and scientific observations when both are properly interpreted.

This passage is no exception and the dimensions given for Solomon's molten sea can be harmonized with the correct value of pi very easily. In the first place the value of pi is a never ending fraction and therefore the dimensions of either the diameter or of the circumference must of mathematical necessity be rounded off to a convenient number of decimal places. Since all the other dimensions in this passage are given in even cubits, one can expect the dimensions of the molten sea to be rounded off to even cubits. Assuming the inerrancy of the Holy Scriptures and using the correct value of pi, it follows that the circumference in cubits was between 29.8451 and 30.5000, and the diameter between 9.5000 and 9.7085, or 30 and 10 respectively to the nearest even cubit. (9)

Other examples, some claiming negative and some claiming positive correlations between the Bible and physical science are found in a recent series of letters in the magazine *Science*. (5, 8, 4, 3, 1 respectively). Rockie (5) started the debate by giving a description of a strong religious leader who believed the earth was flat. Though not directly stated, the inference was that the flatness of the earth was Biblical teaching. Wise (8) replied with the comment that the Bible itself nowhere states that the world is flat. He also quoted a number of passages concerning the shapes and physical conditions of the world, past, present and future, including Matthew 24:35 "Heaven and earth shall pass away, but my words shall not pass away". Wise forgot to include Proverbs 8:27 as one of the Biblical references to the spherocity (6, 5, 8, 8a, 4, 3, 1, 7) of the earth. "When he prepared the heavens, I was there: when he set a compass upon the fact of the depth:" The word "Compass" here, as well as the word "circle" in Isaiah 40:22 ("It is he that sitteth upon the circle of the earth,") are both translations of the Hebrew word "chuwg" which means circle or roundness. (8, 8a, 3)

This apparently was interesting to the editors of the magazine *Science Digest* because they came out in May 1951 with a quote of the Wise article under the heading, "Bible Doesn't Support Flat Earth Theory". (8a) The entire article was quoted with the exception of the last paragraph: "The earth will be destroyed, but some of the inhabitants will be saved (Matt. 24:35-'Heaven and earth shall pass away, but my words shall not pass away'; John 3:16, 'For God so loved the world, that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life')."

Still later *Science* published a letter from Ray (4) which asserted that Wise had overlooked Revelation 7:1 "And after these things I saw four angels standing on the four corners of the earth, holding the four winds of the earth, that the wind should not blow on the earth, nor on the sea, nor on any tree." Therefore according to Ray, the Scriptures taught that the earth was like a rectangular-shaped pancake. He apparently was ignorant of the fact that the word "corners" in Revelation 7:1 is from the Greek

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"gonias" which also means angles or quarters.* For example, we call an instrument for measuring angles a "goniometer". We still describe the winds as coming from four angles or directions, North, East, West, and South. A similar criticism of Ray's twisting of the Scriptures was published by the physician and scientist Macht. (3) He rebuked Ray and said that the passage in Revelation 7:1 was a repetition of similar expressions in the Hebrew Bible and "In each case the Hebrew term *Kanaf* is employed (pl., *Kanfoth*), which etymologically denotes 'wing or wings,' and the expression *arba Kanfoth ha-aretz* refers not to the shape of the earth but to the four points or directions of the compass. By 'four corners of the earth' is meant, as the Authorized Version (in Isaiah 24:16) correctly puts it, the 'uttermost part of the earth'."

The latest letter in the series was from de Rohan-Barondes (1). He suggested that some of the passages previously quoted from the Bible were partly taken from the Epic of Izdubar, written on tablets of a Babylonian library some 3950 years ago. His opinion of the Hebrew Bible is apparently rather low, judging by his statement concerning the Babylonian stone tablets, "These are in their original form, unglossed, unaltered, and ungarbled, and in this respect Chaldean character records are actually superior to those of the Hebrews, the Greeks, or the Romans."

From the above publications we see that the viewpoints concerning the Scriptures and science are quite varied. The correlations have been considered to be negative, zero, and positive. In addition we have the viewpoint of de Rohan-Barondes that the Scriptures are at least in part garbled plagiarisms from earlier works. Let us consider for the moment the possibility that the correlation is zero.

A born-again Christian might conceivably reason that since the Bible was written for people of many different centuries, those in earlier times would be confused by any inclusion of modern scientific data. There is probably a certain amount of truth in this viewpoint. Another likely possibility is that inclusion of universally recognized data would be tantamount to a "sign" and Christ has promised that "An evil and adulterous generation seeketh after a sign; and there shall no sign be given to it, but the sign of the prophet Jonah:" (Matthew 12:39, 16:4).

The position which I believe to be the correct one is that there are many correlations of a positive nature but some of them, at least, are of such a nature that only the true believer can see them. Even true believers not familiar with modern science could also overlook them. I think there are several Scriptural passages which might indicate the correctness of this point of view. The first one is Daniel 12:4, in which is predicted an increase in knowledge (and travel) in the last days of this era, "But thou, O Daniel, shut up the words, and seal the book, even to the time of the end: many shall run to and fro, and knowledge shall be increased." Another passage is Mark 4:11-12, "And he said unto them, Unto you it is given to know the mystery of the kingdom of God: but unto them that are without, all these things are done in parables: That seeing they may see, and not perceive; and hearing they may hear, and not understand; lest at any time they should be converted, and their sins should be forgiven them." First Corinthians 2:14 throws further light on the problem of scepticism concerning the accuracy of the Scriptures: "But the natural man receiveth not the things of the Spirit of God: for they are foolishness unto him: neither can he know them, because they are spiritually discerned."

As an example of a very definite positive correlation between the Bible and physical science, let us consider Jeremiah 31:37, "Thus saith the Lord; If heaven above can be measured, and the foundations of the earth searched out beneath, I will also cast off all the seed of Israel for all that they have done, saith the Lord." Now obviously this verse tells of God's loving care for the remnant of Israel. But since Hebrews 4:12 tells us that "the word of God is quick, and powerful", it appears reasonable to believe that Jeremiah was also in harmony with the results of modern physical research, in this case the Michelson-Morley ether-drift experiment. It will be recalled that in this famous experiment Michelson and Morley tried to measure the drift of the earth through an ether, and were unable to detect such a drift, or even an ether itself. If there is no ether for the earth to float in or through, then the earth has no support. This agrees with Job 26:7, which says, "He stretcheth out the north over the empty place, and hangeth the earth upon nothing." To say that "He hangeth the earth upon nothing" is in agreement with modern science does not in the least deny the alternate meaning as a poetic expression of the power and majesty of God. In fact it emphasizes it, and makes it more real.

Another passage concerning the support of the earth is Job 38:4-7, "Where wast thou when I laid the foundations of the earth? declare, if thou hast understanding. Who hath laid the measures thereof, if thou knowest? or who hath stretched the line upon it? Whereupon are the foundations thereof fastened? or who laid the corner stone thereof; When the morning stars sang together, and all the sons of God shouted for joy?"

* See Rev. 20:8 King James Version.

At this point we, like Job, must admit that we cannot answer these questions. However, because the Comforter is come (John 15:26), we can answer the question of Agur the son of Jakeh (Proverbs 30:4), "Who hath established all the ends of the earth? what is his name, and what is his son's name, if thou canst tell? We can tell with the utmost joy that "Unto us a child is born, unto us a son is given: and the government shall be upon his shoulder: and his name shall be called Wonderful, Counsellor, The mighty God, The everlasting Father, The Prince of Peace." (Isaiah 9:6)

In conclusion, the main points of this paper are:

1. Since the Bible was written for people of many different centuries, probably not very much material concerning modern physical science has been included.

2. However, the Bible never is in conflict with any provable fact of modern science. The modernists' contention that the Bible is full of scientific error is likely to be an example of wresting the Scriptures unto their own destruction. Several examples of such twisting of the Scriptures have been pointed out from the recent scientific literature.

3. Furthermore, there do seem to be several instances of remarkable correlation between the Bible and physical research. Some new ones have been pointed out in this paper.

4. Most of the scientific passages include spiritual truth in addition to scientific truth, and so they had precious meaning even to people living in prescientific ages.

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A Criticism of the A.S.A. Monograph on "Creation and Evolution"

Editor's note: The following letter was forwarded to Dr. Mixter by another party. Correspondence has failed to disclose the writer's identity, except to reveal that he is a university scientist.

I. Regarding logic

There is in logic what is called the *principle of parsimony*. This is exceedingly important, as it is, or should be, used in every attempt at synthesis of theories from empirical facts. It simply states that if there are two or more possible mechanisms which account for the facts, the simpler of them should be accepted until further facts make necessary a more complex theory. Examples are the geocentric vs. helicentric theories of the solar system, and classical vs. modern physics. Similarly, since, as Dr. Mixter agrees, there is ample evidence that evolution has occured in some lines, it is in keeping with this principle to believe that evolution has occurred where the paleontological or comparitive morphologisal evidence is spotty or nonexistent. P. 1 par. 2 creates a false impression, that special creation is necessary to explain certain phenomena. As you can plainly see on further examination, the only thing he shows is a *lack of* necessity to believe in evolution in some particular cases, due to lack of evidence. Thus, on p. 23, par. 2 he says " . . . until bridges are found, one may hold that the groups so separated have arisen from independently created kinds". This is like saying that since I didn't see you go to Wheaton College, you must not have been there. I believe that a fair summary of Dr. Mixter's monograph would be: "Either evolution has occurred as the modern evolutionist says it has (with all his if's and but's), or that God has made the creatures of the world in such a way that we cannot distinguish the order from an evolutionary one". This is little consolation to the creationist unless he is willing to throw out evolution in its *entirety*.

As for the approach to unsolved problems, he does not discuss this further, and I fail to see how creationism can have anything to offer in this regard. If science is to make any progress, it must take as its basis the premise of being able to find mechanistic causes for natural phenomena. I don't see why the study of heredity and the bringing of order out of the chaotic array of plants and animals about us should be any exception to this.

This idea of there being a machinist (God) behind the complicated mechanisms that are living organisms was also found in the other pamphlet I referred to. It is a difficult idea to justify. Naturally there is something back of every natural phenomenon. But a watch is only evidence of a man in the sense that a hoof is evidence of a horse. If you have never seen a man make a watch, or have never seen a whole horse, you don't know the connection. There are a great many leaves and stems found as fossils that have been put into so-called "form genera" separately, because no one has found the leaves and stems attached. Conversely, because of the evidence that has been amassed (in the last hundred years, especially), evolution is conceived as the mechanism behind the diversity of life as we see it today, just as biochemistry gives mechanisms for many of the chemical events that occur in living things, (in contrast to the "vitalistic" theories of years past). If one wished to lay emphasis on this feature of the Bible, then one might say God *is* evolution.

I would like to give some examples of inconsistency in the argument presented in this pamphlet. Vide p. 16 par. 2 (X), p. 17 (X). If he believes that evolution can take place anywhere, anytime, why not in Hawaii in the recent past? Vide p. 27 last sentence. This statement is a direct denial that evolution has occurred at all, whereas Mixter admits that it has. The mutations only indirectly "cause" adaptation anyway, for the diversity must be present for natural selection to act upon it. The latter is the factor producing adaptation (see further discussion below). It would almost look as if Mixter was trying to confuse the reader.

II. Regarding similarities

In pure genetic lines (in which brother-sister matings have gone on for many generations, i.e. laboratory mice, rats, etc.) the difference between parents and offspring is exceedingly minute, and that which occurs can usually be shown to be due to uncontrolled environmental influences. On the other hand, male and female Red-Wings (as well as males and females of any species) do not in fact receive the same chromosomes from their parents. This is the basis of sexual differentiation. In all natural populations which reproduce sexually there is a great deal of variation due to the fact that the genic material is not uniform and is being constantly shuffled. The point is that there is variation about a norm that is the "ideal" species. Now, when an evolutionist

is talking about similarities he naturally takes this into account. As one goes to higher and higher categories (families, orders, etc.) the similarities he works with become more generalized. For example, all mammals and birds have a four chambered heart in contrast to all the lower animals, in spite of variations in size and shape of the details. One of the most important generalizations of the early biology (about a hundred years ago) is that all living things are composed of cells with nuclei. This is not quite true, but even bacteria, long thought to have no nuclei, have recently been shown to have them at least in some cases. The small size is a definite disadvantage to study in this instance. As Mixter says, however, (p. 9, par. 2) it is not individual likenesses that are compelling evidence, but the sum total of likenesses. He forgets this principle many times in his discussion, although it cannot be overemphasized. Believe me, if there is anything in biology that has been hashed and rehashed (and is still going on!) it is the probable relations of this group to that, for example: ideas of what is basicly simple and what is reduced from a more complex condition have undergone revision to the extent of completely inverting the accepted phylogeny in a number of cases.

This is indeed a difficult problem. I have one objection to this argument, however, that a mutation occurs means that the gene is no longer like that of its parent. Does this mean that it is not descended from its parent? Of course not. This insistence on almost complete similarity (in order to be able to demonstrate genetical relationship) is illogical. All automobiles are historically and functionally related, but one can't use a Ford carburetor in a Cadillac. The bolts won't fit, or the position of the air holes is wrong. These are features irrelevant to the *function,* but make it impossible to make a hybrid. Similarly with chromosomes and genes. Given enough time for random, nonessential changes to take place, and the "bolts don't fit" and there won't be any hybrid. So the ability to hybridize is just another of many features used to show relationships. Given sufficient complexity, I don't believe that convergent evolution occurs to such an extent as to confuse the evolutionary picture. That is, birds and bats are obviously different, even though they both fly. Similarly with whales and fish. With things like bacteria, it is a different story and little can be done in the way of phylogenies in this group, although people have tried.

Nor does the evolutionist say that *all* mammal-like reptiles became mammals. Again the judgement of evaluation of the degree of similarity is the critical matter, which depends at least in part on how carefully the subject is examined. Many of the fossils found which *might* be in the ancestral line of mammals, appear on close study to be more specialized in one respect or other than the mammals proper, and so are thought to be not in the direct line. Similarly, it is abvious that present day apes could not be the ancestors of ancient man. But in the judgement of those who have studied evidence, there does not appear to be any compelling necessity to invoke special creation in the ancestry of any line of organisms. The converse does appear to be true, however.

Regarding vestigial organs. The beginning of the first paragraph says that vestiges are evidence of a former perfection, but this is contradicted by the last part of the paragraph, both being views of creationists! What does it matter, whether it is vestigial or not, anyway, the crux of the matter is the business of degree of similarity. Both rabbits and man have a blind pouch off of the intestine, one big, one small. Does it matter if we can find no use for that in men?

Regarding adaptation. It is apparent from a few minutes thought that there is no reason to expect ill-adapted plants and animals to be found in any numbers, for they would soon lose out in the struggle for food, etc. This is natural selection. Read *Time's Arrow and Evolution* by Blum for an attempt to apply the second law of thermodynamics to evolution. Regarding the non-adaptive features in specific distinctions, this may be true of morphology, but I doubt it very much when it comes to physiology. Within the species, if it is at all widespread, there are bound to be adaptations to varying climatic conditions if nothing else.

The necessity to put labels on things (apparently dating back to Adam) is a source of much difficulty in understanding evolution . . .

III. Regarding gaps in the record

A very good example of the slender thread on which hangs the evidence is that of the early history of birds. Archaeopterix and Archaeornis are the only birds known in the Jurassic (which lasted some 30 million years). The first represented is by one nearly perfect specimen (no skull) and one isolated feather, while the latter is known from one more perfect specimen. These are the only ones known, none at all having been found from 1877 until the present (at least until my reference book was written—1939). The number and distribution of avian fossils increase as we go up in the geological record, but we must consider ourselves very fortunate in the Jurassic specimens, as most of the later finds are fragmentary. I believe, therefore, that Mixter's argument that gaps=special creation, is based on the false premise that fossils are a likely occurrence. One has only to consider that all the CO_2 in the air would be used up

in a few decades if there were no decay to realize that much less than one percent of all organisms can be preserved as fossils.

Granting this, a pretty good case can be presented that gaps in the record are probable. It has been shown that evolution among modern plants and animals (that is to say, formation of new species) goes on at a rate proportional to the smallness of the interbreeding group. That is, variations which would be swamped in a large population have a greater chance of expression in a small population. If speciation indeed may lead to formation of higher categories (genera, orders, etc.) as many geneticists believe, then the oldest population of a new Class (Birds) may indeed be quite small, say a few thousand. The chances of one or two of such to be preserved in 30 million years is small enough, let alone a set of specimens illustrating all the steps in the evolution.

So much for the gaps in the middle. I would like you to consider a few items about the earliest ages, also. It is certainly true that there is only very scanty morphological evidence of life in the Archaeozoic and the Proterozoic eras, but the chemical evidence is more abundant. Graphite, so cursorily dismissed in a footnote on p. 24, occurs in the Archaeozoic in beds as much as 13 feet thick. This is hardly comparable to "fine microscopic dust" in igneous rocks. The complete series from peat to graphite is known from later periods, but apparently all the carbonaceous deposits in the Archaeozoic were too far gone to yield any recognizable forms (even anthracite has none).

It is also apparent that any animals that were preserved ate to keep alive. What did they eat? Today the carbon cycle is founded on photosynthesis, carried on by plants. If we now look at the catalogue of species found in the early part of the Cambrian (according to a book by P. E. Raymond in 1939), we find 455 species, of which there were no protozoa, no algae except a few that formed calcareous matrices, 18.5% sponges, 2% jellyfish (etc.), 4.25% "worms", 27.5% brachiopods, 11.5% molluscs, 36.5% arthropods (note that all but 6.25% of these animals had hard skeletons of one sort or another). Are we to suppose that all of these animals lived on the few calcareous algae? It appears exceedingly unlikely from what we know of the feeding habits of modern animals of their ilk. For example, sponges feed on the microscopic plants and animals that they can strain out of the water, and have no means of locomotion. Does it not appear likely that the seas then, as now, were filled with minute plants and animals that formed the food for the larger forms? These animals also needed oxygen to respire and gain energy from their food. The only known source of oxygen in the atmosphere is that produced from green plants in photosynthesis.

It is also possible to outline in general terms how the origin of life probably took place. (theory according to Oparin, Huxley, Bernal, etc.) We know that before there were animals there were photosynthetic plants, but how did *they* get here? Since the photosynthetic plant is the most self sufficient organism existent, this means it has to synthesize all its complex proteins, enzymes, etc. from CO_2 and water. So this does not seem to be the beginning, but the climax of the evolution of the basic protoplasm. (most of the history of the earth went by before abundant fossils appeared!) So we start at the time when there was no oxygen and therefore, no oxone, in the atmosphere. Then the U-V from the sun could penetrate to the surface of the earth. Now it is known that U-V can produce all sorts of reactions, including making simple organic compounds (in the laboratory). In the eons that went by this organic matter accumulated, (there being no bacteria, etc. to eat it). More and more complicated molecules were formed until organic catalysts were formed which utilized the soup they were dissolved in. Somehow or other (it is very vague) these progressed to form organized complexes, and then cells with all their accouterments, living on this organic soup. The synthetic abilities of the early complexes or cells need not be formidable, since many complex molecules are present. The present complexity was then reached step by step as the complex molecules in the environmnt became used up one by one, working backwards down a chain of synthesis until the whole thing could be made from simple compounds. Then each step in the chain was useful when devised, which would not be true if one tried to build up a synthetic chain the other way. If all this seems very unlikely, remember that it might not have worked the first time through, in which case it could start all over (I don't believe that one can calculate how long it would take, for it depends on so many special circumstances, such as absorption on clay particles, concentrations, etc. that we know nothing about). Also remember that it would only take one individual (assuming no sex) to populate the world, and that this process was undoubtedly going on simultaneously in many places, if it was going on at all.

REPLY TO CRITICISM OF "CREATION AND EVOLUTION"

I. Regarding logic

The principle of parsimony requires that the simpler mechanism should be used to explain the facts of nature. This is a good principle and should be applied

as long as it works. I maintain that evolution works within the groups which are separated by gaps in the fossil record and which are distinguished by structures not derived from previous ones by known genetic mechanisms. To illustrate: evolution explains the development of the first horse into the modern horse for the first horse is connected to the modern horse by a series of fossils, and genetic mutations could account for the modifications necessary to produce this amount of change. But the first horse is separated by a structural difference from other orders of animals and this difference is of the type that is not bridged by mutations. There is no fossil series connecting the horses to another order of mammals. Here, then, is where creation could have occurred, and the inability of mutations to produce new forms suggests that creation is needed to produce them. This reasoning does not give a proof but a possibility of creation. The real reason for believing in creation is that the Bible presents it and I take that to be a revelation that gives an explanation which is to be added to observations of living things.

Consider now the critic's statement that gaps are like his not seeing a person going to Wheaton College, so he must not have been there. I would say that if I had not seen someone at a college, he may not have been at that college. Notice the reserve in my actual conclusion, . . . "until bridges are found, *one may* hold that the groups so separated have arisen from independently created kinds". It isn't proof that creation did occur but it would be a place for its need if it is really needed.

My critic says, "A fair summary would be, 'Either evolution has occurred . . . or God has made the creatures of the world in such a way that we cannot distinguish the order from an evolutionary one." I think my paper shows that evolution does account for part of the variety of animal life but that the many breaks in the record (gaps between orders) permit one to believe that something else besides evolutionary forces are necessary for the complete account of what has happened. Members of an order of protozoa could have come from one species, but no mutations are known which could have added stinging cells containing nematocysts to protozoa so they could evolve into coelenterates of even the simplest sort. I say that until the gaps are bridged or a sufficient mechanism is described, one may be logical in his belief that evolution is not all that is at work. The evolutionist believes the gaps were not real, the creationist that many gaps were real; neither can prove his case, but neither can the evolutionist say that the creationist could not be right. He can only say, "He may not be correct."

The idea that science progresses by trying to find mechanistic causes for natural phenomena is good. But I object to saying that mechanistic causes can be the only causes. A scientist would have to be omniscient to say this.

Consider the argument that a machinist is necessary to explain machinery. The principle of parsimony would suggest this. We have seen men make watches; we have seen men construct levers and we know of nothing making levers except men. So when we see muscles work on the lever principle, we are entitled to assume that something with as much intelligence as a man designed the muscular lever. Then we read the Bible which says that God designed man. Revelation caps the argument.

Next my opponent claims I am inconsistent. His first example is a misunderstanding on his part probably caused by an ambiguous statement on my part. I do not believe that Hawaiian species were created in Hawaii; rather, I believe they were derived from mainland species probably South American. My statement about Hawaiian species was an attempt to show a creationist that he could not believe in the creation of species on the Hawaiian islands because the islands are not old enough. They did not exist when creation was occurring, which I assume was when the first members of the orders appeared. Modern orders of birds arose way back in the tertiary and the islands came out of the sea more recently than that. I apologize for giving the wrong impression and I appreciate very much the very careful reading my opponent has given to my manuscript.

The second inconsistency concerns the statement made by a world famous evolutionist who said "it would be a miracle that a mutation causing diversity would also cause convergence for an adaptive end." I did not use this statement to deny the possibility of any evolution but I used it to substantiate my claiming that the mutations which have occurred are not good enough to produce onward and upward evolution. The statement merely shows one of the inabilities of mutations. If I have confused the reader, I am sorry.

II. Regarding similarities

Both of us agree on the occurrence of similarities. I also recognize the use the evolutionist makes of the sum total of likenesses. I do, however, point out that not every similarity means kinship and the sum total need not be taken to mean kinship, unless the kinship is demonstrated by hybridization. When the kinship cannot be demonstrated, then the evolutionist infers it from the sum total of similarities. He could be right, but the sum totals could also be the result of creative activity - as are the resemblances between automobiles the result of the creative (constructive)

activity of men.

The one who is quoted in my work as saying, "Design of creation is a psychological argument which cannot be definitely disproved" is the same world famous evolutionist who was quoted previously in regard to mutations producing adaptations. He was aware of this logic of creationist's viewpoint on similarities, but held that vestigial organs favored the evolutionist.

Vestigial organs may have functions. Apparently my critic does not object to my remarks on the appendix. Vestigial organs may be remnants of formerly more complete organs. The reduction may have been caused by mutation which is what I had in mind when I said that vestigial organs are gentic abnormalities. There is no contradiction here.

We agree regarding the "necessity to put labels on things being a source of much difficulty in understanding evolution." I went into this situation to some extent to try to show one kind of creationist, who believes all species were created, that he cannot hold such a position. That is, I was trying to convert some creationists to a limited form of evolution.

III. Regarding gaps in the record

My critic has helpful material here. Too many of us creationists do not appreciate how lucky we are to have any fossils and enough men to study them. The significant point about the gaps is that they are so consistent in the positions they occur, that is between orders, and classes and phyla. He says the links are missing because they occurred in small numbers. It is neither in the small nor the very large population that evolution is likely to occur but "probably the best chance for recombination is in a rather large population more or less broken up into local areas in which the frequencies of allelic genes are different." (Shull, *"Evolution"* 1951, p. 187) The size of a breeding population could be in the vicinity of 500 to 2000 individuals. It is reasonable to expect in 30,000,000 years that there would be a few specimens giving some hint of how feathers may have evolved —so far as I know, no such fossils have been found. The first birds had feathers which appear as complicated as the best of feathers today. Archaeopteryx is separated from their ancestral reptiles by a striking gap. The evolutionists (such as Heilmann in *"Origin of Birds"*) say that the real missing link is the proavis, which would be intermediate between reptiles and Archaeopteryx. So I hold that Archaeophteryx does not prove birds came from reptiles; it merely emphasizes the problem of gaps.

The reference to graphite being as much as 13 feet thick is a revelation to me. Apparently the footnote I quoted should be omitted. I am also grateful for the evidence that there was much plant life preceding the Cambrian animals.

I shall not comment on guesses as to the origin of life except to say that such works as du Nouy's "Human Destiny" and A. Cressy Morrison's "Man Does Not Stand Alone" show the extreme improbability of getting living things by chance happenings. The quotation at the end of my booklet is by a professor of botany at the University of Illinois. His statement admits that a belief in the creation of the first protoplasm is as logical as a faith in spontaneous generation.

R. L. Mixter

Wheaton, Illinois

ANTHROPOLOGY

by

James O. Buswell, III, M.A.

Piltdown Man

Students of Human Paleontology the world over sighed a collective sigh of relief when it was announced in November, by the British Natural History Museum, after nearly forty years of controversy and speculation, that the jaw of the famous fossil man from Piltdown was a hoax.

Although the skull cap is genuine and human, chemical tests showed that the jaw was that of a modern ape, perhaps an Orangutan, and that it had been treated with potassium bichromate and iron salt, which made it look the color and age of the skull cap. The teeth also, it was announced, had been filed down to appear more plausibly human.

The Museum bulletin published by J. S. Weiner, K. P. Oakley, and W. E. LeGros Clark, said, "The faking of the mandible is so extraordinarily skillful and the perpetration of the hoax appears to have been so entirely unscrupulous and inexplicable as to find no parallel in the history of paleontological discovery."

Now, at last, *Eoanthropus Dawsoni,* Dawson's Dawn Man, can be set aside as merely one more of the many late Pleistocene fossils of early *Homo Sapiens.*

Discovered in 1911 by Charles Dawson, a lawyer and antiquarian of Sussex, the finds proceeded to cause great controversy among paleontologists for many years because of the seeming enigma of the association of a very ape-like jaw with a very modern human skull. Whether or not Mr. Dawson created the hoax, or whether it was one of the workmen in the area who planted it there, is not known at present. Whoever it was, certainly knew his chemistry and anatomy sufficiently well to keep some of the best scientific minds guessing for more than a generation.

Some advanced an explanation of "assymetrical evolution" claiming that in this case the human brain developed faster than the jaw, and that the jaw could not have been that of an ape since apes have never been found anywhere in Britain. The fragments were painstakingly assembled and reconstructed by Sir Arthur Keith into the composite assemblage displayed in most natural history museums throughout the world.

Keith and others believed that the stratigraphy and associated gravels indicated an age of between 200,000 and 500,000 years, making it contemporaneous with *Sinanthropus* and *Pithecanthropus.*

Authoritative opinion recently has been much more conservative in its estimate. Upon reexamination of the site, and the application of Fluorine tests on the remains, the latest consensus was that Piltdown man was "now considered to be comparable in age with the Fontéchevade skulls . . . probably at least 50,000 years."[1]

While many conceived of Piltdown as the "first Englishman" and the most ancient of European fossils, there were others who believed all along that the jaw was that of an ape form in the same deposit with a human skull, and, on morphological grounds, refused to accept the conclusion that the whole thing was human. Kroeber,[2] never one to jump to conclusions anyway, decided that " . . . the claim that the Piltdown skull belongs to a distinct genus *Eoanthropus* is to be viewed with reserve. That the jaw and teeth pertain to an early human form seems equally doubtful. Miller[3] in 1915, Saller[4] and Hrdlicka[5] independently in 1930, Frederichs[6] in 1932, have all denied that the skull and the jaw can have come out of the same body."

Weidenreich[7] in 1946 was of the opinion that the mandible was "without any doubt, the jaw of an anthropoid." He concluded that "both skeletal elements cannot belong to the same skull. All that has been known of early man since the discovery of the Piltdown fossils proves that man cannot have had an ancestor with a lower jaw of a completely simian character."

Most recent texts have tended to agree with this opinion. Beals and Hoijer[8] state that " . . . the skull fragments must be regarded as those of a relatively late *Homo sapiens* form, accidentally associated with the jaw of an older chimpanzee-like animal."

The significance of the discovery of the fraud will be chiefly historical, and will not substantially change the present beliefs with regard to the antiquity of modern man. The Swanscombe and Fontéchevade (Cherente) skulls are still incontestable examples of modern type man geologically older than the Neanderthal race.

From this brief survey of the Piltdown puzzle, it can be understood why paleontologists generally will review the recent report of the British Museum with a feeling, somewhat, of relief, that one of the more perplexing riddles of man's prehistory is finally solved.

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2. Kroeber, A. L., *Anthropology,* New York: Harcourt, Brace and Co., 1948, p. 90.
3. Miller, G. S., Jr., "The Jaw of Piltdown Man", *Smithsonian Miscellaneous Collections,* vol. 65, 1915.
4. Saller, K., *Leitfaden der Anthropologie,* Berlin, 1930.
5. Hrdlicka, A., "The Skeletal Remains of Early Man", *Smithsonian Miscellaneous Collections,* vol. 83, 1930.
6. Frederichs, Heinz F., *Schädel und Unterkiefer von Piltdown,* ("Eoanthropus Dawsoni Woodward") in neuer Untersuchung. Nebst einem Vorwort von Franz Weidenreich. *Ztschr. f. Anat.* u. Entwcklngsgesch., 98: 199-262, 1932.
7. Weidenreich, Franz, *Apes, Giants, and Man,* Chicago, 1946, pp. 22-23.

8. Beals, Ralph, and Harry Hoijer, *An Introduction to Anthropology,* New York: Macmillan, 1953, p. 138.

Shelton College
Ringwood, New Jersey
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ASTRONOMY

by

H. Harold Hartzler, Ph.D.

(This is the second article for this column written by Owen Gingerich, graduate student in Astronomy at Harvard University. I am very happy to present this article to the readers of the *Journal.*—H. H. H.)

A catch phrase, "continuous creation", has made its debut into astronomical circles within the past few years. At the same time, it has acquired two entirely different meanings, but both of which are among the most fascinating developments in current astronomy.

In its first sense, continuous creation refers to the active formation of stars from the gas and dust already present in our galaxy. What evidence can support this view?

Astronomers have long been bothered by the extreme luminosities of such stars as P Cygni and 30 Doradus. These stars are burning up their masses at such an extremely rapid rate that they could hardly have existed the several billion years that astronomers now give as the age of the universe. As a further hint, a few years ago Bok pointed out a number of "globules" —small, very dark patches found against the bright galactic nebulae—which may correspond in size to possible proto-stars in their early stages. Already von Weiszácker and Kuiper had revived the old Kant-Laplace hypothesis of formation of the solar system from a condensing gas, so the evidence began to fit together.

The research which really tipped the scales, however, was done by the Dutch astronomer Blauuw, who has examined several "O associations". These associations, which were investigated first by the Russian astronomers, consist of a group of very hot stars of spectral type "O"; frequently they are associated with obscuring nebulosity. Blauuw realized that these associations are in a state of increasing dissolution, and that by calculating the motions of the stars backwards in time, he could find an approximate meeting place or region, the probable birthplace of the stars. Working with the Zeta Persei group, he found an age of 1.3 million years from the velocity of expansion, which is astronomically very short. Furthermore, these stars were of the extremely profligate variety which might be expected to use up their energy in a relatively short time.

Most astronomers now accept this type of continuous creation as a working hypothesis, for these and other reasons. The second form of "continuous creation" belongs to the highly speculative realm of cosmology, and its mere mention can produce a controversial argument between astronomers.

The cosmological continuous creation is generally associated with the names of four English astronomers, Bondi, Hoyle, Gold and Lyttleton. Technically stated, it arises from a steady-state kinematical relativity. These workers take a Platonic approach, seeking to establish broad general principles of the universe, of which our present physical laws may be mere first approximations.

In general, an important criterion for a cosmological system is that the three space dimensions present an unchanging aspect on a large scale; in other words, in the large the universe should be homogeneous. These cosmologists feel that the universe should present an unchanging aspect in time, the fourth dimension, as well. Then, as Bondi states, "Since the universe must (on thermodynamic grounds) be expanding, new matter must be continually created in order to keep the density constant. As ageing nebulae drift apart, due to the general motion of expansion, new nebulae are formed in the intergalactic spaces by condensation of newly created matter." Hence they postulate the continual creation of hydrogen, *ex nihilo*. This, of course, opposes the law of conservation of mass-energy.

Once the hydrogen is created, further physical laws must take over to form the higher elements. This could, perhaps, be done by "cooking" the hydrogen during the explosion of a supernova. It is interesting to note that the only other current explanation for the abundances of the elements is given by Gamow, who postulates that they are created out of primordal matter, "ylem", in the first half hour of creation several billion years ago. In Bondi's cosmology, of course, the universe had no beginning.

Observational data may eventually cast serious doubts on this steady-state cosmology. As is commonly known, the distant galaxies show a Doppler reddening from the expansion of the universe; in addition, a residual reddening is found, called the Stebbins-Whitford effect. This reddening, which has been observed only for elliptical galaxies, increases with the distance of the galaxy. Since these galaxies are millions of light years away, we see them as they appeared millions of years ago, at earlier times in their existence.

If, as many astronomers believe, the reddening is an age effect, then the younger galaxies would appear redder. Thus if the Stebbins-Whitford reddening is generally present, then it would confirm that these distant galaxies (seen in the light which had started

out in earlier times) are consistently younger. This would vitiate the steady-state cosmology, which predicts that both young and old galaxies should be intermixed.

1. Bondi, **Cosmology**, Cambridge University Press, 1952

107 W. Plymouth Ave.
Goshen, Ind.

BIOLOGY

by

Irving W. Knobloch, Ph.D.

Evolution, Creation and Science — Frank Lewis March Ph.D., Washington, 1947, Review and Herald Pub. Assoc. — 2nd Ed.

This little book of 381 pages is now in its second edition and was written by a trained biologist. Dr. March has also written *Fundamental Biology* as well as articles in the field of entomology. Dr. Marsh points out that he is a Special Creationist and an Evolutionist but he is careful to add that his intrepretation of these connotations may differ from the generally accepted ones. It may come as a surprise to some that a man can lay claim to territory on both sides of a fence but the fence itself exists only in the minds of those who put it there. People like to classify dichotomously—one is either a conservative or a progressive, an evolutionist or a Special Creationist and so forth. Truth, however, is seldom found at either end of a pair of extremes.

Dr. Marsh believes that the ready acceptance of Darwin's explanation of the mechanism of evolution was due to the fact that thinking individuals of the nineteenth century were seeking an escape from the narrow interpretations of the schoolmen and religious leaders in respect to Special Creation. Darwin is to be congratulated for freeing men's minds but it is unfortunate that he likewise set up a fallacious train of reasoning. Linnaeus and Agassiz are especially assailed for putting the theory of Special Creation in a bad light.

The Bible does not teach that nature is static. It does not teach that all modern species arose by separate acts of creation. It does not teach that animals were created as blind in caves. It does not teach that flightless insects were created as such. In short, the Bible does not teach the fixity of species.

Contrary to the ideas of some, Dr. Marsh does not believe that God created man with recessive genes for abnormalities such as feeblemindedness, albinism, hemophilia and other conditions. It is more likely than not that these conditions arose by mutations in the genes of early man. He thinks that *real* species are not the narrow entities as we now have them. Real species contain a number of related organisms, often times interfertile and sometimes crossing a generic "barrier". In this connection, it might be pointed out many recent workers in plant genetics, cytology and taxonomy are uncovering much evidence that so-called "species" in the field are, in many cases very "impure" and that there exist large "hybrid swarms". Edgar Anderson, Wendel Camp, G. L. Stebbins and others are some of the leaders in this promising re-evaluation of our species concepts. It will be advantageous for us to review, at a later date, some of the advances being made on this most active front. To continue with Dr. Marsh's book, he believes that the organisms created were just as complicated as they are today, to all outward appearances, but there were not nearly as many species. Modern species have arisen, with a few well-known exceptions of static forms, from these created, labile species by the processes of mutation and hybridization. The author is a specialist in this field and develops it rather fully and well. Dr. Marsh points out that the methodology he conceives of accomplishes diversity within the separate kinds and does not erase the fundamental discontinuity so manifest in nature.

Werner's onion coat theory of minerals has been replaced by an onion coat theory of fossils. Dr. Marsh doubts that there is any place in the world where more than a few thousand feet of fossiliferous rock are exposed in any one spot. In no one place can the evolutionary story of a plant or animal be satisfactorily traced. The story must be pulled together from many places. I would like my geologically-minded friends to tell me whether this is so or not.

Space does not permit a discussion of other important points in the book. The usefulness of the gill arches in man is explained and the need for the three types of kidneys in mammals is handled very well. The evidence from serology is criticized because of its fallibility. For example, W. B. Scott is quoted as saying that the blood tests show the ostrich and parrot more nearly allied than the wolf and hyena. Dr. Marsh wonders why precipitins are used to show relationships while agglutinins are considered to be of no importance?

The writer was greatly impressed with the book now being reviewed and it is my opinion that it is worthy of wide circulation and discussion. There is very little to criticize in it because the theory is very well presented. I cannot agree that the Bible teaches that the protoplasm of man and beasts is similar because the author of Ecclesiastes said that—"all are of the dust, and all turn to dust again". I wonder whether one can say that the words "dust" and "protoplasm" are synonomous? One other point: Dr. Marsh may have oversimplified the matter when he said, on page 242, that "Evolution is the development of the more complex from the simple". In the main this may be true but every biologist feels that there are many cases of

simplification going on and that these are *also* called changes or evolution. The willows and oaks, the viruses and the tapeworms and so forth are thought, by many, to be examples of organisms which are now *simpler* than they once were—in other words, they are no longer considered primitive. To close this review upon a sweet note, let me say that Dr. Marsh cities his references in such a way (with complete data) that they can be checked if one is so inclined.

Browsing in the stacks of a large college library is usually a rewarding pastime for me and some interesting discoveries can be made. A short time ago I chanced upon a book by L. Allen Higley entitled "Science and Truth", published by the Revell Co. of New York in 1940. This volume supports the Genesis version of the origin of organic diversity but the author, being aware of the many scientific objections to the account, makes many efforts to harmonize the fields. Most of the efforts are quite artless but one is fairly clever, although not entirely original. Higley recognizes full well the difficulties of the "one flood" theory in accounting for the age, abundance and distribution of fossils and he lists most of the important objections to the "one flood" theory. Accordingly, he postulates a flood prior to the Noachian deluge. This he authenticates by referring the reader to the second verse in the first chapter of Genesis. According to Higley, organic life existed previously, was destroyed by the first flood (Gen. 1:2) and was reformed as mentioned from Genesis 1:3 on. This series of events would overcome some of the scientific objections in regard to the age of the fossils. Laudable as this attempt is, I believe that geologists in general would not be satisfied since they postulate many floods. A point about the floods may not be out of order. I am not expressing my belief in this matter (since it is in a state of flux) but it may be unfair for some to maintain that the flood of Noah's day covered all of the earth. The words "world" and "earth" are used figuratively in some places and it may be that Noah's flood was a fairly local affair—that is—it covered the then-known earth. For example, *when all the world was to be taxed* or *all the Kings of the earth sought the presence of Solomon* or *men of every nation under heaven.*

Passing now to another book "Modern Discovery and the Bible" by A. Rendle Short, Inter-varsity Fellowship, London, 1949, we encounter a book of higher caliber. In this book, Dr. Short expands certain chapters of his previously published book, "The Bible and Modern Research" in an attempt to show that modern discoveries do not make it impossible for an intelligent person to embrace the Christian faith. Part of the book is concerned with biological problems but the greater portion dwells with ethnology and archaeology. The latter aspects of the main problem are out of my "line" and so I shall not comment upon them.

Dr. Short evidently allows more than six literal days to Creation as he tries to link up the appearances of organisms in the geological record with their appearance in the Genesis record. An example of this is the fact that birds appear at the same time as mammals in the Bible but at different times in the record. The argument on this point is that the Hebrew word *oph* comes from a root meaning to fly. It could be that flying insects are meant in the Bible instead of "winged fowl". A clergyman friend of mine told me that Dr. Short was right about this point.

Another difficulty frequently mentioned in connection with the "amoeba to man" concept is the possibility of an organism recapitulating its ancestral history. De Beer (*Embryos and Ancestors,* Clarendon Press, Oxford 1940) takes a dim view of Haeckel's theory. Dr. Short mentions the segmented character of the trilobites (ancient crustacea) as opposed to the unsegmented embryos of modern crustacea, as a point against the theory. I must confess that this does not look like too strong a point to me.

Dr. Short's book is an interesting one and quite different in viewpoint from either Dr. Marsh's book or Mr. Higley's book. Those outside the field of biology may find it quite profitable reading.

East Lansing, Michigan

GEOLOGY

by

Karl Turekian

An article by an ASA member recently appeared in the Inter-Varsity campus publication *His* dealing with that perennially fruitful topic of heated speculation—Genesis and Geology*.

Dr. Morris, the author, on examining the various attempts at a reconciliation between modern scientific thought and Biblical interpretation finds them imaginative but impossible. The principle of uniformity and the Scriptural record of Creation and Deluge do not jibe!

Let us then, says he, scrap the principle of uniformity and rather enunciate a principle of discontinuity—i.e. the things that happened about 6000 years ago followed a completely different pattern than scientific theories would predict from contemporary observations.

Briefly, his point is that only a literal interpretation of the creation and deluge story is acceptable for the Christian. He then states the obvious implications:

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* Morris, H. M., "Creation and Deluge", *HIS,* January 1954.

1. All animals and plants appeared full-blown on the designated 24-hour days listed in Genesis.

2. The deluge (some 1600 years after the creation) resulted in the geologic record of the present day. Due to the conditions prevalent under such a world-wide flood it would not be surprising to find so many animals and plants preserved as fossils.

Dr. Morris clinches the argument by quoting a statement from St. Peter (II Peter 3) which he invokes as an overwhelming vindication of his view.

This columnist considers it rather fruitless to consider each statement of his thesis. The problems this interpretation evokes are considerably greater than the ones he has apparently resolved.

Admittedly the mechanism of the creation of the panorama of life is still debated by Christian scientists. It is not obvious that the principle of natural selection itself is essentially vicious and uncomplimentary to God. The chain from inanimate food to a diversity of animal protein has never been a bloodless one. Tyrannosaurus was equipped to devour Triceratops if he won the fight. Smilodon's stabbing teeth were ideal for felling the herbivorous Probiscidians. Tennyson's concern over "nature, red in tooth and claw" is justified. And these beasts were created that way.

But I'm afraid we have defended a straw man dressed in 19th century clothing. Natural selection of the modern scientist is not so much a matter of belligerent aggression as it is passiveness. Two clams sit in the mud—they hardly ever fight—the water gets saltier; one clam becomes dull and has fewer offspring, the other thrives and his many children with him—this is the modern picture of natural selection.

Another item. Dr. Morris: all sedimentation and fossilization was caused by the Flood. During the Flood people must have died like flies. Had they lived contemporaneously with dinosaurs or now extinct mammals we should expect to find human corpses distributed liberally with these animals. This has never been observed.

A lengthier discussion would elicit more of the questionable premises incorporated in Dr. Morris' treatise. However, I feel a quest should be made in a different direction first. The area on which our searchlights should play is that of the meaning and scope of Biblical interpretation.

If we consider the Bible as God's inspired message to man, how are we to view its contents? It is seen that large areas are obviously allegorical. Other areas are demonstrably historical and factual. But one other ameboid mass remains which is the subject of continuous speculation. This speculation is healthy as long as the main message of the passage is not lost in the process.

An intense plea for literalness imposed on a passage constructed allegorically may do as much injustice to the Scriptures as the liberal theologian's allegorization of all of it.

Lecturer in Geology
Columbia University
New York, New York

PHILOSOPHY

by

Robert D. Knudsen, Th.M.

In the previous columns I have mentioned several movements of European origin which will exert pressure on the dominant naturalistic and positivistic thought in American philosophy. First, I referred to an attack from the Christian side, the new critique of theoretical thought by Herman Dooyeweerd, aided by other Neo-Calvinistic thinkers. Then I mentioned the existentialist movement, which is familiar to us mainly in theological circles. Finally, I wrote about the epoch-making work of Edmund Husserl.

In this issue I shall make a few remarks about another movement, which in some of its phases is very congenial to American thought, but which in other phases is again an adversary to be reckoned with. I refer to the *Lebens-philosophie,* spoken of in English as the philosophy of life or life-philosophy. This is a very broad classification, bundling together a group of modern philosophers who break with the rationalistic tradition and who place life at the center of thought. Of these Bergson is a thinker who challenges American thought. On the other hand, our own William James and John Dewey are also classed as life-philosophers.

Henri Bergson (1859-1941) has been called the most original and most significant exponent of the life-philosophy. He was a French philosopher, a member of the Royal Academy, who wielded a tremendous influence. This influence was due in no small measure to the beauty of his style of writing, as well as to the depth and acuity of his thought. He is regarded as a pioneer of the spirit of our times.

Bergson's main works are four, of which I give the French titles: 1) *Essai sur les donnees immediates de la conscience* (1889); 2) *Matiere et memoire* (1896); 3) *L'evolution creatrice* (1907) 4) *Les deux sources de la morale et de la religion* (1932).

Bergson is like Husserl in that he opposed the positivism inherited from the last century. He is much different, on the other hand, because he also sought to overcome idealism. He gave a push to the current reaction against idealistic thought.

Bergson's thought was activistic, dynamic. He claimed that there are no things; there are only *acts.*

Being is becoming. The real is not static being; it is a living impulse. Bergson's thought was characteristic of the turn in philosophy away from rationalism, which emphasizes the mathematical understanding, to a biological thinking, which emphasizes life. Hence the name, life-philosophy. This activistic, biological type of thinking received a great boost from evolutionary ideas.

Life-philosophy has taken the direction of irrationalism. In this it is similar to existentialism. Bergson claimed that the really real was not approachable through the forms of understanding. The understanding spatializes; it sees things as static, measurable, definable. It is capable of grasping the essence of matter; but it is quite incapable of penetrating to the core of reality, which is life. The impulse of life escapes the understanding, which can see it only at the cost of killing and dissecting it. Life can be seen as it truly is only through intuition.

Bergson held, therefore, that the most profound level of reality is not clear, distinct, and analyzable. It is not seen in the clear light of understanding, and knowledge of it cannot be communicated to others directly. It is seen darkly in intuition, and one can only help another come to the place were he can gain a similar intuition of it.

The idea that the forms of the mathematical understanding must be transcended is characteristic not only of Bergson's thought, but also of existentialism and some phenomenology. It is quite foreign to the main stream of American thought, which is naturalistic and scientistic.

In this connection it might seem surprising that another branch of life-philosophy has a great affinity with naturalism and positivism. I refer to pragmatism. Pragmatic ideas were first presented by Peirce. They were modified and brought to public attention by James. Modified again, they have profoundly influenced American thought through John Dewey.

It is amazing how the strands of thought intertwine. Both Bergson and Husserl opposed positivism. They both had a doctrine of intuition. On the other hand, Husserl was a strong rationalist, while Bergson was an irrationalist. Both Bergson and the pragmatists are activistic; they are biological thinkers; they can in one way or another both be classed as irrationalistic. However, the pragmatist differs from Bergson. The latter thinks of the real as a vital stream, which is seen *theoretically* through intuition. At the center of the pragmatist thinking is the idea of the biological adjustment of the organism to its environment. They see the intellect in the *practical* role as the instrument in this adjustment. The intellect has a much more central role in pragmatism than in the thought of Bergson. Further, life is thought of not so much as a vital stream, but as the life of the organism in its adjustment to the environment in which it lives. The pragmatist sees intellectual concepts merely as conventional tools used in this biological adjustment, and he denies any other faculty by which one could penetrate to a more fundamental stratum than the intellect can probe.

Life-philosophy is thus a broad term, covering movements that are congenial to American thought and movements which are not. Bergson has had influence in this country, though I understand that it has been more indirect that direct. There is a school of Bergsonians in France; if there is one here, I am not aware of it. Bergson's thought is worthy of attention, however, because of its clarity, its incisiveness, and its beauty of expression. His general influence, moreover, has been great. Though it is an older influence than the others I have mentioned, Bergson's thought has nevertheless played its part in moving philosophy toward activism and irrationalism.

Denver, Colorado
January 30, 1954

PSYCHOLOGY

by

Philip Marquart, M.D.

Love Is Not Enough*

Under this title, Bruno Bettelheim, M.D. of the University of Chicago, strikes a new note in the field of Psychology. To be more specific, Dr. Bettelheim works in the field of Psychoanalysis, the Freudian area of treatment.

Love, to a Freudian, is a more inclusive term than we recognize and it is obvious that it is viewed as sex-evolved. All psychological groups who work with children, have been emphasizing love, affection, consideration, self-expression, understanding, freedom from restraint. Behind all this movement is the belief that man is inherently good, and therefore, all a child needs is freedom to do whatever comes into his mind. We as Christians cannot follow such un-psychologic doctrine, but we see its ramifications in many related fields. Nondirective counseling is based upon this teaching, likewise Play Therapy for children, and the utter expressionism that is often found in the modern applications of Progressive Education. State laws and school principals alike forbid any form of corporal punishment, and even such punishment as disapproval is being frowned upon as inhibitive to the child's natural productivity. Likewise the two dominant schools in the

*Bettelheim, Bruno, *Love is Not Enough.* (Glencoe, Ill., The Free Press, 1950.)

field of therapy stand for this expressionism, which is well-oiled in "love", these two schools being 1) the Freudian 2) Conditioned Reflex therapy (Behaviorism).

But here is Dr. Bettelheim, a voice in this wilderness of self-expressive nonsense, who finds by the dint of his clinical experience, that "Love is not Enough". Of course it isn't enough. Why not a little "shock treatment". Shock helps patients. We do not know exactly why, but help it does. Isn't that what we all need—Shock Therapy. That is why God sends affliction into our lives, and that is why we, as Christians, still believe in spankings. Read the Book of Proverbs once again and note how many times it enjoins corporal punishment. Love is not enough!

Yes, there is a place left for Love. Infants only a few months old, will frequently die unless they be given some cuddling at the breast of a mother figure. A child in late babyhood, who is denied the love of a mother, will never know what it has missed. But such love forms the starting point for the effective spankings of reformative discipline. Even small children, when denied a mother's love, will tend to turn to sex for satisfaction and masturbation is a result. Adolescents and also adults need their dosage of Love. Insane patients in State Hospitals have been known to be loved back to normal by some one person who is concerned about them. But Love Is Not Enough! It forms only a foundation for a well-balanced program of full-orbed discipline.

Wheaton, Illinois
January 30, 1954

Letters

Editor:

Here are some thoughts in connection with J. C. Sinclair's "A.S.A. Publication Policy" in the *Journal,* September 1953. Would you transmit them to those who might be interested?

Direct access to the high school student and the layman through articles in Christian magazines offers several advantages: cost of printing and distribution would be met by the publication rather than ASA, more could be reached than we could hope for through a system of our own, reading of the subject matter (in a series of articles) would cover a longer period of time affording better assimilation. Have not such items appeared in HIS and ETERNITY? Possibly some denominational organs would be interested.

To the counselor—the one (perhaps an ASA member) to whom the student or layman turns because of his scientific background or his position in youth work—we must provide reference material to enable him to be informed in fields other than his own, a record of current thought, and material that he may make available to those who seek his counsel.

The reference material might be in the form of a comprehensive book. It is desirable that it be written to be understood by anyone versed in scientific thinking. Hence, where terms are introduced whose defining principle cannot be covered in the text, there should be given reference to an accessible standard work which treats the subject concisely. It should include "what is known about (the) subject; the more important theories that attempt to account for what is known and how these theories point to further knowledge; . . . what the author believes with his reasons for his conclusions"; in fact, this might well be the essential outline of the book. To attempt to include all important theories in all fields would make the job impossibly long; certainly emphasis should be placed upon those fields which seem most controversial. It is of dubious value, then, for superficial appearance of covering all major fields, to include matter which involves neither important theories nor their substantiation. It should be subject to criticism of interested ASA members, and to periodic revision. To a large extent MODERN SCIENCE AND CHRISTIAN FAITH now fills these requirements.

The aims of the ASA embody two basic tasks: the construction of a consistent Christian theistic philosophy as it relates to science, and correlation of this with significant current scientific thinking. Therefore "the record of current thought" should present current developments in both areas. This is the place of the *Journal.* The new sections initiated in the April number are a good start in the second field.

With proper planning, much of the need for material which the counselor can make available to those coming to him can be filled by the magazine articles. Such planning should anticipate the articles being reissued in reprint form for such use. Hence where feasible the material should be copyright by the ASA (or the ASA maintain right to its use) and the format be such that it may be reprinted from the original plates. This would eliminate the need for rewriting the article and would reduce printing costs. The matter would be presented in a format associated with serious thought. The plan should be formulated before any of the articles are written so that they could be designed toward an integrated coverage of the problems to be considered.

While the series is in progress, a running bibliography in the *Journal* would help make them available to those not ordinarily receiving the publication in which they appear.

The needs of others familiar with the scientific method—the college student encountering a materialistic philosophy, the pastor wanting background for his work, the Christian school teacher—will have been largely met through reference material suggested for

the counselor.

I would welcome further exchange of thought on the subject.

Sincerely,
Harold Barker, Jr.

17 Minthorne Street
Worcester, Massachusetts
November 27, 1953

Editor:

In the Dec. 1953 issue of the A.S.A. Journal there appeared a review of my book, A Christian View of Men and Things. Since it was distinctly unfavorable, you kindly have offered me an opportunity to reply. This gracious offer I am happy to accept because the review contains so many misunderstandings, distortions, and perhaps even what may be called mis-statements of fact that I do not want the readers of this Journal to be in error as to my position. Although the distortions are numerous, I shall try to avoid imposing on your patience by selecting only a few examples.

The reviewer asserts (p. 7, col. 2) that the author "rather cynically remarks that 'Democracy made the naive assumption that the mass of the electorate could choose men capable of managing a nation's affairs'." The sentence which the reviewer quotes occurs in a section of four pages summarizing the views of Oswald Spengler. Much of the wording is Spengler's own. But so carelessly has the reviewer read the book that he quotes this sentence as if it were mine.

It is true, I admit, that while rejecting Spengler's political theory and underlying philosophy, I agree that civilizations have come and gone, empires waxed and waned, and that the U.S.A. will probably not last forever; in fact I hold that our government has deteriorated considerably in the past twenty years; I hold too that the total depravity of man makes political deterioration inevitable and that the only permanent government will be the Kingdom of our Lord Christ. Perhaps this is cynical (i.e. snarling, contemptuous, misanthropic, pessimistic, and gloomy); modernists and humanists regularly say that it is; but I hold that it is unadulterated Christian truth.

To analyze the material on the "Inductive Theistic Arguments" would require too intricate a discussion. The reviewer mentions Abraham Kuyper as one who accepted them and who represents the usual Protestant position. But Kuyper did not accept them. In his Encyclopedia of Sacred Theology (p. 112) Kuyper says, "Every effort to prove the existence of God by so-called evidences must fail and has failed." I happen to agree with Kuyper on this point. To say with Calvin that there is "nothing so obscure or contemptible even in the smallest corners of the earth, in which some marks of the power and wisdom of God may not be seen" is not to assert the validity of Aquinas' or Aristotle's cosmological argument. If anyone thinks that the Thomistic, empirical proofs are valid, he should answer my specific criticisms of them found on pp. 308-312. Although a theorem of geometry may be true, it does not follow that a particular student's demonstration is valid.

For a reply in this Journal it might be more appropriate to pass over most of the philosophy and theology and to consider the section on science; though even here the questions often turn on logic and epistemology. On page 11, col. 1, the reviewer accuses me of shifting my definitions. He quotes "science is incapable of arriving at any truth whatever." To this he joins my remark that Nietzsche "stated the exact truth." This, the reviewer claims is an inconsistency. A little reflection would show that this is not an inconsistency, for Nietzsche did not arrive at his truth by scientific experimentation; and there is no contradiction between saying that scientific methods cannot arrive at truth, but that truth may sometimes be had otherwise. I may be wrong in what I said, but anyone who says I am inconsistent has not read carefully.

At the bottom of the same column the reviewer states that Carlson's assertion—that the scientist tries to rid himself of all faiths—and my statement—that a syllogism is either valid or invalid and cannot be semi-valid—are exactly the same in sentiment. The reviewer's assertion can only be taken as a misstatement of fact. Unlike Carlson I allow room for faith, so much room that maybe there is no room for anything else; unlike the reviewer I hold that demonstrations, such as are found in any geometry book, cannot be semi-valid. Semi-validity is nonsense. And incidentally neither Karl Pearson nor A. J. Carlson were straw men, as the review claims.

The paragraphs on physical measurement and aesthetic formulation concern mainly the choice of the arithmetical mean. The reviewer's language is vague, but when he says, "The selection of an average measurement is based upon much experience," I would suppose that he meant that the choice is empirically determined. I still believe that my argument shows that this is not so. It would be most extraordinary if the mean were identical with an observed reading; but the lists of readings frequently contain modes, and half the time they contain medians. The choice of the mean therefore, instead of the mode or the median (a choice about which the reviewer says nothing, lacks empirical compulsion. An elementary example of something that can become very complicated, it is selected for reasons of a systematic simplicity that can well be called an aesthetic choice. (Cf. Cohen and Nagel, *Introduction to Logic*, p. 215).

The paragraph, Is Science Totally False (p. 12), seems extremely confused. Obviously the reviewer is disagreeing with me, but he admits so much of my

argument that the disagreement seems to be for the sake of disagreement. He admits that "no abstract number will precisely correspond with the dimensions of this physical object under all circumstances" and that "careful scientific men do not state the mathematical formula . . . as absolutely true . . . " But this precisely is one of the points of my argument. And no confused comparison with Route U.S. 30 between Philadelphia and Chicago will make it absolutely true. One important difference between the law of the pendulum and ordinary conversational speech, like the difference between a line without breadth and thickness and U.S. 30, is that the former is mathematically precise. And it is the very precision of scientific law that prevents it from being true. Loose general statements can be true in virtue of their very latitude.

To conclude: the omission of many points in this reply is not to be construed as acceptance of the interpretations imposed by the review. The review is so inadequate that I would be greatly pleased to see a criticism of my chapter on Science written by a competent physicist, who would of course be familiar with the procedures I am discussing.

Gordon H. Clark

February 12, 1954
Indianapolis, Indiana