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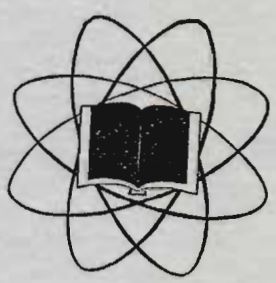

The fear of the Lord is the beginning of wisdom. Psalm 111:10

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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.

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EDITORIAL

A.S.A. Library

You can aid the library of the American Scientific Affiliation in the following ways:

1. Suggest books which should be purchased. A thousand readers will run into valuable books more readily than one librarian. So if you have a choice book, send a short review of it to me and it will appear in the Journal.
2. Borrow books from our library after reviews appear in the Journal, or from books listed on our A.S.A. library catalog. A complete list of books may be obtained from the librarian.

Some recent loans are to:

A woman in Missouri preparing a discussion for High School students.

A theologian writing on the Flood.

A member of the executive committee surveying the "Doorway Papers".

A college student studying apologetics.

A teacher sampling literature on science and scriptures.

We are buying a complete set of "Doorway Papers". These are written by anthropologist Arthur Custance on such topics as "Why Noah Cursed Canaan", "The Problem of Evil", and "The Interpretation of Genesis I." You will find them well documented and stimulating whether you agree with them or not.

Perhaps you have a valuable book you would like others to enjoy. Give it or lend it to our library. Our collection contains the Journal of Transactions of the Victoria Institute, an English organization comparable to ours. In 1958 the publication changed to a tri-yearly magazine, *Faith and Thought*. A sample issue contains the following titles: Faith's Debt to Scepticism, Some Ancient Semitic Ideas of the Afterlife, The Concepts or Randomness and Progress in Evolution, Sigmund Freud, Life and Work.

R. L. Mixter
Wheaton College
Wheaton, Illinois

The Editor's Views

The perennial question arises as to what kind and quality papers should appear in the Journal. As to kind, most decisions are not too difficult. Some borderline cases including a point pertinent to the cause of the organization may be included.

As to quality, well, everyone is concerned that papers be of the best. But to set up an infallible set of objective rules by which to determine quality (and to a certain extent the subject of the paper) is easier said than done.

Some rules are easy. It is usually a simple matter to find whether an author is misinformed on facts or is only partially acquainted with the facts pertinent to his study. Composition is another criterion. Beyond that, the line of acceptance or rejection becomes more hazy.

It would be easy to establish a "party line" in accepted scientific theory and in theology to which any accepted paper must adhere. Among most journals this seems to be the case. One doesn't expect to find an amillenial article, for example, in a magazine supported by people with premillenial convictions; neither does one look for an article on creation in the Journal of Evolution. These policies, no doubt, have their good purposes.

The Editor, however, believes that the A.S.A. has a purpose, and can thus best fulfill a needed function, of open-minded study that precludes such restrictions. In pursuing that policy of liberal thought within the framework of revealed Christianity, it is inevitable that some papers will get into print that will meet with considerable objection. And the Editor freely admits having made some poor judgments; however, it is not uncommon to have been scored for printing an article and, by another, complimented for having had the opportunity to read the same. At that, about one-half of the papers received are turned down.

It is his (Editor's) belief that a primary function of the A.S.A. is to allow free discussion. It should be a medium for producing new thought, new approaches, new solutions to some old problems concerning science and Christianity.

It should be made clear that the Council has given the Editor quite free rein in such matters and therefore he is responsible for selection of papers that are printed. Of course, he is dependent to a great extent on the advice of referees of papers.

Finally, it should be emphatically pointed out that any paper or column is to be considered only as the views of the author, not as an opinion or policy of the A.S.A. membership, Executive Council, nor the Editor.

D. N. Eggenberger

NEW FELLOWS

The following members were recently elected to the status of Fellows of the American Scientific Affiliation in recognition of their contributions in various ways to the development of the aims of the organization.

Douglas A. Block	John McLennan
George Fielding	Herbert Meyer
Wayne Frair	David O. Moberg
Russell Heddendorf	Edwin Olson
Richard Hendry	Robert M. Page

The Need For An Evangelical Philosophy of Science *

THOMAS H. LEITH

By analyzing past attempts at synthesizing theism and science, the need for an adequate contemporary philosophy in the area, capable of meeting past failures, is presented. Important issues may then be outlined between the attitudes of presently fashionable philosophies of science toward such synthesis and varied types of Christian study therein. The necessity of a careful choice of a unique theistic starting point is offered as the only path to a useful and abiding resolution.

Huxley, the great English biologist, once remarked that "extinguished theologians lie about the cradle of every infant science like the strangled snakes about that of the infant Hercules." It is with regard to Santayana's reminder that "those who cannot remember the past are condemned to repeat it" and in the hope of preventing the above cruelty to my theological brethren that this paper is given. While none of us is infallible, even the youngest, I shall assay an escape from Santayana's chains of history by the simple device of reminding the theologian that he cannot impede the growth of an infant he needs must succor and of reminding the scientist that he may not debach the theology he needs must sanction. If this is a worthy purpose, my task then is not to bury either but to praise the first-fruits of both.

A well-known schoolboy malapropism reveals that "the difference between Science and Religion is that Science is material and Religion is immaterial". Much as our day decries in many quarters and with divers voices the perspicacity of our student, surely the acts of his seniors reveal his discernment. There are those who are akin to Faraday who, in his letter to Lady Lovelace, informs us that he went into his lab and forgot his religion and came out again and remembered it. Others like Haldane, failing totally in memory, cry "scientific education and religious education are incompatible. . . Religion is still parasitic in the interstices of our knowledge which have not yet been filled. Like bed-bugs in the cracks of walls and furniture, miracles lurk in the lacunae of science."[1] The army of both is legion and the Christian must *face it* with purpose.

But the tragedy of tragedies is that platoon of Christians who march in step *with it,* or provide food for its appetite albeit blindly, calling to all who will hear, "Worship and thought are *distinct.* My ways, oh fellow scientists, are your ways and my thoughts are your thoughts!" But must not science and religious belief be mutually intelligible and mutually interdependent? In our day, can either live, as implied above, coherently if apart? Or we hear again, "In my God you must believe! How else explain life's origin? The hiatuses of my paleontology? The indeterminancies of my quanta? The mind of my psychology? May one not exclaim here as did Henry Drummond, "As if God lived in gaps!" Must we not remind these Christians that if they *do not* have valid arguments for their beliefs they surely *do* love their prejudices? But need they be anyone else's?

It is often remarked that the sciences haven't failed man: rather man has failed them. Have not such Christians often failed both? Reinbold Niebuhr writes, "Nature can be known through scientific enquiry, but scientific knowledge does not disclose its own meaning." To be sure, hasty and premature explanations of this meaning have proven to be Job's false comforters in the history of the church, and as the above indicates, even today, but if the Christian view is the only way to redraw the map of knowledge, should it not best be done by those who have done some intellectual traveling particularly in theology and in the sciences? As John Baillie so wisely observed, "Surely the depth of the problem emerges only when the man of science and the man of faith are the same man, so that the two who have to walk together are but two elements in the total outlook of a single mind."[2]

My plea then is for a revitalized witness to science by those aware of its difficulties. We must point out that the scientist has a range of awareness transcending the purely scientific discussion of experiences and that to find understanding in nature, he must pass beyond a purely scientific universe.[3] As Pasteur said, "(There is) something in the depths of our souls which tells us that the world may be more that a mere combination of phenomena." We must make clear too that God doesn't exist because a famous scientist says so, nor cease because an infamous theologian agrees, popular though these beliefs are in rather different quarters. His existence is axiomatic. Only then may we challenge that indifference so clearly portrayed in Wood's observation, "Probably the revolution that has had the profoundest effect upon religion in modern times is not that caused by science itself, but by the absorption of the scientist in his science. He feels no need to go outside its range for intellectual and emotional satisfaction . . . They set up for themselves and other

*Paper presented at the 14th Annual Convention of the American Scientific Affiliation, Chicago, Illinois, June, 1959.

people a climate of opinion in which religion need play no part."[4]

But lest it escapes in unwonted satisfaction, let me point out too that theology needs to, and has ofen failed to, *provide* this vitality of witness. An anti-scientific Christian, ust as an anti-Christian scientist, is not Baillie's 'man of faith and science'. In both cases prejudice or lack of communication sunder what must be united. R. G. Collingwood states this so well. "Religion always mistakes what it says for what it means. And rationalism, so to speak, runs about after it pointing out that what it says is untrue."[5] If anything is to be gained by contemporary stress on semantics it is this: speak wisely and clearly if you would be understood, and in particular if you would adjust that strife of the religious and scientific temper of mind, that debate between the critical intellect and the inner spirit which would fain believe.

With these introductory comments let me move to my appointed task. If what we have said is rather negative in tone, what positive remarks may be made? Of course time and ability must stay my zeal here. I do not intend like Priestley, in the late 18th Cent., to be "induced to undertake the history of all branches of experimental philosophy" in their relation to our problem but rather to survey the general need for a fruitful synthesis of Christianity and science. Unfortunately, it is impossible in this effort to avoid the use of the big brush though I will try to avoid the slovenly use of that utensil. Let me begin by placing, as I see them, the sciences in their appropriate position in this dialectic.

Huxley, writing to Kingsley advised, "Sit down before a fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses nature leads, or you shall learn nothing." Despite the desirable plea for open-mindedness it is unfortunate that this Baconian ideal, as even a cursory reading of Bacon himself will reveal, turns out to be unattainable. The same applies to Whitehouse's observation that "the scientific attitude may be a gift of God which can liberate us from the idolatry of divinised tradition in the same way that it has freed us from the idolatry of divinised nature."[6] No scientist (indeed no man) is so humble, so lacking in preconception, so apart from the past of his teachers and societal mores that he can become a *divinised* scientist. Indeed were science only as Prof. Young stated in his Reith Lectures, "in the end practical . . . serving to ensure that so many of us can live on earth"[7] it still must be replete with the prior value judgments of the scientific community.[8] And again, were science but calculated unfolding of nature it still must run the Socratic risk of the *Phaedo* where the sage tells us that science alone leads to blindness of soul. Who cannot feel the pangs of Darwin as he tells us "his higher tastes . . . were atrophied" as his mind became "a kind of machine for grinding general laws out of large collections of facts"? The scientific *man* cannot escape his humanity in the interest of becoming an animated Univac. If faith dies so must science. Mere inquisitiveness won't sustain the proper attitude of mind. A speculative interest in nature's manner of proceeding depends on the assumption of a meaningful nature with a controlling purpose. "The scientific intellect often slays the object that it loves in order to understand it . . . Perhaps this is the reason why poets and scientists do not understand each other."[9]

Indeed, I feel Waddington said more that he thought when he remarked, "Science is concerned to discover how things work and its test for truth is that it makes them work as it wants to." Scientific laws are not only descriptive hypotheses which bear much fruit, they are really *prescriptive* models into which *we* fit the data of observation as long as no great violence seems to occur in the whole *weltanschauung*. of our science nor in the value of the model for suggesting future experiments. However, this temporary form of interpretation must not be confused with the eternal substance of God's immutable law. Thus science is to a greater degree than is often asknowledged a product of *our* scene, *our* interests, and *our* spiritual condition.

What then must the Christian realize and proclaim? He must realize that while nature is never understood without experiment nor described without geometry as the 13th Cent. Oxonian Grosseteste proclaimed, it is incapable of ultimate resolution in these alone. Demanding religious commitment, science needs the challenge of the orientation of Biblical theism. In addition to failing to provide this, the placing of science by the Christian in some abhored naturalistic limbo forgets that science itself doesn't lead to naturalism. The naturalistic commitment was felt long before science, which indeed is the abode of many a non-naturalist and the product of the Christian church. Every scientist must say 'yea' or 'nay' to God but no Christian may say 'nay' to God's voice in nature. In fact, as Archbishop Temple affirmed "unless all existence is a medium of Revelation, no particular revelation is possible" thereby linking Kant's starry heavens with the moral responsibility of man.[10]

And what must the Christian proclaim? Is it not the following which Burtt outlines? He notes that the thinker who decries metaphysics will actually hold metaphysical notions of three main types. He will share the ideas of his age on ultimate questions (where he agrees); his method will tend to be turned into a metaphysics, ie. he will assume the universe of such a sort that his method will be appropriate and successful; and if a great mind he cannot avoid ultimate questions else he cannot have full intellectual satisfaction.[11] Must we not add to these Bavinck's great truth, "What

nature is to us is determined by what we think of God and who He is for us"? If we remove God from His creation we end up investing it with the character of God.[12] Is it not finally then the Christian argument that the disputing guides of men may leave the guided to complain justly that he has been abandoned in the metaphysical jungle without even a way of identifying the animals and that only God's self-revelation may truly guide?[13]

Hence, we find science and theology in need of one another. We may not compartmentalize without a wholesale oversimplification of the aims of both. The spiritual and natural realms cannot be in conflict. Science, theology, and the ethics within both "are intertwined and cannot be separated without the entire structure's collapse." [14] The scientist must be reminded, as Thos. Pratt observed in 1667, "It is a dangerous mistake into which many good men fall that we neglect the dominion of God over the world if we do not discover in every turn of human actions many supernatural providences and miraculous events. Whereas it is enough for the honor of His government that he guides the whole creation in its wonted course of causes and effects."[15] And the Christian must continually observe that "when we come to the scientifically unknown, our correct policy is not to rejoice because we have found God: it is to become better scientist, and to think a bit more deeply and imaginatively until we can devise some model, or some concept, that will bring the previous unknown into the pattern of the known."[16] Thus both must see that God is the God of *all;* not just the miraculous or the mysterious. Science should understand nature as demanding God (and *that* a God who illuminates His acts in His creation by the enlightenment of Scripture) while theology must see its system and its Biblical sources isolated and starved without deep thought about the general revelation of God that it is meant to clarify and portray.

As generality this is all quite appropriate, but what is the detail of this union of science with theology? Is history not replete with syntheses weighed and found wanting? What audacity is it that assumes we can escape the inexorable decay of some potential monument of our thought under the erosive scrutiny of our progeny? My reply is, I believe, both simple and correct. We must, as I mentioned earlier, learn from the past and its heart-rending list of failures. Let us cull out error and save the timeless which is truth. Let us assay to construct on lasting foundations. To be sure, any apologetic system in the area of our interest is a product of the problems of its day and fades as the problems are revised or forgotten. Any human system must expect this, but what has this to do with the validity of its methods? It is tragic only when the foundation, the principles, the basic ideas are found incorrect and unwarranted. We are expected only to speak to our day but our principal grammar must be appropriate to a revelational theism and firmly ensconsed within it so as to challenge the future as well as our own time. May we then turn for a few moments, with these thoughts in mind, to the broad sweep of the last five centuries of church history before more carefully scrutinizing the recent past and our present scene?

I am sure that most of my audience will recall that the intellectual scene, insofar as it interests us here, was prepared for the Renaissance by, among other things, the partial decay of the great 13th Cent. synthesis of human knowledge in the *Summa* of Thomas Aquinas. The problem of our paper which had appeared to have been given resolution were now, by many, found wanting. Where Aquinas had closely delineated the distinction between faith and reason and defined their limits, these limits were now altered radically. The great eclectic had placed certain dogmas of the church beyond reason but not contrary to it. With Sotus the list is enlarged and with Occam all that has not its source in the data of the senses becomes faith. Where Aquinas had found God clearly, though partially, revealed to all men in His creation, for Scotus more is hidden, and for Occam the need for making suitable assumptions makes the proof of God the consequence of arbitrary prior decision. Thus by the middle of the 14th Cent. the spheres of faith and reason are so dichotomized as to leave man's views of this world separated into spheres of distinctive types of truth. The moot question is whether to resolve the problem by shrinking one of the poles to insignificance. The temptation to walk one side of a fence of paradox is always strong and many tramped paths on the side either of revelation or of human reason, even though for a time most of this was done within the realm of church authority.

But the failure had yet to become more overt. Occamism, with its stress on a sphere of coherent but secular knowledge, led to an interest in this to the detriment of revelation. His razor led to attempts to simplify the ideas of nature's mode of operation by the exclusion of the supernatural and the teleological. With the revival of learning and a growing interest in pre-Christian literature came a certain disdain for the rote of much scholastic thought and the attempts at ecclesiastical interference in the growing political, economic, and legal freedom. In the heart of this comes the Reformation with its doctrine of the priesthood of the believer, frequently (but with notable exceptions) interpreted so as to allow considerable freedom in man's application of revelation to the affairs of this world and frequently fostering an interest in the question of the mode and extent of God's revelation to each man in His creation. From this time on, the Renaissance interest in non-Biblical thought and the Reformation return to Biblical bases was to be in

conflict between and within individual thinkers.

Then in the late 15th Century appears Francis Bacon to crystallize the methods of the Leonardo's and the Gilbert's of the century just passed. We find him derisive of scholasticism and of the idols of the past, asking that all knowledge begin and end in sense experience, proclaiming that all knowledge is to be his province, and forgetting facts need prior value judgments and present rational correlation. In him the inductive method is crudely crystallized, but unfortunately confused and attenuated by a lack of interest in mathematical relations and a search for substances instead. At almost the same time we find the pious Lutheran Kepler overstressing just that which Bacon lacked (mathematical relationships, in his case in the motions of the planets): overstressing because of a mystical conviction that God created and moves the universe in simple mathematical harmonies. And finally, in the same period Galileo, utilizing the work of Kepler, crystallized the rising problem of the past several centuries.

And what is this? The question of the relation of truth in description and truth in Scripture. The Inquisition and Cardinal Bellarmine would have been happy had Galileo described his work as speculative, as theory and not as fact. Did not the Bible and tradition obviate its factuality? Galileo would have been happier[17] had they paid more attention to experiential facts and less to the past and fallible exegesis. The problem then is whether appearances can give an answer, both simple and precise in logic, which differs from the grounds of those appearances. If Scripture tells us about the world as it *really is* ontologically can we place confidence, for more than utilitarian motives, in descriptions of nature? Does the Bible use postulational language or does it use either man-oriented modes of description or language so as to illustrate or strengthen a revelational truth? Can science ever go beyond description or organization according to our schemes as researchers? Is there meaning, in science, to any other kind of natural law?

Subsequent thought usually stresses one of these three. The Christian generally does believe that God does sustain a universe of laws but has the problem of correlating changing laws of science, or presumed laws discovered from thought alone, to this. The empiricist stresses the availability only of appearances and claims our thoughts cannot reason beyond this. All else is faith. The rationalist, finally, claims an ability to discover the secrets of nature by innate truths and reason, claims a consistency of these with scientific discovery, and if a Christian, claims thereby to find what God means by His revelations about nature.

Let us briefly discuss the thesis of the rationalist first, specifically by illustration from the three major figures of the school embracing almost perfectly 17th Century continental Europe.

Descartes, the earliest, strongly influenced by the mathematical (as were the others in distinction from the experimental bias of the English empiricists) claimed that all that was clear and distinct was true. First we cannot doubt our existence, then we cannot doubt the existence of God as the conserver of our existence, and finally we must assume the truth of logic and the existence of the external world because God would not cause intuition, demonstration, and appearance to lie. Having now grounded all in God, he proceeds by steps we may ignore to remove God from His creation leaving all that exists, including man, part of an inexorable mechanism with which God does not interfere. He does allow for a free mind but never integrates it satisfactorily with the determinism of man's body.

With Spinoza, infinite substance or God becomes the eternal ground of all that is. All that exists is in, and inconceivable apart from, this substance. Our world is an aspect of this and not a creation. In it we may know two of the infinite attributes of God—thought and extension—but all are independent even if everywhere as aspects of God. Thus Spinoza ends with a pantheistic world in which freedom means only that the action is determined by God and a world equally well described by either the mental or the physical.

Leibniz finally reasons to a world of monads or independent and continuous centers of perception. Each mirrors the universe from its point of view and there is a harmony between the perception of any monad and the motions of the rest of the universe. Since there is no interaction this must be pre-established and thus deterministic. Everything has thus a sufficient reason and man's role is to try to discover it by more clearly perceiving the universe around him.

Thus we reach an impasse. All three leave us with the antinomies of freedom and mechanism; Spinoza and Leibniz continue with an eternal universe which, for quite unclear reasons, manifests itself differently with time; and all three face the unenviable task of explaining how infallible reason leads to three different Gods with the attendant problem of how reason alone can, from the nature of any of these Gods alone, decipher the course of history and the details of nature.

Stretching between the mid-17th and the mid-18th century we have in England a quite opposite attempt to relate God to nature in the great empiricists Locke, Berkeley, and Hume. All disagreed fundamentally with the ability of unaided reason to understand reality. Locke first challenged innate ideas, claiming all knowledge to rise from simple ideas such as sensation and reflection received passively by the mind. These the

mind combines, relates and abstracts into complex ideas such as number and beauty, the conceptions of external objects, and cause and effect. Knowledge then is the perception of agreement and disagreement of these ideas and is of three degrees: intuited as in mathematics and our own existence, demonstrative as in the existence of God, and sensitive as in the assurance of an external world of items made up of a substance with cohering primary qualities such as shape.

Bishop Berkeley spotted a difficulty in Locke. He rejected the existence of a world of primary qualities and a substrate as unproven. All that exists is either perceived (an idea) or a perceiving mind. Mind and its content alone are real. We have only a combination of sense qualities and the consciousness we exist as an independent thinker. There is no evidence in sensation or reason for the belief in external objects. God is the cause of ideas attributed to the outer world. Of this mind and our own mind we have only notions, and not ideas, as our ideas are passive. But if God is the source of ideas perceived by the senses we can trust them. On any other basis we might doubt that the world was like our ideas of it. God also sustains reality even when unobserved by us.

Finally Hume takes this to its apparent conclusion. We perceive only sensations or emotions first appearing to the mind and ideas which are faint copies of this in memory or imagination. Both are the source of association of ideas into resemblance, identity, contiguity in space and time, and cause and effect. Matter is thereby just a constant combination of simple ideas given a convenient name but has no logical necessity. Berkeley's self is rejected as we have no direct perception of it and confuse it as an object with a flow of impressions constantly coming and going. Thus Hume denies both material and spiritual substance and rests solely on perceptions. Observing the contiguity and succession of impressions we assume a necessary connection in causality. Scepticism he tries to evade by a leap of faith in instinct and habit inducing us to believe in the reality of the world and the validity of causal analysis. So confident was he in his assumed uniformity of nature and in causality that he rejected free will and miracle. God he also reduces to an assumed ground for nature, but nothing can be discovered precisely about His nature.

Thus empiricism rests! Berkeley, defending God's necessary relation to nature, left man to doubt the existence of other minds like ourselves. Hume, the critic of Christianity, left us without even sure belief in ourselves. He lost the whole world and lost his soul too. And all leave us with the question of how empiricism on such grounds could attain knowledge at all. No mind, and if a mind, no logical demonstration of an ability to construct a philosophy of nature at all!

Thus we see the tendency of the thought of the philosophical mind of the time. It is a trend, either by way of reason or by way of experience, leading to the rejection of revelation as necessary or basic to the understanding of nature. Its weakness is the chaos of the rationalist views of God and His relation to our world and the ultimate scepticism implicit in empiricism. Man's reasoning and experience alone have been tried and found wanting. Though not many contemporaries went as far as Hume, for example, a spirit of irreligion on the continent and the limitation of revelation to the laws of nature and by the tests of reason in the English deists are willing bedfellows. Did the more scientific mind of the time do any better? Let us see.

Many forces were at work in 17th and 18th century science but no force was so great as an inexorable adjustment of Christian beliefs to conform to the conclusions of science. Natural religion rises with the stress on reason and the growing concern with other religions and the spiritual state of the heathen. Mechanism and the anti-miraculous sentiment grow both in the reaction to scholasticism among Protestants and from a misunderstood Calvinism where John Wallis's God laying down eternal and unchangeable laws was easy to merge with Robert Boyle's Divine Mechanic constructing his machine. Let us survey rapidly the fruits of the Puritan devotion and utilitarianism in England which made, in the work of the *virtuosi*[18] that country the scientific leader of the period of the 17th century. For these are the days of the origins of the Royal Society, of Boyle and Hooke and Lower the pioneer physiologist, of Barrow in mathematics, of Halley and Hobbes, and of the equal genius of Wren and Newton.

We may characterize the century by a strain to preserve traditional faith in the face of a burgeoning science. Some would preserve by restricting the scientific attitude and others by fostering it. Alexander Ross cries in 1646, "Whereas you say that astronomy serves to confirm the truth of Holy Scripture you are very preposterous; for you will have the truth of Scripture confirmed by astronomy, but you will not have the truth of astronomy confirmed by Scripture; sure one would think that astronomic truths had more need of Scriptural confirmation than the Scripture of them."[19] Twenty-four years later Henry Stubbe decries the superciliousness that implies the praises of the savant are more acceptable to God than the blind wonder of the ignorant. Hence on one side there is a fear that science leads to arrogance wherein scientific ideas outweigh God's Word and to a gross materialism.

The defense stresses design and harmony in the world, replies that the study of God's natural revelation is a truly pious task, that science will remove ignorance and superstition and clearly distinguish the un-

usual from the miraculous, that the praise of the student *is* better than blind praise, and, as Boyle remarked, that the rejection of nature to promote disbelief is as absurd as promoting atheism by the study of the Bible.

However, the difficulties between science and Protestantism were not primarily ones of religion *versus* science but of religion *within* science as science defended a view of nature mundane as to appearances and supernatural as to inferences.[20] "The sources of rationalistic atheism were not the same as the sources of scientific agnosticism".[21]

For example, where John Ray found divine omnipotence in the multiplicity of creatures in nature,[22] Newton found it in nature's mathematical simplicity. The antithetical nature of such arguments is not of as great import as the realization that they can apply to either side as multiplicity and simplicity are relative. One sun warming seven planets and seven suns warming one plant might equally argue to design through simplicity *or* complexity or it might argue to caprice.

Let us say a few words about Newton for it is he, with the Enlightenment philosophers, who raise up deism in the next century. Newton sought God in the precision and harmony of planets and optical spectra but his views led where he guessed not. As Pope wrote (but with more than he intended), "God said, 'Let Newton be', and there was light."—for he removed much of the mystery in nature which to many led to faith. Newton also thought his system raised questions of origin.[23] Later, others found here deism or atheism. God for Newton is nearly identified with the eternity and infinity of the world. "He constitutes duration and space." (Though elsewhere this is qualified as space and time become merely the sensoria of God.) As Westfal points out, God is taking on the character Newton assumed his creation had, and "a God deduced from nature can be no more than a projection of nature."[24]

Newton also said that God occasionally restored order to the accumulating small inequalities of the planetary motions. Leibniz replied that this made God incompetent.[25] Clarke tried to defend Newton by saying that God *continually* controlled nature but this is more typically providential than Newton's spirit.[25] In the 2nd edition of the *Principia* Newton himself assayed a reply but in it God's dominion is still not made direct and immediate but "his arbitrary freedom in shaping matter and promulgating laws at the original creation."[27] Miracles are reduced to rare events the causes of which we do not know. Natural religion here becomes the whole of Christianity where the *virtuosi* made it only the foundation.[28] By it man is to discover the power of God and His benefits and our moral duties to God and man. Thus the work of the *virtuosi* led to the Enlightenment deism with its replacing of spiritual worship by moral law and its claim to discover true religion without special revelation. The reverence of the 17th century *virtuosi* became the doubt of the 18th—a change, not in argument, but in attitude.

But there were also those who attempted to lift religion out of controversy onto a firm philosophical base. These centered around the Cambridge Platonists, modern analogues of the Alexandrians Clement and Origin, who, as Basil Wiley points out, both made an effort to maintain philosophy and religion as allies, not as strangers or enemies.[29] The group of Lord Herbert, John Smith, Henry More, Joseph Glanvill and Ralph Cudworth tried to formulate a belief commanding the universal assent of men. God's revelation thereby was considered to go on continually as He enlightens man's reason with Scripture intended only to confirm the truths so discoverable from nature. Surely this reversal of the true position of Scripture was the type of argument that led Butler, Ray, and Paley to what I consider their misplaced defense of the faith on arguments from nature.[30] When both Scripture and the Platonists' arguments were ignored their opponents, the deists, also arrived at their misplaced exclusion of God from the nature He created.[31]

It should be remembered, however, that philosophy was far advanced of science in its agnosticism as the 18th century begins and so continued for some time. As Lecky put it, "The direct antagonism between science and theology which appeared in Catholicism at the time of the discoveries of Copernicus and Galileo was not seriously felt in Protestantism until geologists began to impugn the Mosaic account of creation."[32] Let us turn therefore briefly to 18th century geology to see how it handled the relation of its data to the Christian faith and how later an increasing breakdown in this relation was thought by many to have been made final by the advent of Darwinism. The measure of a synthesis is not its duration but its donation. How much do we retain today?

As the 19th century begins Neptunism is the dominant geological theory. While technically it was the thesis that all rocks came from cold solutions its apologetic strength lay in its basis as a fine argument for design in nature, it did not need excessively long ages, and successive flooding seemed to allow varied forms of life as distinct creations. Its competitor, Vulcanism, which believed at least some rocks were of igneous origin, had apparently none of these advantages. However, one has but to read Gen. 1 and 2 exegeted in the light of Neptunism as in Kirwan's *Geological Essays* in 1800 to see how forced even this apparent harmony was. The spirit of God moving on the waters bceomes evaporation soon after creation which led to the crystallization of early rocks, and so on. Surely this is isegesis of text into pretext! Indeed at this

time the inspiration of Scripture was defended on just the grounds of this supposed agreement with geology since certainly ordinary Jewish literature could not anticipate this. Some even went so far as to assume God *and* Scripture could be perfectly deduced from geological argument. But in 1802 we find Playfair defending Vulcanism to similar ends but with a more reasonable restriction that science could only illustrate those portions of design and purpose appropriate to its realm. His thesis did, however, lead to agnosticism about the time and nature of creation as we cannot know more than the laws operating since then which are those of the present.

About this time Catastrophism arose as Sir James Hall, explaining Alpine valleys by a tidal wave, disagreed with Playfair that laws of nature have been the same since creation. (Here are the direct origins of present-day flood geology). The subsequent disagreements led by about 1820 to a truce whereby Scripture was no longer connected in detail to geology but where it sufficed that there be no contradictions with Moses' more detailed (sic) account. Much present Christian thought here is the offspring of this.

Wm. Buckland and Cuvier the paleontologist in the early 1820's developed Catastrophism into a sequence of universal deluges following the rising of continental areas and mountain belts. After each, new life was created. All this was used for a great argument for design, for the interdependence of life and the environment, and for the manifest destiny of Britain with its bounty of economic minerals. It was Buckland also who raised the 'ages-day' interpretation of the creative week to popularity. It was he too who argued that deviations from general natural laws was God's way of showing us Him immanence. But does it not argue rather for a more Newtonian occasional interference?

But the facts were slowly causing an attrition in the Catastrophist camp and Lyell rose to generalize the views of Hutton and Playfair into his principle of uniformity which taught the constancy of the tempo and energy of present laws as we move into the past. "If Buckland feared that without cataclysms there was no God, Lyell was as fundamentally apprehensive lest, without uniformity, there be no science", Gillispie remarks.[33] To be sure such a view of uniformitarianism is much too simple for today[34] and this may be illustrated by his inability to reconcile this with any thesis of evolution in past life.[35]

Lyell did not go unchallenged. Sedgwick, one-time president of the Geological Society, claimed uniformitarianism to be Ptolemaic, arguing that it rejected belief in all not seen or done by us. It circumscribed God's actions to our ignorance of them. Conybeare also argued that the degree and intensity of past causes has changed—a quite modern view!

In 1844 Chambers wrote his *Vestiges of Creation* in which he held that primitive and simple life developed by very tiny steps into the more complex. The "tiny steps" were from one specie to another. The writer anticipated, and got, violent reaction so that he kept his name secret for 40 years. Sedgwick claimed it annulled all distinction between physical and moral, thereby degrading man. He wrote in like vein to Darwin in 1859. Hugh Miller argued that the strata showed no such simple pattern and suggested a degradation theory instead. Others claimed it did away with design but Miller argues that it does away with much more—man's responsibility and immortality.

But interest in evolution was growing.[35] Whewell and Brewster carried on a debate even before the publication of Darwin's work on the possibility of life on other planets. When Darwin published his *Origin* in 1859 it was to be only 25 years or so before most of the intellectual community had accepted it. With the plethora of books and articles on the issue appearing in this centenary year I need not recall the detailed events. But let us very quickly complete our "survey with the big brush" by noting the impact evolutionism had on various areas of thought. Just as there are philosophies *of* science which change with our ideas of nature and our relation to it, there are philosophies *from* science which stop with the scientific view from which they grew even when it is long past. Such as the latter are most of the subsequent trends in evolutionism as a creed.[36]

For one thing, evolution was used to argue for everything from the most extreme forms of capitalism to Marxism. It had an impact on historical scholarship as in Andrew White and Wm. Draper and the massive field of philosophies of history.[37] Certainly it had tremendous impact on philosophy where pragmatism, Smut's holism, Spencer, Bergson, Alexander, Morgan, de Nouy, and modern organicism were saturated with it, but in vastly different ways.[38] But its greatest impact was on theology.[39] This ranged from the extremes of the Scopes trial to modernism of the early decades of our century. Some used it to defend imperialism and racial superiority. Others construed it as a basis for optimism and humanitarianism. Some rejected it entirely as in Chas. Hodge's, "It is atheism." Still others tried thereby to reconcile theology and science or develop a new theology based on evolutionary science, so that by 1890 evolution was fully recognized by the leaders of the liberal movement. History became the evolution of divinity out of humanity, the evolution of the kingdom of God on earth. God became immanent in nature; what Jesus was man is becoming, and sin is mere lapse into man's past animal nature.[40]

Our survey of the past is now complete. The certainties of one age have become the problems of the next and temporal prejudices have apparently often

been mistaken for timeless convictions. Well might one cry with Kierkegaard, "Lord, give us weak eyes for things that are of no account, and clear eyes for all your truths." Yet surely my peregrinations will have been most odious if we do not learn. We cannot operate on the strange assumption that by not taking thought we can add one cubit to our stature. Let us ponder a while.

We have learned first the dangers of the Thomistic conclusion that man, unaided, can find God. Apart from the problem it immediately raised as to how much we might find and the logical question of whether one can indeed accept the traditional arguments at all (now almost universally settled in the negative by philosophers outside of Thomism)[41] there is the additional broader stricture that sinful man of himself cannot know God. As a man sows his axioms so shall he reap his deductions. No one can validly *deduce* more than that with which he begins. If he does not start with God as sovereign he will not end up with Him. Nor can a man *induce* the Biblical God from observations in nature. A God who *might* act in nature doesn't prove that He did. Also, God is not exhausted in His natural revelation and it is thus insufficient to give all truth about Him as Hume pointed out long ago.

But there is a greater difficulty here yet. If we look at nature we must evaluate the evidence for God on our prior criteria of judgment. But this has led, in some philosophers, to the problem of evil implying a finite God and in others to the scepticism of Russell's *Free Man's Worship*. Our criteria can only come from God Himself.[42] If we accept them knowingly we then have *already* accepted God as speaking in Scripture. If unknowingly, any agreement we find with what a Christian finds in nature is a product of a violence we do to our own prideful and self-centered assumptions in accreting to these items from a Christian heritage or melieu.[43]

I believe we must say the same about the history of Rationalism. Its many different Gods, all supposedly self-evident, and its great difficulty in deriving particular events from its generalities only reveal what we have said above.[44] Sinful man wards off the revelation of God. He is blind and cannot see, but he is responsible for this as his life and world-view are the antithesis of the acceptance of God as sovereign. He cannot isolate his reason from his life and faith consistently, so how may reason find the God his world-view denies? (The same applies to the Christian. How can he presume to find the God who speaks through Scripture and in Whom he believes by isolating his reason and arguing independently to God thereby? He will conclude either with a God in his own image or surreptitiously he will introduce elements of Christian theology and end with the God of Scripture only to that degree. Neither is satisfactory.) Descartes said that it was inconceivable that God would implant reason in man so as deliberately to lead him in error. He was right. Man is the source of the error.

Empiricism likewise failed. Pretending to work out from experiences it failed to find the ordered world of God with which it needs must start. Consistency demanded that it fragmentize nature. Indeed it ended up by distintegrating the self! Our point then is crucial. Only by *starting* with God as person, as creator and sustainer; with man as made in His image but now fallen; and with the fact of moral and physical evil can one ever correctly see the world. Wm. Temple, in his great study of natural religion and theology, remarked that the primary assurances of religion are the ultimate questions of philosophy.[45] May I interpret this to mean that one must move from a theistic starting point to philosophy and science? Then, and then alone, will we find the confirmation of the original belief.

Let us now turn to the implications of this. There are never any facts without interpretations thereof or organizations of these without prior working judgments. A truly Baconian science is thus a figment of the imagination. Nor can man-centered interpretations ever assume the necessity of universal assent. Certainly they have never got it! The system of the Cambridge Platonists has come and gone. The arguments from design of Ray and Newton, of Butler and Paley, of the Bridgewater Treatises, of Kirwan and Playfair, or yet again of an Eddington or a Morrison, apart from their often contradictory nature have never achieved more than transitory acceptance.[46] They special plead,[47] their God is finite and changes with their judgments about Him, and when consistently argued becomes merely a personification of nature. Like the camel he partakes of that awkward look as if assembled by committee.[48]

We must also reject the claim that knowledge in the Christian is arrogance. Where the unregenerate should see God but refuses the Christian can see God and give meaning and purpose to the scientific work that he does. Indeed, in the mind conscious of God in the world, there is an obligation to study God's hand in every realm of nature and life. Where sin caused the distinction of special from general revelation, the Christian *must* use the former to restore perspecuity to the latter.

But we must therein correctly construe this relationship of Bible and nature. Science is not the judge of Scripture. The exegetical crudities of Neptunism or Catastrophism or the forced constructions of many modern writers are to be abhored. While the Bible does not settle the operational usefulness of theories in any science it does require that the construction of these assume as axiomatic the propositions of God's

special revelation. The unregenerate, in violence to the incoherence of their theological assumptions, derive brilliant systems in spite of themselves but the believer's choice of these, or of others of his own construction, must be couched in the framework of theistic presuppositions. Thus a thorough mechanistic theory of nature may be quite useful to Christian or non-Christian but whether it is interpreted providentially, deistically, pantheistically, or atheistically depends on what one believes to begin with.[49] The apparent nature of the world neither proves God nor the inspiration of passages of Scripture supposedly teaching this assumed nature, nor the antithesis of these, but rather it confirms our view of God and His Word and reveals the incoherence of any other view.

We may now suggest the basic structure of an evangelical philosophy of science. Built upon the foundations mentioned and delimited by these, it will nonethe-less be temporal and on-going. It must not only speak to the problems of its time but it must see God's revelation in nature as unfolding under its scrutiny. How prone we are to stagnation! Much current Conservative literature in the field could have been written centuries ago. If this were because of lasting truth no one could gainsay the import, but much of it is the error of the past couched in new material. What is the placing of God in some fourth dimension but a ridiculous modern deism? What is a God in the indeterminancy of atomic physics, the "deft touches" of Milne's cosmology, or the gaps of the fossil record but Newton and Cuvier all over again?[50]

Surely our scientific philosophy must retort strongly to the current stress upon the general revelation of God in much contemporary philosophy due to its de-emphasis of Scripture. Scripture must be seen as the unique revelation of the Archimedean point of truth which is God. Of course it must be interpreted with great care. Interpretation must try to be ahead of, not a generation behind, what is lasting in science. Unfortunately hermenutical principles do not arise entirely in Scripture and sometimes the development of human thought has had to lead us to re-examine and revise specific exegesis. We must walk carefully between the appearance of continually fudging Scripture to fit scientific advance and a too-broad interpretation of the text. But if we must err let us err toward the latter, giving every possible latitude in interpretation apparently consonant with inspiration and the internal unity of Scripture. And then let us clearly recognize that, of scientific theories thereby given latitude, we *pick* the theory on the grounds of its suggestiveness of future experiment, its ability to organize data, and its coherence with our entire world view.[51]

Of all the tasks for hermeneutical theory and Christian philosophy of science, this tension and its exploration and partial resolution are the greatest. The Jew reading the creation account saw it elaborated in whatever knowledge of nature he had; early 19th century geology and biology saw Genesis illuminated therein; and we see it amplified by our data. God's revelation in Scripture must be sufficient to present *all* that God desires in any age. And what is it that changes from age to age but insight into the meaning of Biblical statements and our knowledge of nature? The great truths of God's nature, plan, and purpose always speak with sufficiency in Scripture but further insight comes by patient linguistic research and scientific study.

But the coin has another side. Science, by its very nature, assumes a regularity in nature.[52] It develops descriptive theories and constructs prescriptive models or laws into which it organizes nature.[53] With time both change, but always they will exclude certain things. For example, miracle cannot nose into the tent via probability considerations or indeterminism[54] and even the Christian rejects miracles in his working model of science and places them only in a non-predictive model embracing God and nature. Creation cannot steal in through entropy or arguments about design and first cause. Neither logic nor scientific working models can settle the argument of whether the universe has or has not a finite age. Only a broader scheme inclusive of God and His revelation can do this. The origin of life may be discussed and even achieved but this can never *prove* that life did originate in any given way in the past. A Christian may construct physico-chemical descriptions of the origin and development of life but at best they are only highly possible. His thesis that God is its source and sustainer is a model in another level of discourse including the scientific models as possible manners in which we can describe God's actions. Indeed here is the major point regarding a Christian philosophy of science.

The Philosophy of Science can never be ultimate to the Christian. Indeed it can never consistently be ultimate to the non-Christian. It is a discipline organizing the varied sciences and suggesting techniques of exploring its field of study. It does this with whatever foundational principles it desires, but only one group can consistently integrate with all we know and are. For the Christian these are the understanding that God, as creator of the universe, is to be seen in it and that it is a universe sustained in law by Him and also the understanding that these principles we arrive at through theology. But theology itself is not ultimate as it is, in turn, a special science dealing with the propositions of Scripture. What then is ultimate for us? It is a philosophy embracing theology, philosophy of science, and system organizing the other disciplines of human experience; a philosophy grounded in the revelations of Scripture. In other words, a truly Christian philosophy must *begin* with the self-disclosure of God.

Thus we see that at the root of all we know and are lies God. God is thus revealed in all that is His handiwork, but because of sin His special revelation in Scripture becomes the only light by which this may be seen. Hence the propositions of Scripture become axioms in a truly Christian Philosophy. It is the role of theology to attempt organization of these but no doctrine or creed can be accepted as final. Finality lies only in the discreet statements of Scripture. The organization of these is ours and hence liable to error. Theological statements, therefore, are to be continually appraised both from the side of improving our knowledge of what the Bible really says and from the side of semantical clarification and improved ability to encompass the statements of science. Our faith is never a faith in theology. Nor is it a faith in science. It is a faith in God as creator and sustainer of all that is. Indeed, it is a mistake, I think, to view theology or science as an aid to faith. If we have no faith in God to start with we will never get it by any human study and if we *do* have faith, we will only find in the varied areas of experience that which we expect anyway.

But there is one last point. While theological models (or if you like systematic organizations) by their very nature try to organize the revelations of Scripture which cover every area of God's creation. This does not imply that they thereby settle disputed questions in these areas. The operational principles making for fruitful scientific endeavor have their own realm of discourse and this does not treat of origins, of purpose, of meaning. Both make a mistake when they overstep their appropriate bounds.[55]

And thus we finish. But this is but the beginning. I have done very little with respect to exploring in detail the relations of theology to science, of the semantics of theological statements and of scientific statements,[56] with the precise place of teleology and miracle, with the social sciences and their relationship to those physical, with the relations of the humanities and the sciences, with the nature of mathematics, with the sociology of value judgmens in science, or with the technical data of and staggering quantities of precise philosophical studies of science. The work for Christians here is immense and most that I have seen is a diarrhea of promise and a constipation of fulfillment. Let us, however, not become enthusiasts but rather enthusiastic. For the former, as you have heard, is a person who, having completely lost sight of his objectives, redoubles his efforts. Our objective must never be forgotten and our Christian philosophy must guide our every step!

References

1. J. B. S. Haldane, *Facts and Faith*, p. 107.
2. John Baillie, *Natural Science and the Spiritual Life*, p. 6.
3. See C. A. Coulson, *Science and the Idea of God.*
4. Quoted in his *Belief and Unbelief Since 1850.* James Orr also pointed out that perhaps the conflict of science with religion lies more in the general outlook of science than in its specific results.
5. *Speculum Mentis*, p. 148.
6. W. A. Whitehouse, *Christian Faith and Scientific Attitude*, p. 143.
7. *Doubt and Certainty in Science*, p. 149.
8. "To seek an integrative philosophy and neglect the Christendom out of which science and its consequences have sprung . . . goes far to explain and to perpetuate our present distress" as Chas. Raven remarks somewhere.
9. H. E. Kirk, *Stars, Atoms, and God*, p. 76.
10. Quoted from *Nature, Man and God* in C. A. Coulson, *Science and Christian Belief.*
11. E. A. Burtt, *The Metaphysical Foundations of Modern Science*, p. 226.
12. Herman Bavinck, *The Philosophy of Revelation*, p. 103.
13. If I may misquote Morton White, *Religion, Politics and Higher Learning*, p. 33.
14. John Clark, *His*, June, 1959.
15. Quoted in R. Westfal, *Science and Religion in 17th Century England*, p. 39.
16. Quoted in C. A. Coulson, *Science and the Idea of God*, p. 16.
17. See his letter to Christina in S. Drake (ed), *Discoveries and Opinions of Galileo.*
18. See R. K. Merton, *Osiris*, 1938, pp. 360-632.
19. Quoted in R. Westfal, *op cit.* Richard Baxter also wrote against the arrogance of testing God and the Epicurean atomism of the time. "They cut off and deny the noblest parts of nature and then sweep together the dust of agitated atoms and tell us that they have resolved all the phenomena of nature." p. 23.
20. C. C. Gillespie, *Genesis and Geology*, p. ix.
21. *Ibid.* p. x.
22. Compare here Prolusion 7 of Milton's *Paradise Lost.* "When I behold the goodly Frame, the World of Heaven and Earth consisting, and compute their magnitudes, this Earth a spot, a grain, an Atom with the firmament compared, and all her numbered Stars, that seem to rowle Spaces incomprehensible merely to officiate light around this opacous Earth, this punctual Spot, one day or night; in all their vast survey useless besides, reasoning I oft admire, How nature wise and frugal would commit such disproportions."
23. In the *Optiks* we read: "The main business of natural philosophy is to argue from phenomena without feigning hypotheses, and to deduce causes from effects till we come to the very first cause, which certainly is not mechanical." And again we read, "Whence is it that nature does nothing in vain?" Compare this with Sir Thomas Browne's creed in *Religio Medici.* "Every essence created or uncreated, hath its final cause and some positive end both of its Essence and Operation. This is the cause I grope after in the works of nature; on this hangs the Providence of God." (I, 19).
24. *Op cit.*, p. 24.
25. And cannot we see Hume gleefully agreeing later as for him, at best, God can be considered to be only as great as the universe is construed to reveal.
26. See H. G. Alexander (ed), *The Leibniz-Clarke Correspondence*, 1956.
27. Westfal, *op cit*, p. 202. We may note here Paley's later comment that astronomy might, by the perfection of its processes, lead to a neglect of God as things too trivial led us to self-sufficient principles and not to a skillful Will behind them. However, he claims that after studying anatomy we may then turn to find the comparative sublimity of God in this area of nature. *Natural Theology*, pp. 260-279.
28. "In his drive for a rationally demonstrable religion he excluded the spiritual element in Christianity." Westfal, *loc cit.*
29. *The 17th Century Background*, p. 126.
30. Ray, *Wisdom of God in the Works of Creation;* Paley, *Evidences of Christianity* and *Natural Theology* (so well known to Darwin as a youth); and Butler, *Analogy* (for critiques from quite different perspectives see A. Duncan-Jones, *Butler's Moral Philosophy* and C. Van Til, *Christian Theistic Evidences*).
31. See John Toland, *Christianity Not Mysterious* and

Pantheisticon; Tindal, *Christianity as Old as the Creation;* Woolston, *Six Discourses on the Miracles of Our Savior,* and Morgan, *The Moral Philosopher.*

32. *A History of England in the 18th Century,* II, p. 571.

33. *Op cit,* p. 121.

34. See R. Hooykaas, "The Principle of Uniformity in Geology, Biology, and Theology," *Trans. of the Victoria Institute,* 1950.

35. Though he believes all forms of life to have been around since creation many forms he considers to have not fossilized in the early history of the earth, thus we think they appeared late. However, he is inconsistent here, as he argues from the absence of fossils to the recent origin of man.

35. See articles in the *Scientific American,* May and February 1959; in *Endeavor* of April 1958; in the *American Scientist,* December 1958; also Jan Lever, *Creation and Evolution;* L. Eiseley, *Darwin's Century;* the *Journal of the History of Ideas,* June 1958; Ayer (ed), *Ideas and Beliefs of Victorians;* Fothergill, *Historical Aspects of Organic Evolution;* Darwin, *Autobiography;* and Clark, *Darwin, Before and After.*

36. See particularly S. Persons, *Evolutionary Thought in America; The Antioch Review,* Spring 1959; R. Hofstadter, *Social Darwinism in American Thought;* and E. A. White, *Science and Religion in American Thought.*

37. See any of the multitude of works and articles available in historiographical survey. Stern, Dray, Munk, Renier, and Geyl have all excellent studies. See also articles in the *Christian Scholar,* March 1957, and in the *Personalist,* Autumn 1956.

38. Wiener, *Evolution and the Founders of Pragmatism;* M. White, *The Origins of Dewey's Instrumentalism;* and E. A. White, *op cit* all discuss pragmatism and evolution. *Main Currents in Modern Thought,* a bi-monthly journal and G. Cannon, *The Evolution of Living Things* are defenders of a somewhat teleological organicism.

39. See Ginger, *Six Days or Forever,* 1958 and the article in the January issue of the *Scientific American* for discussions of the Scopes trial. See also David Lack, *Evolutionary Theory and Christian Belief,* 1958; Jan Lever, *op cit;* E. A. White, *op cit;* and Ira Brown, *Lyman Abbott.*

40. As in C. W. Sajous, *Strength of Religion as Shown by Science,* 1926, where we find the fall becoming "a solemn plea to mankind to beware ofthe animal instincts which the animal inheritance of the body includes." A recent writer states also, "Original sin is the mark of the beast from which we have come, still lingering and still to be overcome. It becomes sin only when man has reached a stage where he was conscious of choice and chose the lower part". See Wallace, *Religion, Science and the Modern World,* 1952.

41. Though some still do. See S. Hackett, *The Resurrection of Theism;* J. C. Monsma, *The Evidence of God in an Expanding Universe;* and Cressy Morrison, *Man Does Not Stand Alone.* Of course, for Catholics, the Vatican Council of 1870 said God could be *known* through nature and the anti-modernistic agreement of 1910 interpreted this to mean that God could be *proven.* However, some Catholic writers assume science incapable of this. "I cannot agree . . . that physical science within its own universe of discourse as understood by itself can grasp final causes. The force of the data presented would seem to be that physical science is dealing with data which are not entirely explainable within the framework and method of science itself, and that for sheer explanation a discipline superior to physical science is needed." *Proc. Amer. Catholic Philosophical Assoc.,* 1952, p. 195. For Catholic discussion of science see H. J. Koren, *Readings in the Philosophy of Nature,* 1958; H. Van Laer, *The Philosophy of Science* and *Philosophico-Scientific Problems;* A. van Melsen, *The Philosophy of Nature,* 1954: and Kane et al, *Science Synthesis.* See also P. J. McLaughlin, *The Church and Modern Science,* 1957 and Hauret, *Beginnings.*

42. Gordon Clark in Carl F. H. Henry, *Revelation and the Bible,* points out that even a sinless Adam had to have God speak. Note also Berdyaev's remark that "philosophy is anthropocentric but the philosopher ought to be theocentric," in *The Beginning and the End.*

43. T. H. L. Parker, *Calvin's Doctrine of the Knowledge of God,* 1959.

44. E. J. Carnell states, "Whereas philosophy seeks to explain the heart by a God gained through the examination of nature, Christianity seeks to explain nature by a God gained through an examination of the heart." *A Philosophy of the Christian Religion,* p. 274.

45. *Nature, Man and God.* The Gifford Lectures of 1956. For further elaboration of my point see Herman Bavinck, *The Philosophy of Revelation.* For much more detailed criticisms of Thomism, rationalism, and empiricism see G. Clark, *From Thales to Dewey;* C. Van Til, *op cit* and his *Apologetics;* and the magnificent *A New Critique of Theoretical Thought* by H. Dooyeweerd.

46. See the fascinating study, *Revelation and Religion,* by H. H. Farmer.

47. As R. E. D. Clark put it in his *Scientific Rationalism and Christian Faith,* "The world is very largely colored by our own spectacles. The 'rationists' are careful to put on dark spectacles when they are arguing with theologians, but very rosy ones when they are dreaming of evolution or world utopias." p. 86. But he then turns around and does it himself. See his *Creation,* 1953.

48. Bernal, in his *Science and Ethics* rightly claims of such arguments that God survives only to explain the origin of the universe or of life. He is thus just a vague form: a name for our ignorance.

49. "The reason why the Victorian world contained nothing corresponding to religious experience is then obviously because religious experience had not been taken into account in building it up." Herbert Dingle, *The Sources of Eddington's Philosophy.* (I do not agree, however, with what Dingle thinks this implies.) See also S. Stebbing, *Philosophy and the Physicists* for a critical analysis of the views of Eddington and Jeans.

50. Ernst Cassirer, *Determinism and Indeterminism in Modern Physics,* states, "Ethical freedom . . . (where ethics takes shelter in gaps in scientific knowledge) . . . would somehow be tolerated in the world but it could not exert any effect, any true power; it could not move anything outward. Yet . . . everything depends on this outward influence." p. 198. Is this not similar to our point?

51. As d'Abro points out in his *Evolution of Scientific Thought,* introducing *ad hoc* hypotheses continually demands we keep doing this with each deviant case. This removes the predictability from science. We must instead choose new axioms giving simple and apparently consistent results. See p. xv. See also G. Clark, *op cit,* p. 209.

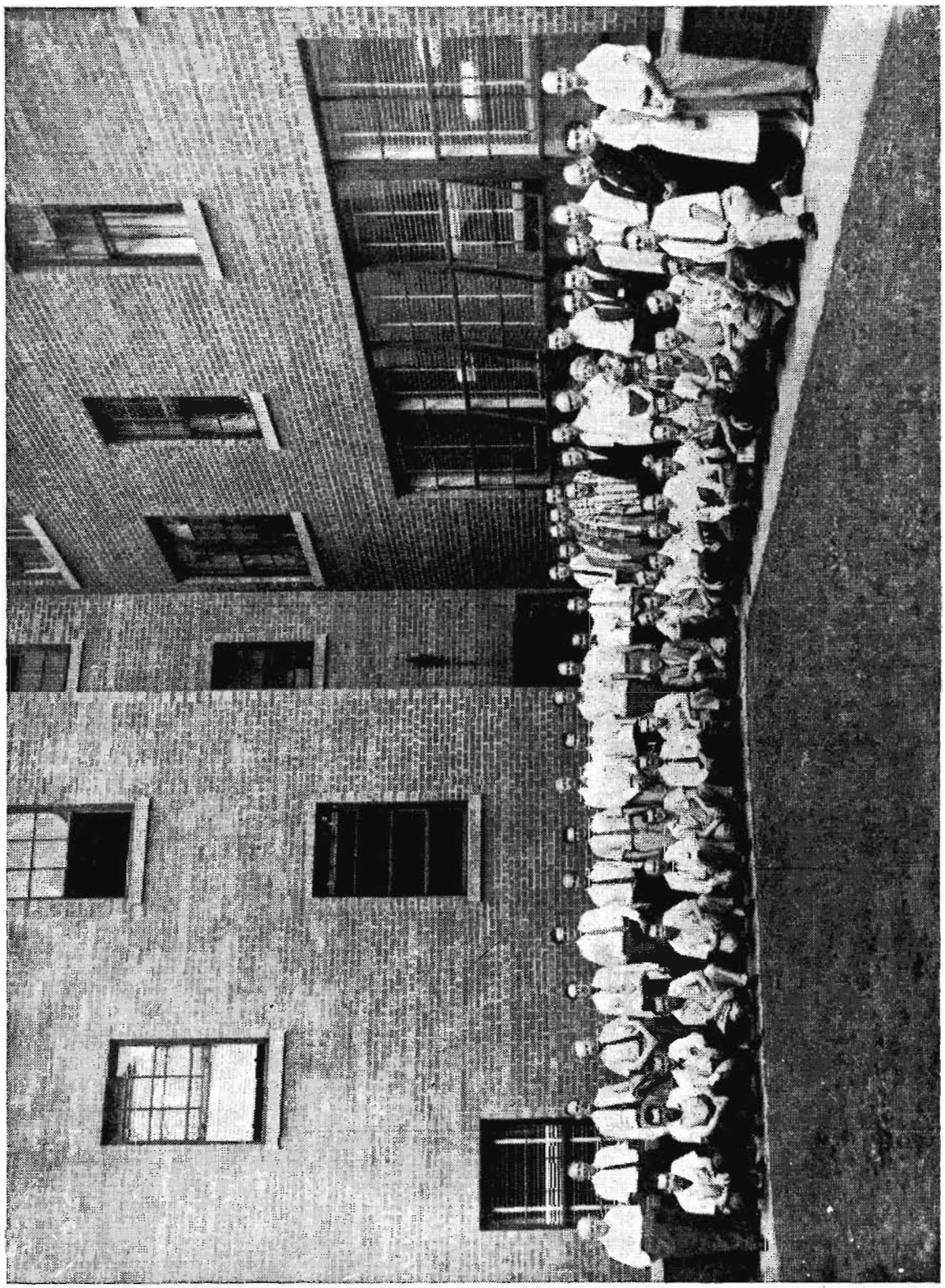
52. And the Christian must not reject it with impunity at every desire to argue progressive creation or a reluctance to accept age determinations. It is very easy to end up in solipsism!

53. On the theoretical structure of even mathematics see Max Black, *The Nature of Mathematics* and G. Berry, "Paradox and Logical Uncertainty", *Philosophical Forum,* 1957. On problems with induction see S. F. Barker, *Induction and Hypothesis.* For theory construction see P. Frank, *A Philosophy of Modern Science;* H. Mehlberg, *The Reach of Science;* and J. G. Kemeny, *A Philosopher Looks at Science.*

54. See Ernst Cassirer, *op cit,* pp. 203-205 and David Bohm, *Causality and Chance in Modern Physics,* 1957. On philosophical issues in quantum mechanics see S. Korner (ed), *Observation and Interpretation.*

55. For a similar discussion see, in increasing order of complexity, J. M. Spier, *What is Calvanistic Philosophy?* R. J. Rushdoony, By *What Standard?* J. M. Spier, *An Introduction to Christian Philosophy;* C. Van Til, *op cit;* and H. Dooyeweerd.

56. A great deal of work is going on here though it leaves much to be desired in most cases. See T. R. Miles *Religion and the Scientific Outlook;* Flew and MacIntyre (eds), *New Essays in Philosophical Theology;* M. Foster, *Mystery and Philosophy;* B. Mitchell (ed), *Faith and Logic;* E. L. Mascall, *Existence and Analogy;* S. Toulmin et al, *Metaphysical Beliefs;* and I. T. Ramsey's *Religious Language* and *Miracles.*



Group At 1959 Annual Convention

*American Culture In The Light Of Scriptural Principles: Introduction**

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In his Foreword to *The New Testament in Modern English* J. B. Phillips states that one principle of a good translation is that it produces in the hearts and minds of the readers "an effect equivalent to that produced by the author upon his original readers."[1] While no Bible translator would claim completely successful achievement of this goal, it must be a guiding principle of his work if it is to make a lasting impact upon the contemporary generation. The translator's task is to understand as fully and deeply as possible what the New and Old Testament writers had to say and then write it down in the language of people today as if he were the Biblical author writing the particular message from God to his contemporaries.[2]

This principle holds true not only in the direct translation of the Scriptures but also in the interpretation of them in their references to the way we ought to live and move and have our being in twentieth century America. We need to see, under the guidance of the Holy Spirit, the way in which Scriptural principles bear upon our personal lives and upon the society in which we live. The repetition of time-worn clichés will not suffice for this purpose.

When the social scientist refers to a *culture,* he generally has in mind the totality of the material and non-material patterns and products of human behavior. American culture thus includes the property, tools, technological inventions, social customs, values, symbols, institutions, systems of human relationships, and patterns of social interaction of the American people. The totality of what is socially transmitted from one generation to the next is included in the culture of a society.

Man is so earth-bound and culture-bound in all of his superficial judgments that he can rationalize the most egotistic, selfish, and sinful aspects of his behavior. Hence God instructs us to prove *all* things and, having done so, to hold fast that which is good and to abstain from all appearance of evil (I Thes. 5:21-22)

God's Word judges every culture of man, including our own. The common assumption that "the American Way of Life" is basically Christian and that all deviations from "Americanism" are un-Christian may indeed be a teaching of the Evil One who comes disguised as an "angel of light" to deceive (if it is possible) even the very elect of God. We who are interpreters of God's message to twentieth century man must develop the faculty of self-criticism under the Holy Spirit's guidance and apply it to the way of life of our own generation, our own nation, our own institutions, including our evangelical Christian churches and even the American Scientific Affiliation. As the prophetic, purifying, living Word of God brings His judgment to bear upon our situation, we shall find, even as did the seven churches of Asia in the early days of Christianity (Rev. 1:20-3:22), that God's commendation rests upon certain of our practices while His purging judgment condemns others.

Human societies and cultures vary in time and place. We are easily made aware of the latter by our recognition of the differences between American and Indian society or between the institutions of China and Australia, but it is equally true that American society is not the same now as it was in 1620, 1776, 1860, 1914, 1933, or even 1945. Generational conflict and even religious schisms are no doubt due in part to a failure to recognize the impact of social change upon social organizations, ideologies, and activities of man.

Just as the expansion of scientific knowledge is breaking down limited conceptions of the size and nature of the physical universe, the social sciences are breaking down our limited, culture-bound interpretations of human nature and human social relationships. They can help us who are Christians to rise above many of our limitations so that we can see our society from a perspective which is closer to the judgments our our infinite, omniscient God.

Many images of American society have been produced in the social sciences, for any scholar and even any discipline has only a partial, finite view of the totality that is America. Social scientists who not only are familiar with these portrayals but who also believe in and understand Christian norms are in an ideal position to evaluate human society in terms of these Christian values. Their translations of the Gospel and its Christian ethic into practical meanings for

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our culture and age can clarify God's message of truth for the world of our day.

I am sure the contributors of the excellent papers of this program all agree that their conclusions are tenative and subject to change with the development and application of new techniques of research and instruments of precision in their respective social sciences as well as with new insights emerging from increased understanding of the Christian Scriptures. They would be among the first to insist with the chairman of this symposium that these papers, synthesizing much material from the work of other scholars and reflecting social science theory in a value framework, are not "pure" social science (if indeed there can be any such thing!) These papers are rather in the realm of applied science or social philosophy.

Many problems are implicitly posed in these papers. Careful application of the scientific method can illumine these and provide a basis for empirical research on topics ignored by secularists and shunned by most fundamentalists and evangelicals. If but one or two such projects are stimulated by this symposium, the writer will consider the effort and work involved in it to have been worthwhile.

References

1. J. B. Phillips, *The New Testament in Modern English,* New York: The Macmillan Co., 1958, p. vii. The other two principles he stresses are that the translation must not sound like a translation at all, and that there should be the least possible intrusion of the translator's own personality and unique style, so that the original author's work is not changed by the translator's own strong style.
2. *Ibid.,* pp. vii-x.

New Testament Political Principles And American Constitutional Principles

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It is sometimes asserted that there is a positive relationship between the demands of Christianity and the institutions of the American constitutional system. This paper explores this assertion by comparing the political principles of the New Testament and the principles of the American constitution. In church history there has not been continuing agreement about the political principles of the New Testament, and in American politics there have been repeated and sharp differences over the nature of the constitution. Thus, the first task here is to list and describe those political principles which can be found in the New Testament and those constitutional principles which are a part of American political life. Obviously, the conclusions concerning the interrelationships at issue will be determined in large measure by what is included in these two lists. In light of this, an effort was made to arrive at the two lists by independent processes. The New Testament political principles which follow were derived from the scripture and from writings which were rarely related directly to American political life, while the principles of the American constitution were arbitrarily limited to those included in several typical and widely-used college textbooks on American government. This means of selection does not insure that the New Testament principles described here were not in fact the product of sub-consciously held conclusions which were brought to the task, but the selection processs reflects a conscious attempt to minimize the likelihood that prior conclusions determined the nature of the problem.

Section 1: *New Testament political principles*:

In one sense there are no New Testament political principles. The New Testament writers comment very briefly on political matters in treating a few specific problems. They do not write political theory. We take their statements concerning the Roman government or its agencies and apply them to governments everywhere. We assume that this abstraction is legitimate, and probably the assumption is correct, for some of the New Testament's statements concerning government are couched in general terms. However, the political context of New Testament writings was radically different from the political context of America in 1789 or 1959. For example, the extent of democratic responsibility could not have been an issue for a Jew in Christ's day, and the New Testament does not discuss it. Today, the extent of democratic responsibility is an issue for many Christians. Our task is, therefore, difficult, for statements made about one kind of government cannot be applied to another kind of government without great caution.

This is not the only problem related to these political principles. There is also the difficulty of separating the political interests in the New Testament from other interests which are closely allied. Principles touching the nature of God, man, society, the family, law, and the church, among others, have political ramifications, and all need to be studied to develop a full Christian view of political life. Here, however, I will treat only those New Testament principles which directly affect the existence of the state and the scope of its powers, for these most concern constitutional form. This delimitation is legitimate if it is accepted that all scriptural principles are consistent with each other.

There are three basic New Testament political principles that affect state organization and the sphere of state action. The first is this: human government is approved by God. Put negatively, anarchy is not a scriptural option. The most complete single passage supporting this is in Romans XIII. This passage makes it clear that government properly uses coercive power to implement its will, and it properly can require public obedience to law. Might it be argued that state authority is ordained only where a state exists, and anarchy is permissible where governmental institutions are nonexistant? I think not. The passage states that the ruler "is the minister of God to thee for good."[1] Government is ordained because it is necessary, not because it exists. It is an instance of God's provision for man's need. As such, it possesses great dignity and deserves the deepest kind of respect.

The second basic New Testament political principle is this: human government can act legitimately only within certain limitations. These limitations must be amplified in detail and can be described in four categories.

The most obvious limitation on government is defined in what Oscar Cullman calls "religio-ideological" terms.[2] This denies the government the power to require idolatrous worship from its subjects. If the government makes such a demand, its action is satanic. The fullest single passage concerning this is the denunciation of certain actions of the "Roman" government in Revelation XIII.

The second of these limitations is the direct and implicit New Testament denial that any governmental unit can legitimately forbid the preaching of the gospel. The attempt of the Sanhedrin to end the preaching of the apostles was met with Peter's answer, "We ought to obey God rather than men,"[3] and the lives and deaths of the apostles testify that they did not accept state action that would quiet their testimony.

This limitation on the state's authority is not refined by the New Testament writers to any advanced level of legal exactness. It would be dangerous to conclude that the apostles were demanding any sweeping kind of religious freedom. What if some Christians, in spite of Peter's and Paul's admonitions, were insisting on the basis of religious convictions that governments need not be obeyed, taxes need not be paid, and violent revolution was a Christian duty? Would the apostles denounce Roman laws and actions aimed at curbing the teaching of such doctrines? The severe criticisms by Peter and Paul of anarchical tendencies in the church make me think otherwise.[4] Would the apostles have demanded freedom for the propagation of some new pagan cult? Would they have refused to cooperate with magistrates who controlled the time and place of religious gatherings for public convenience? We can only speculate on such questions, for the demand to preach the gospel need not have been a sweeping insistance on religious freedom. It might be argued that logically the apostles' demand implied some sort of general religious toleration or freedom. But this logic has been denied frequently and forcefully by leading churchmen and denominations. Therefore, such a deduction should be drawn only with considerable hesitation. In this matter we can assert only this with confidence: the apostles insisted that, in spite of governmental requirements to the contrary, they would preach the gospel.

The third limitation in government is not directly stated in the New Testament. It stems from the potential conflict between the state and other God-ordained institutions. It is possible to argue from the total impact of many scriptural references that the family and church can lay claim to divine ordination.[5] Since their proper authority and the state's proper authority bear on some of the same social relationships, it is conceivable that any one of them might lay claim to some power which could reasonably belong to the other, and some such claims might strip the other agency of the very means of and reason for its existence. Such a claim would be excessive, because it would be destructive of a God-ordained institution.

It is easy to read more into this limitation than is legitimate. The limitation does not mean that in some areas there can not be mutual cooperation. A court may well make the family responsible for the discipline of a minor. The limitation does not mean that the institutions of a less inclusive nature cannot be controlled in some measure by the more inclusive. The church and the family must be properly fitted into the total order created by the state, otherwise a kind of anarchical challenge would permanently threaten the state. In saying this, it is implied that in some ways, perhaps very important ones, the state can mold these less inclusive institutions. The family might be required by state action to take varying forms, and the church might be subjected to certain controls on such matters as organization and property

ownership which do not directly affect its unique spiritual mission. Also, there is no warrant to include all kinds of institutions from vegetarian clubs to railway corporations in the category under discussion. Indeed, I would venture that only the church and the family can be so treated.

The fourth limitation on governmental action found in the New Testament consists of certain moral imperatives. It is clear from Romans XIII and I Peter II that the end of human government is to repress evil and promote good.[6] Christians are told that governments establish a divine order, which must be obeyed for the sake of conscience. This order punishes the wicked and rewards the good. Governmental officials should be supported by prayer so that a tranquil and godly life may be lived.[7] From these statements it has been argued that it is ". . . the just end of the civil State which gives it a sacred character."[8] By implication from this, if the state acts in ways contrary to justice or contrary to certain moral demands, its action at that point is not divinely ordained.

The indirect nature of this argument must be noted. The New Testament does not say expressly that governments are limited by moral considerations. The limit is deduced from the passages just cited, and from the scriptural requirements that individuals must act morally. This means that if the state ordered a person to murder, or bear false witness, or commit adultry, the order would be illegitimate in two ways. First, it would be unjust in itself, as it would violate directly revealed moral imperatives. Second, it would be unjust, because the order would have to be executed by some individual who stood morally responsible to God.

This chain of reasoning seems sound enough, but it opens a Pandora's box of the most perplexing problems. What are these moral limits? Must they be strictly or loosely interpreted? What if the state exceeds them only in one or a few points? Does a higher value permit an immorality with respect to a lesser value? What mode of opposition to an evil demand of the state is legitimate?

Clearly, these questions can be answered only on the basis of the whole Gospel. The problem raised here is that of identifying the bed-rock moral demands of the scriptures which no reasonable Christian can disavow. But there is always a danger that this identification will be biased by the self-interest mankind cannot escape. This self-interest will operate so that individuals will tend to denounce as scripturally unjust or immoral any state actions which affect them adversely or which run counter to their pet theories of how states should be organized and operated. Scriptural passages will be prostituted to prove that the government ought not take such and such action. Examples could be piled up. Some defenders of particular private property institutions appeal to the parable of the talents to prove that 20th century American property law is a part of the essential moral demands of scripture. Some humanitarians point to the parable of the good Samaritan to prove that a particular welfare law cannot be repealed legitimately as it reflects the scriptural requirement of aiding those in need. Such abuses of the scripture should inspire caution when a particular governmental action is measured against the implied scriptural requirement that the state must act justly.

May I suggest some critical questions which might well be asked before a scriptural mandate is used to illegitimatize state action? Is the mandate expressly stated in the scripture? Is it clearly a mandate directed at the state rather than at the individual? Is it certain that it is not so particularized that generalization from it is inappropriate? Is it an isolated statement, or is it frequently repeated? Should the statement be read along with other seemingly contradictory scriptural statements? Does its application relate to man's spiritual life? Short of asking such questions and weighing carefully the answers, a passage like Paul's admonition to the Corinthians to keep their intra-church squabbles out of the courts can become an indictment of human legal systems in general.[9]

To return to the list of basic political principles the third is this: Christian subjects may properly resist the state that exceeds the scriptural limitations to political authority. In Revelation XIII those who did not bow in idolatrous worship are said to be enrolled in the book of life,[10] and we recall that the apostles preached in spite of the Sanhedrin's admonition.[11] The necessity of resistance also follows from the above-mentioned Christian duty to God if the state acts to destroy other God-ordained institutions or if it acts contrary to basic moral demands.

But resistance can be of different sorts, and Christians have long argued over the relative merits of passive resistance and active resistance. John Calvin admonished that, ". . . though the correction of tyrannical domination is the vengeance of God, we are not, therefore, to conclude that it is committed to us, who have received no other command than to obey and suffer."[12] John Knox concluded otherwise.

> The punishment of such crimes as idolatry, blasphemy, and others that touch the majesty of God, doth not appertain to kings and chief rulers only, but also to the whole body of the people and to every member of the same . . .[13]

While it is not necessary for the purposes at hand to try to resolve this old controvery, the problem merits its passing treatment. For myself, I have been helped much by Oscar Cullman on this matter.[14] In the teachings of Christ, the writings of Paul, and the denunciation of "Rome" in Revelation, one consistent re-

frain is carried on in different ways. "All they that take the sword shall perish with the sword."[15] This repeated warning against violence in different circumstances would itself argue against the use of force by Christians who oppose the state. When those passages are coupled with the Sermon on the Mount, the position seems overwhelming.[16] The passages are startlingly direct and unqualified. If there is an argument for violent resistance to constituted authority in the New Testament, it must show why these passages are not pertinent.[17]

This completes my list of basic New Testament political principles. To review: the state is a God-ordained institution serving human needs, its sphere of competence is limited at several points, and some kind of resistance to a state exceeding its competence is legitimate. These principles place the Christian in an inevitable tension. He must show the state deep respect, and he must obey it in all normal circumstances. But also, he must always stand ready to criticize it, and in some matters he must even resist it. He must be a loyal opposition.

Section 2: *American constitutional principles*:

The following list of American constitutional principles was obtained from five widely-used American government textbooks. The books were chosen solely because each included a chapter or section which itemized the principles of the American constitution—not because I agreed with the itemization. Each text offered a somewhat singular list, and, therefore, a synthetic regrouping was made. The principles follow:

First, republicanism;

Second, popular sovereignty and the related principle of the representative form of government.

Third, federalism and the related principle of national supremacy;

Fourth, the separation of powers and its counterparts in American experience—the check and balance system and judicial review;

Fifth, the principles of limited government and constitutionalism;

Sixth, the protection and expansion of free enterprise;

Seventh, the principle of civilian supremacy.[18]

Section 3: *A comparison of New Testament political principles and American constitutional principles*:

The two lists outlined above will now be compared. This is a dangerous task for several reasons: Terminological differences between the lists are great. American constitutional principles were originally framed chiefly in the terms of English law, while New Testament political principles were framed in more general terms. The materials on which the two sets of principles were based were written for different purposes. American constitutional statements were developed to give or to deny specific agencies and officials some governmental authority, while New Testament political writings were largely admonitions to private persons or small groups concerning their behavior in relation to the state. The backgrounds for the writings pertinent to both lists differed widely. The Revolution, government under the Articles of Confederation, State experience, and the American ideas of the era of the Enlightenment helped shape early American constitutional thought. Roman government, a delegated Jewish authority, Judiaism, and the life of a new religious cult were the political milieu of New Testament writers. Given these and other differences, the comparison here proposed is justified only on the basis of two interrelated beliefs: namely, the belief that basic scriptural principles are permanently valid, and the belief that mankind displays some of the same political characteristics in all ages and environments.

On one matter the New Testament principles and by implication American constitutional principles are in complete agreement. Both reject anarchy. This rejection was our first item in the New Testament principles, and it was obviously implicit in the American constitutional principles listed above. While it is true that the textbook writers previously cited do not include this point in their itemizations, the existence of the principles they describe implies that American society rejects anarchy. Indeed, it does so by establishing two levels of sovereign authority. It must be observed, however, that all governmental systems agree with the scriptural demand at this point. On the matter of anarchy, the New Testament, the American Constitution and the Constitution of the USSR are at one. Thus, in observing a positive correlation on this point, we have not noticed anything which would make it possible to claim some uniquely Christian quality for the American pattern.

From this point of agreement, let us move to a point of disagreement. The New Testament allows a person to resist a government that is acting beyond the state's proper limits. As was stated in our third political principle of the New Testament, a Christian under certain circumstances may defy a governmental order. He must preach the gospel in spite of a gag law. He must not worship in idolatry to comply with state demands. He must support God-ordained institutions even if the state attacks them. He must live by a basic moral code even if the state orders him to do otherwise. On these points the Christian may resist the state. But here is a problem. The American constitution does not permit certain types of resistance. This assertion requires some development.

At law, once the regular courts have spoken and if they have upheld or refused to review a particular governmental order, the individual must obey that order even if he believes it to be legally and morally

wrong. If he chooses to disobey, he must suffer legal punishment. Thus, one religious group may believe that the required flag salute of a local school district is idolatry, forbidden by scripture, but if the courts rule that such a flag salute is a legitimate requirement for school children, the unhappy group cannot resist further short of punishment. This was the outcome of the case of the Minersville School District v. Gobitis.[19] Or again, a group may hold a sidewalk parade to disseminate religious information as "one of their ways of worship," but if such a parade is conducted in violation of rules respecting the use of the sidewalks, the group may be punished. The group may claim a right to parade as "freedom of worship," but in Cox v. State of New Hampshire the Supreme Court said that in this case freedom of worship was "beside the point."[20] It cannot be forgotten that at law it is the courts that define freedom of religion and freedom of speech. Once they speak, no person in their jurisdiction can disobey unless he accepts the bitter consequences. Shouting about moral, religious, and constitutional rights is usually to little avail from the jail cell. Thus the American constitution does not permit resistance to governmental actions which its courts have found to be constitutionally exercised.

What type of resistance does the American constitution permit? First, it permits the individual the right to test governmental actions in the courts. A law that is unconstitutional or an administrative action that is *ultra vires* in the courts' view will be rendered of no effect. The individual may, therefore, resist in this legal way, but if the courts refuse to hear his case or if they decide against him, this means of resistance is closed. Second, the constitution permits political resistance. The individual can organize and act politically to change the governmental action that offends him. He may run for office or vote if qualified, he may support candidates and programs politically, he may petition the authorities, and he may lobby. But again, if he fails in his objectives, he has no constitutional recourse but to obey constituted authority acting within due process of law.

Thus, the constitutional system permits certain kinds of resistance according to certain rules. The resistance is limited however, and, therefore, it must be recognized that the New Testament principle of resistance runs afoul the American constitutional demand that law be obeyed. There is no complete solution in theory or practice to this conflict, and all governmental systems share the problem. Especially during the Reformation period, creative minds earnestly sought a solution. Time does not permit an excursion back to the interesting results, but none of them is without its peculiar difficulty.

We have now noted an instance of agreement and an instance of disagreement between the two sets of principles being compared. Our further comparison of these sets of principles will not be in terms of agreement or disagreement, for in significant measure other items in the two lists are comparable, if at all, only in a loose sense. Rather, it will be said, first, that in light of a particular New Testament political principle a given American constitutional principle may be more or less expedient, and, second, that in some cases there is no discernable connection between some American constitutional principles and New Testament political principles.

Two expedient relationships have already been indirectly noted. In our discussion of the New Testament principle that people may resist the state, it was observed that the American constitution permitted limited political and legal means for resisting constituted authority. The political means, i.e., forms of democratic opposition, may be tied to two basic American principles, i. e., popular sovereignty and the representative system. Since in American experience these principles are integral to democratic action, we may say that they are useful principles by which some political resistance may be defended. It would be wrong to say that they were "Christian" principles. The New Testament demands neither popular sovereignty nor the representative system, but given the possible need for resistance, these American principles are expedient. Similarly, the American principles of limited government and constitutionalism are expediently related to the same New Testament principles of resistance. The American courts, operating under these principles, make possible a circumscribed legal resistance to government. The Christian viewing these useful tools of resistance and recognizing that he may need such tools at some time can regard them as expedient.

It might be asked if something more than this could not be said for the American principle of limited government and its subsidiary elements including the bill of rights. Is not the idea of limited government found both in the New Testament and the American constitution, and, therefore, could we not say that the two are in agreement? The answer is easy, if words do not confuse. Both require limited government, but in specifics, the limits are very different. The New Testament principle of limited government is derived from scriptural demands that the gospel be preached, that Christians refuse to bow in idolatrous worship, and that Christians live a moral life, and it was inferred in the existence of other God-ordained institutions. The substantive and procedural limits found in the American constitution do not specifically include any of these New Testament demands. The first amendment's statement that, "Congress shall make no law respecting the establishment of religion or prohibiting the free exercise thereof; or abridging the freedom of speech . . ." has been interpreted in a broader way in most cases

than the New Testament requires. It protects all kinds of religious faiths and most religious utterances. The New Testament does not demand such liberality, and many "Christian" governments and some church groups have argued against such "freedom for falsehood." Clearly, the two principles of limitation are not the same. Also the New Testament does not touch upon many of the elements that make up the American concept of limited government. Where is *habeas corpus, ex post facto,* trial by jury, freedom of the press, etc. in the New Testament? On the other hand, where in the American constitution (except, perhaps, by implication in the unenforceable preamble) is there a demand that the government not force its citizens to act immorally? It is not good law which holds that substantive due process is a guarantee of a particular moral code. In light of this, it would be wrong to say that the New Testament principle and the American constitutional principle of limited government are similar. However, it can be said that the American principle of limited government is expedient in that it may give the individual Christian some protection from arbitrary governmental actions that run afoul New Testament principles.

It should not be implied from this that particular American expressions of limited government including separation of church and state are uniquely expedient. The British insist that their Parliament is ultimately without legal limit—a majority vote in Parliament can alter any constitutional provision—and British due process and church-state relations differ from ours. But the gospel may be freely preached there, idolatrous worship is not required, state and free churches exist side by side, and Americans may safely concede that the subjects of the Queen are as politically free to be moral in light of their Christian conscience as are Yankees.

Another example of an expedient American principle may be found in the complex principle of separation of powers, checks and balances, and judicial review. This principle provides both legal and political tools for limiting an improperly ambitious government. It may protect the Christian in his endeavor to please God in light of New Testament principles, but it is only an expedient. It is not required in any way by the New Testament. Nor should the principles of other states that stress the fusion of powers and omit American forms of checks and balances and judicial review be regarded as other than expedient solely because they are contrary to American practice. The British principles related to the rule of law and the role of the opposition have given British subjects perhaps as much protection from arbitrary government as the American principles under discussion.

In the discussion of expediency so far, I have insisted that certain principles of the American constitution that limit governmental action are expedient. New Testament limitations on government are thus reflected, but a system which is expedient in protecting a Christian from governmental action could be inexpedient if it too severely limited the power of government to arbitrate and resolve the inevitable conflicts of the society. The New Testament demands a government capable of promoting social good, and thus, limits on governmental power should not be excessively restrictive of needed governmental action any more than governmental limits on the Christian should be restrictive of his God-ordained duties. This expedient balance of order and freedom, unfortunately, is neither easily located nor static. The state under siege or under the threat of the anarchy of civil war may need to extend its power. Therefore, concentration upon state limitations is not without its dangers.

We now arrive at the last category of comparison discussed here. One group of American constitutional principles cannot be related in an important way to political principles of the New Testament. If a relationship does exist, it is so indirect as to be almost unmeasurable. The main distinction between the group of principles classified as expedient and the group of principles unrelated to the New Testament is this: The former group gave the Christian some political or legal means of resisting a governmental action he could not conscientiously accept, and the means was operationally useful. The principles to be classified as unrelated to the New Testament political demands do not offer any tools of resistance that have important operational usefulness. However, there is no sharp line between this group and the group of principles classified as expedient, for under some special set of circumstances an American principle previously not expedient in promoting New Testament political requirements could become useful to that end.

Federalism and the related principle of national supremacy belong in the group of American principles unrelated to New Testament political demands. While the Roman world practiced a kind of sharing of authority between levels of government, the New Testament writers did not bother with the problems involved. If in the terms we are using there is any significant expediency in federalism and national supremacy, it must relate to the New Testament principles of limited government and resistance to government. But the resistance described in the New Testament is resistance by individuals — not subsidiary states. Also, while it is true that the law of federalism limits the scope of action of one level of government at specific points, it does not now significantly limit both levels of government at the same point. The twilight zone has substantially disappeared since Hammer v. Dagenhart. While federalism may be a useful tool in limiting one government, it also places the individual

under two governments of sovereign authority. It would seem to be impossible to weigh all the advantages and disadvantages of the federal system and arrive at an index number of some sort that could be meaningfully related to New Testament principles. Also it must be noted that in terms of New Testament political requirements some states have been and are well governed without federalism, other states have been and are well governed with federal systems different from the American one, and the United States has been well governed before and after the courts and Congress have redefined the federal structure and its operation.

Republicanism also cannot be meaningfully related to the political principles of the New Testament. It is not discussed or mentioned in New Testament writing, in spite of the fact that the period was dominated politically by hereditary monarchs. The inspired writers were willing to accept kings as God's ordained rulers, and they give no hint that other means of executive power are intrinsically and generally superior. And if, despite this indifference, monarchical power has been viewed as intrinsically dangerous to the liberties a Christian must demand, the age of constitutional monarchy has removed the danger. "Long live the king" is as appropriate for Christian tongues as "Vive la Republic."

The New Testament also does not hint at anything called the principle of civilian supremacy. If it could be shown that without this principle there would probably develop a threat to New Testament political imperatives, the principle might be moved into the category of expedients discussed above. Harold Lasswell's description of the "garrison state" comes to mind here, and if such tendencies in modern states as he describes progress, perhaps civilian supremacy could become more important on the Christian's scale of political values.[21] I am sure that some Christian pacifists would hold this principle very dear now. But the principle guarantees nothing that will operate to check an inordinate governmental action. Therefore, I do not classify it with the expedient principles discussed earlier.

Last, the principle of the protection and expansion of free enterprise is also unrelated to New Testament political principles. Free enterprise is not mentioned or discussed in the New Testament. Indeed, the New Testament says nothing directly about economic systems. Private property, an ingredient of the free enterprise system, is sometimes said to be defended by the New Testament. If we grant that this is so, we still have not arrived at the American free enterprise system for at least two reasons. First, private property exists in states that do not have the free enterprise system. There is private property in the USSR, and there was, after all, private property under mercantilism. Thus, private property and free enterprise should not be treated as the same thing. Second, the institution of property exists by law, and the laws of property of the New Testament period differ from the laws of property today. In the short period of American history the law of property has been changing. Think of the changing regulation of property rights by price control in such cases as Munn v. Illinois, Nebbia v. People of the State of New York, Ribnik v. McBride, and Olsen v. State of Nebraska.[22] In light of these changes, to say that private property was defended in the New Testament is not to say that the New Testament defends today's American property law—let alone the whole free enterprise system. If it is observed that the New Testament defends the idea of private property and the American constitution does the same, it must be said that so does the law of the Soviet Union and socialist Britain, and so did the law of the mercantile period. How then, does this observation lead to the free enterprise system? These cautioning remarks on the sacredness of free enterprise and American property law are necessary, because some American Christians see red spots before their eyes if it is said that free enterprise is not, in fact, related to New Testament political and economic demands.

I am aware of the argument that political liberty, including religious liberty, is based upon the free enterprise system. I reject it, because I cannot accept this kind of economic-system determinism. Men do not live politically, and religiously by the economic system alone. Those "libertarians" who say men do, must learn, together with the Marxists, that humanity is not a slave to the economic order. Human creativity can be and has been capable of producing many useful combinations of different political and economic orders. If democracy and its political and religious liberties are to survive long, it will do so without all of the 19th century's economic ideals maintained in pure form.

Section 4: *Conclusions*:

From what has been said here, it is clear that there is little direct relationship between the political principles of the New Testament and the constitutional principles of the American government. Only in the mutual rejection of anarchy is the similarity singular. However, since the New Testament sets some limits to governmental action and since it permits individual resistance to governments, some American constitutional principles which limit the government and allow a circumscribed resistance can be called expedient by the Christian. These principles should not be called "scriptural" or "Christian", because they are not developed in the American form in the New Testament and they are not necessarily better from the Christian's point of view than disimilar principles followed by other governments. Other principles of the Ameri-

can constitution are not meaningfully related to the political imperatives of the New Testament.

The limited relationship that exists is no criticism of the American constitutional system. It stems from the restricted New Testament interest in the mechanics of governmental organization and operation. If government exists and if it does not infringe upon the limits outlined in Section 1, the New Testament requirements are met. This gives very wide freedom for state action because the prescribed limits do not affect great ranges of governmental concern.

References

1. Romans xiii, 4.
2. Oscar Cullman, *The State in the New Testament.* p. 91.
3. Acts v, 29; also iv, 19.
4. I Peter ii, 13-17; Romans xiii, 1-7.
5. Passages describing the status of the family as a social unit are not found in the New Testament, but there is an assumed family relationship in admonitions to wives, husbands and children. These, supported by Old Testament statements on the family, imply some sort of divine approval. Passages relating to the church include: I Cor. i, 2; Col. i, 18; Rev. ii, 7; etc.
6. Romans xiii, 1-7; I Peter ii, 13-17.
7. I Timothy ii, 2.
8. Carlyle, R. W. and Carlyle, A. J., *A History of Mediaeval Political Theory in the West.* Vol. I, p. 90.
9. I Corinthians vi, 1-6.
10. Revelation xiii, 8.
11. Acts iv, 19; v, 29.
12. John Calvin *Institutes of the Christian Religion,* p. 804.
13. John Knox, *Appellation;* Works (ed. by Laing) Vol. IV, pp. 501. Cited by George H. Sabine, *A History of Political Theory,* p. 369.
14. Cullman, *op. cit., passim.*
15. Matthew xxvi, 52; Romans xiii, 1-5; Revelation xiii, 10. The citation of Romans xiii might be criticized, but the force of verse 4 argues that only God takes vengeance, and therefore no mere subject can kill.
16. Matthew v, 38, 39, 44.
17. I am not here discussing force and violence in international relations.
18. Robert K. Carr, Marver H. Bernstein, etc., *American Democracy in Theory and Practice,* pp. 57-98; Alfred De Grazia, *The American Way of Government,* pp. 85-93; John Ferguson and Dean E. McHenry, *The American System of Government,* pp. 45-53; Frederick A. Ogg and P. Orman Ray, *Essentials of American Government,* pp. 34-40; John M. Swarthout and Ernest R. Bartley, *Principles and Problems of American National Government,* pp. 77-88.
19. Minersville School District v. Gobitis (310 U. S. 586, 1940); reversed in West Virginia State Board of Education v. Barnette (319 U. S. 624, 1943); cited in Walter F. Dodd, *Cases and Materials on Constitutional Law,* pp. 837 ff.
20. 312 U. S. 569, 1940; cited in Walter F. Dodd, *Cases and Materials on Constitutional Law,* pp. 831.
21. Harold D. Lasswell, *National Security and Individual Freedom, passim.*
22. 94 U.S. 113, 1877; 291 U.S. 502, 1934; 277 U.S. 350, 1928; 313 U.S. 236, 1941; cited in Walter F. Dodd, *Cases and Materials on Constitutional Law,* pp. 1054 ff.

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*An Evaluation Of The Fossil Record**

RUSSELL L. MIXTER

If you have ever sat in the shade of western yellow pines and tried to write about fossils you can feel how I felt when I wrote this. A vireo is singing his monotonous phrases, a flycatcher has failed to find the insects buzzing around me and a kingfisher rattles crosslots on his way to the creek. All I see is alive except the pre-Cambrian rocks on which I sit. They contain no fossil animals, or at least none that everybody agrees is a real fossil, although I read that "there is no serious dispute that algæ do occur from at least the middle part of the long pre-Cambrian span onward."[1]

About a half mile from here is a cliff of redish brown standstone of Cambrian age. In this same Cambrian in various parts of the world are found fossils of all the major groups of animals, except backboned ones. There are single celled animals, brachiopods (which resemble clams which exchanged their side shells for top and bottom ones), starfish-like creatures, mollusks, and the jointed-leggers, of which the trilobites are an outstanding example. Do not think any of these appeared suddenly for the Cambrian period lasted a long time and these groups, which we call Phyla, came in at various times over some millions of years. It is striking that the jointed legged ones (called arthopods) are found in the same stratum as the single celled ones (which are called protozoa).

You readily notice that we have an abundance of fossils when we get any at all. We know nothing from the record of the rocks about the supposed progression from the first living thing up to the protozoan and this change "was probably the most complex that has occurred in evolution, and it may well have taken as long as the change from protozoan to man."[2] But we have in the fossil record much information about what has been here after the first members of the major groups, or phyla, were fossilized.

Because you wish more detail than I can give you in this paper, you will read, "The Meaning of Evolution" by George Gaylord Simpson, who was chairman of the department of paleontology at the American Museum of Natural History and professor of vertebrate paleontology at Columbia University and is now at the Harvard Museum. He is a frequent contributor to the popular and technical literature dealing with the significance of fossils and he is obviously honest, for if there is any doubt about what he is saying, he will suggest the qualification of his belief on the spot. For example, he wrote, "I am trying to pursue a science that is beginning to have a good many practitioners but that has no name: the science of four-dimensional biology or of time and life. Fossils are pertinent to this field when they are treated as historical records (paleontologists do not always treat them so.")[3] Another example:

> Some idea of probable rates of evolution in gaps in the record that correspond with major changes in adaptation can be gained by comparing the possible lengths of the gaps with the length of the relatively continuous record in the sixteen orders of mammals for which there is fair knowledge. These estimates are highly unreliable, because a large element of personal opinion is involved and no fully objective method of measurement exists as yet. The averages and consistant tendencies... give as good an indication of probabilities as can now be achieved.[4]

You realize that he knows his own limitations as well as those of his co-workers.

As you read some of Simpson's books you will be impressed with two ideas. One is how much we do know about fossils and the other is how much we really do not know after all. Consider what seem to be fairly certain conclusions from paleontological observations.

First, species can change into other species. I quote Simpson and he can list for you many examples. "Among the examples are many in which, beyond the slightest doubt, a species or a genus has been gradually transformed into another."[5] Also he writes, "Splitting and subsequent gradual divergence of species is also exemplified..."[6] Some of you may still doubt this. If you wade through one of his books you will at least be less sure that your doubt is justified.

Second, the members of families and orders had their origin in a common ancestor. Consider the record of the horse along with the ass and the zebra. It belongs to the family called Equidae. It is a reasonable belief that all these sprang from the same ancestral stock. If you do not accept this belief, you are holding to one which is less simple, that is, one which would demand more specific creations, and you would be saying that hereditary transformations cannot produce the changes required. Let us admit that no one actually knows what the hereditary sequence in the line-

*This paper was first presented at the 1957 Convention of the American Scientific Affiliation but publication was delayed since the program chairman was holding it in an attempt to obtain a cross-section of critiques to accompany it. Not realizing this objective in full, it is felt desirable to publish it now to coincide with the A.S.A. Centennial Volume on Darwin.

age of horses really was. We are dealing, not with precise facts, but with greater or lesser probabilities. Nevertheless, we should be willing to admit the possibility that the ancient horse (Eohippus) was the remote grandparent of the modern horse (Equus). We should admit it because there are *so many* stages and *such gradual* stages between Eohippus and Equus and the best explanation for slightly different stages is that they are related to one another by descent.

As more specimens accumulate, and more missing links are found, it may be more and more evident that whole families do arise from species.

Here is Simpson's summary of the second point. "Gradual transformation is also fairly well exemplified for subfamilies and occassionally for families, as the groups are commonly ranked."[7]

Third, as Simpson states,

> In spite of these examples, it remains true, as every paleontologist knows, that most new species, genera, and families and that nearly all new categories above the level of families appear in the record suddenly and are not led up to by known, gradual, completely continuous transitional sequences. When paleontological collecting was still in its infancy and no clear examples of transitional origin had been found, most paleontologists were anti-evolutionists. Darwin (1859) recognized the fact that paleontology then seemed to provide evidence against rather than for evolution in general or the gradual origin of taxonomic categories in particular. Now we do have many examples of transitional sequences. Almost all paleontologists recognize that the discovery of a complete transition is in any case unlikely. *Most* of them find it logical, if not scientifically required, to assume that the sudden appearance of new systematic groups is not evidence for special creation or for saltation, but simply means that a full transitional sequence more or less like those that are known did occur and simply has not been found in this instance.[8]

One view of the meaning of the gaps in the record is as follows. The gaps set the boundaries between groups of species which have descended from created kinds. Because the gaps were "systematic defiiciencies of record" and occurred so regularly between orders, it was held that each order had a start with a created being. To illustrate. Between the first horse and the supposed ancestor of it (the condylarthra) there is a definite break in the continuity of successive forms. So it may be concluded that the first condylarthra are created, and that the first horse was created.[9]

But on the other hand the breaks may represent links which *did live* but were not fossilized, or forms which did live but have not been found or recorded in the literature. For instance, "Eohippus is more like some condylarths than it is like *Equus*." But in other words, there is not as much difference between the supposed ancestor of the horse and the horse as there is between the first horse and the latest horse. So, if there was a transition from the horse of ages ago to the one of today, which was a considerable change, there could well have been animals which were stages between the horse and its ancestors, which is a lesser amount of change. If there already is much change on the record, why believe that a little which is not documented did not occur?

In the 1944 treatise on *Tempo and Mode in Evolution,* Simpson said that the first horse was "an equid, which is a classificatory way of saying that the vast majority of its multitude of morphological characters were already the same as those preserved in *Equus* and in all equids as well as in many other more or less related animals."[10] That is, the first horse was a genuine horse. In 1953 in *The Major Features of* Evolution, Simpson remarks, "eohippus is more like some condylarths than it is like Equus."[11] Also he states,

> "For instance, Matthew (1926) pointed out, but later students have mostly ignored, the fact that eohippus was *not* a horse, that it is about as good an ancestor for *Rhinoceros* as for *Equus*. In effect, there was no family Equidae when eohippus lived. The family and all its distinctive characters developed gradually as time went on. Eohippus is referred to the Equidae because we happen to have more nearly complete lines back to it from later members of this family than from other families. There is no particular time at which the Equidae became a family rather than a genus or a species; the whole process is gradual and we assign the categorical rank after the result is before us.[12]

Simpson has probably more lucidly and substantially stated the case for transformations from one order to another than any other recent writer.

It is not possible to study much of evolution experimentally.

> When a genus in a steadily moving lineage like that of *Equus* has an average duration of 7½ million years, nothing we can do to speed up experimental evolution is going to bring such events, let alone the longer spans of families and still higher categories, down to a period men can hope to follow in experimentation. Cross-breeding, essential for most genetical analyses, is almost never satisfactorily possible at the level of genera, and absolutely never above that level. Here, then, is a domain in which the observational approach and, when available, paleontological materials are the only ones possible.[13]

We should recall that it was possible to breed backwards to a horse that is now extinct, the tarpan. But we can never prove by producing eohippus again,

that it was in the direct line of horse ancestry. We merely accept the plausible statement about its relationship to the horse.

What does Genesis really say? I take my clue from John Ockenga's statement in a book that discusses the first woman.[14] Ockenga says that Genesis says there were three creations as shown by the use of the Hebrew word bara: the heavens and the earth; animal life; and man. "Between these stages," he writes, "there is room for evolution in our thinking when it is taken to mean under the power of God."

I do believe in creation because of the Bible statement—and because of the argument from design. Arthur Holly Compton, Nobel prize winner in physics said, "The argument on the basis of design, through trite, has never been adequately refuted."[15] In recent years it has been admirably presented by the Moody Science films. No one need apologize for believing in creation. But the question is, "How much was directly created and how much was left to hereditary processes, which were also created?"

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1. Simpson, *The Meaning of Evolution,* p. 17.
2. *Ibid.,* p. 16.
3. *Ibid.,* p. xii.
4. *Ibid.,* pp. 351-352.
5. *Ibid.,* p. 360.
6. *Ibid.,* p. 360.
7. *Ibid.,* p. 360.
8. *Ibid.,* p. 360.
9. Mixter, *Creation and Evolution.*
10. Simpson, *Tempo and Mode In Evolution,* p. 159.
11. Simpson, *The Major Features of Evolution,* p. 352.
12. *Ibid.,* p. 345.
13. *Ibid.,* p. 340.
14. Ockenga, *Have You Met These Women?* pp. 80-83.
15. Compton, *The Freedom of Man,* p. 73.

Comments On Dr. Mixter's Paper

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There are several basic problems indicated in Dr. Mixter's paper that have too often gone unanswered by evangelical Christians. The first of these is that "species can change into other species". To a Christian that has been brought up to defend the concept of fixity of species this may sound like a shocking statement. Actually, as we study the living world around us and the interpretation of that world in scientific writing it should be obvious that: 1) we are not really sure of exactly what a species is, and 2) no matter what definition we accept, we can find considerable evidence for a common origin of at least closely related species.

The common ancestor of members of a family or order is not so directly observable but on the basis of the tendency of organisms to vary, the amount of time involved from the geological record, and the probable changes that have taken place in the environments during that time, it is not unreasonable to interpolate to the recognition for the common ancestry of the members of these groups.

The origin of the major groups—phyla and classes—constitutes a more serious problem as any honest evolutionist will readily point out. The evidence for common ancestry at this level is based on analogy, interpolation, and an extremely incomplete fossil record. However, just as we criticize the materialistic evolutionist for reading too much into the inadequate record we too jump to hasty and ill advised conclusions every time we insist that such and such a gap "proves" a supernatural creative act. Then, as our gap gets filled in we are forced to contract the role of God. Our God is too great to become a synonym for our ignorance. Is He not the author of any natural laws that may be behind our puny theorizing? Let's not try to outdogmatize the materialistic evolutionist. As Christians I think we could more profitably consider the role of God the Creator throughout the entire course of evolution instead of defending the God of the gaps. I personally am not convinced of the "entire course of evolution" but in answering the question "*How* did God create the physical and biological world"? I am not averse to considering the evolutionary hypothesis as a *tentative* working hypothesis until we can come up with something better.

It seems to me that this is the direction of Dr. Mixter's arguments. Certainly neither his paper nor my comments imply a blanket endorsement of "Theistic evolution" but the discussion would seem to indicate that we have arrived at a point where the differences between "Theistic evolution" and "progressive or step-wise creation" need to be calmly and thoughtfully considered.

The Evolution of Evangelical Thinking on Evolution

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Over twenty years ago a group of zoology majors at a Christian college agreed in all seriousness that as part of his life's work each would take a certain phase of evolution, explore it carefully, and derive therefrom inherent data to refute the evolutionary concept. At that time these men had no question as to the refutability of the theory, but were dissatisfied with the kind and use of data (if any) then presented in refutation.

The viewpoint of this group was probably representative of that of many Christians of this period who were students of biology and was, no doubt, a reflection of the tenor of the times. The conflict between Fundamentalism and Modernism was at a whiteheat. Separationist groups were even dividing within themselves. To be right doctrinally was more to be desired than to show the love of the indwelling Christ in a

regenerated life. One's status in a Christian fellowship seemed to depend as much upon the method, the place, or the person involved in one's conversion as upon the fact of it. In this climate much contending for the faith had become contentious and much standing fast in the faith had become reaction.

"Evolution" was a dirty word, and hence to be dealt with by invective and shunned as sin. Under the guise of scholarship, a few crusaders stumped the country building up straw men to knock down as they "warned true Christians" of the evils perpetrated in the name of science. And small wonder, for had not the deism of Darwin been replaced by the mechanism of Spencer and Haeckel as bioliogists strove to grasp the significance of nature's laws? And was this not the sperm which fertilized the egg of Natural Philosophy giving rise to "higher criticism"—the father of Modernism?

The basic ("fundamental") beliefs of the Bible-believing Christian were being challenged from within and from without by scholarship, and orthodox scholars were slow to meet the challenge on its own ground. But this group of well-meaning college kids is an example of the awakening to the need for Christian scholarship. As the recognition of this need developed, a few Christian men of science realized that effectiveness of scholarship can be enhanced by an organization providing for the stimulation of the exchange of views and for the publication of results of investigation; and the A. S. A. was born.

Although the contribution of an A. S. A.-inspired scholar to either his discipline or to the synthesis of the Christian view has only rarely been startling, certain trends can be seen to have been developing. Perhaps the lack of original contributions can be attributed (at least to some extent) to the personal stress on each individual who has dug at all deeply into the data of evolution. First to be overcome was the onus of dealing with a "verboten" term and in a "non-existent" area. Then, as each made an honest and objective consideration of the data, he was struck with the validity and undeniability of datum after datum. As he strove to incorporate each of these facts into his Biblico-scientific frame of reference, he found that—while the frame became more complete and satisfying—he began to question first the feasibility and then the desirability of an effort to refute the total evolutionary concept, and finally he became impressed by its impossibility on the basis of existing data. This has been a heart-rending, soul-searching experience for the committed Christian as he has seen what he had long considered the *raison d'etre* of God's call for his life endeavor fade away, and as he has struggled to release strongly held convictions as to the close limitations of Creationism.

This struggle is made no easier by the lack of approbation (much less acceptance) of some of his less well-informed colleagues, some of whom seem to question motives or even to imply heresy. To watch the still eager acceptance of views he has been forced to reject and the stolid rejections of views he feels clearly supported by evidence while having his own character brought into question at the same time often makes him question the worth of the whole effort.

Some have reacted by lessening their activities or at least their pronouncements in the field, others by becoming less active in the Affiliation, while a few hardy souls (to which the paper under discussion gives witness) continue to give forth their God-given convictions and with them perhaps a simple challenge —"If you have a better approach please tell me quickly for this one of mine has been bought at great price to my peace of mind."

My acceptance or rejection of Dr. Mixter's conclusions depends upon (indeed, demands) my honest exploration and consideration of the data and references he presents. Whether or not I agree or disagree with him has no bearing upon his right to be heard. His contribution is of real significance to A.S.A.; and his presentation needs to be cloaked in the dignity commensurate with the significance of his pronouncement —a pronouncement in essence that:

> I, an evangelical Christian, can accept the basic concepts of evolution. Although not exclusively demanded by the data involved, it is certainly allowed, and in fact I can see no better or more logical way to handle the data. I believe in Creation, and simply affirm that in the light of the evidence now available, I think some evolution—that is, development of present-day forms by differentiation of previously existing forms—the most likely way God accomplished much of His Creation.

Thus, in fifteen years we have seen develop within A. S. A. a spectrum of belief in evolution that would have shocked all of us at the inception of our organization. Many still reserve judgment but few, I believe, are able to meet Dr. Mixter's challenge of, "Show me a better explanation." Some may see in this developing view the demise of our organization, but it seems to me that we only now are ready to move into the field of real potential of contribution—that in releasing Truth from the restrictions we have been prone to place upon it, we can really view it in the true fullness which the Christian perspective gives us.

CHEMISTRY

Walter R. Hearn, Ph.D.

Chemists as a class seem to be less concerned than other scientists about the philosophy of science. The most profound problems touched on at our joint meeting with the E.T.S. devoted to a Christian philosophy of science seemed to spring from the physicist's description of matter on the one hand and from the biologist's description of man on the other hand. As "molecule-watchers" we seem to be philosophically adrift, becalmed between the storms experienced by the "meson-watchers" at one extreme and the "bird-watchers" at the other; we begin the day's work by washing yesterday's glassware instead of by thinking about the axioms on which our work is based. At the meeting our colleagues in philosophy (the "axiom-watchers"!) chided us for this callousness toward the philosophical implications of what we are doing. Some of us were tempted to return a chide for a chide instead of turning the other cheek, but even while doing so recognized the value of being jarred out of our naivete.

For those of you who missed the joint meeting and our Annual Convention in Chicago, I would like to recommend a book which was praised by both philosophers and scientists present: Philipp Frank's *Philosophy of Science,* published by Prentice-Hall in 1957. It is also available at a reduced member's price through the Library of Science, 59 Fourth Ave., New York 3, N. Y., a "science-book-of-the-month-club" which many of you might be interested in joining. Professor Frank's book is very readable (even to a chemist) in contrast to a number of other books on the philosophy of science I have tried to wade through. The author's own background as a theoretical physicist makes his approach thoroughly modern and capable of being appreciated by a working scientist; yet he shows clearly the links between modern physical theories and the historic systems of philosophy such as idealism and materialism, whose terminology is not usually part of the working vocabulary of a "bench-chemist."

Another book which has made a deep impression on me because of the discussions at our joint meeting is *Values in a Universe of Chance; Selected Writings of Charles S. Peirce,* edited by Philip P. Wiener. It is available as a paper-back Doubleday Anchor Book for $1.25. Peirce was the American logician who lived between 1839 and 1914 and who first formulated pragmatism as a doctrine of meaning and method of inquiry—later taken over, popularized, and converted into a more psychological version by William James. So far, I have had time to read carefully only the brief section on "Science and Religion" near the end of the book, but this section has whetted my appetite for the whole book. Without knowing much about Peirce's personal history, I felt a strong sense of spiritual kinship from his writings about Christianity. His essay, "What is Christian Faith?" emphasizes the Law of Love as the basis of Christian faith without deprecating conservative doctrine; in this essay he says that miracles seem to him to be intrinsic elements of a genuine religion, and adds: "Doubtless, a lot of superstition clings to the historical churches; but superstition is the grime upon the venerable pavement of the sacred edifice, and he who would wash that pavement clean should be willing to get down on his knees to his work inside the church."

The essay in Peirce's writings which struck the strongest chord of response within me, however, was his "A Neglected Argument for the Reality of God," first published in the *Hibbert Journal* in 1908. At one point in the discussions at our joint meeting the comment was made that scientists, philosophers, and theologians are all engaged in essentially the same task but going about it in different ways: that is, we are each trying to understand our experience by building "models" of the universe and "playing" with the models we have made. For the scientist, a simple mechanistic model may seem more satisfying than an elaborate logical model of a philosopher, but this is not to say that either is a "better" model: the important thing is that each should have a model he enjoys playing with. It occurred to me that as a Christian, it is more important to me that the universe, or my model of it, be enjoyable than that it be logical. From the poor reception this idea received, I had about concluded that no philosopher would ever agree with me, when I picked up Peirce's essay recommending the "Pure Play of Musement" as being a neglected way of arriving at the hypothesis of God! Peirce thought fifty years ago that this argument was being neglected by theologians, who ought to have described it and defended it. The argument is that "playing" with the ideas in any of our Universes of Experience will give birth to the hypothesis and ultimately to the belief that they have a Creator independent of them. Of this argument, he says, "In the mind of a metaphysician it will have a metaphysical tinge; but that seems to me rather to detract from its force than to add anything to it. It is just as good an argument, if not better, in the form it takes in the mind of the clodhopper." Perhaps that is why it appeals to me! This book also deals with the links between science and the historic systems of philosophy, but its description of science is of course not so modern. The style is rambling and sometimes quaint, but full of vigor and wit, which makes the book thoroughly enjoyable even to a "clodhopper".

Another book which I have read since our joint meeting and which I recommend most highly is William G. Pollard's *Chance and Providence,* published by Scribners in 1958. The subtitle is *God's Action in a World Governed by Scientific Law.* Pollard is the Executive Director of the Oak Ridge Institute of Nuclear Studies who went into the Episcopal ministry from an established career in physics, and who therefore has had formal training both in science and theology. His book is written from a thoroughly Biblical (though perhaps somewhat neo-orthodox) point of view for the benefit of Christians who are trying to integrate their theistic concepts with mechanistic descriptions of the universe; however, it should also be of great value in helping our non-Christian scientific colleagues come to a simple faith in Jesus Christ. For one thing, Pollard does not fall into the trap of basing human free will on direct application of Heisenberg's uncertainty principle, and is careful to point out other false solutions to the problem. The basis of his analysis is the difference between "scientific time" and "historical time". Scientific time has an arbitrary starting point: when one plots a variable as a function of time he chooses a convenient point for the zero on his time scale, and when someone in another laboratory repeats his work he sets *his* zero time in such a way as to duplicate the plot. The time intervening between the two experiments has no bearing on the results, because scientific time is uniform. Historical time, however, the kind in which we actually live, is sharply divided into three segments of non-uniform character. All of existence is encompassed in the "now" which divides the fixed events of the "past" from the highly unpredictable events of the "future". It is in historical time that God operates, says Pollard, and it is those events which are called "chance" and "accident" by the scientist which bear the marks of His workmanship. And these are not isolated events, emphasizes Pollard: It is the very essence of the nature of a universe describable in probabilistic physics that *every* event is a chance event, with genuine alternatives, no matter how small a probability can be assigned to them.

Pollard's book seems to me to be a magnificent approach to the objects we have set for ourselves is the A. S. A. I intend to keep at least one copy circulating among my scientific colleagues, Christian and non-Christian. Perhaps some of you with better backgrounds in the philosophy of science would care to contribute full-length reviews of the books I have mentioned here. The Editor welcomes reviews of significant books as well as criticism and discussion in the form of letters.

My comments in a previous column on time-saving devices brought some response from Professor James D. Bales of Harding College, Searcy, Arkansas. One of his very good suggestions is that of doing a thing once for all when possible. He writes: "For example, when I read, instead of deciding to come back later to clip out what I want, I clip out the article and mark it for filing right then and there. Even when I do not have time to read it, I see what it would go under and mark it for filing so that when I am ready for a study of that subject the material will be waiting. When I am reading on one subject and run across material on other subjects that are in my range of interest, I jot down the reference as to where the material is so it can go in my files and later on I can check back and fiind that material. If one does not do it at that time he may remember he ran across a good reference but may forget where it was. Of course the problem of what a thing should be filed under, what subject or phase of the subject, is a very big problem and one never gets it solved satisfactorily, I suppose. But I am a great believer in files as evidenced by over seventy filing drawers pretty full of material." Wow! And he adds that he didn't get started at filing things as early as he is now trying to encourage his students to do!

Even though my filing is done on a much more modest scale, I have learned the value of Professor Bales' suggestion. Not only does a good filing system save time spent in looking for lost references, reprints, etc., but I think it actually prods one in the direction of creative effort. That is, it forces you to think of possible future uses to which you may put such material, in the very act of choosing where to file it. "Am I ever liable to write a paper (or an article or a book) or do some lab work on this subject?" Making a file folder on the subject which invites you to collect other material on the same subject, seems to have the effect of committing you to the task!

This column welcomes the sharing of ideas for helping its readers to improve their efficiency as students, teachers, investigators, administrators, or in whatever area of professional responsibility they might be. "Be wise in your behavor toward non-Christians, and make the best possible use of your time." (Col. 4:5, Phillips).

A lot of chemists in the A. S. A. have been doing interesting things that I don't have time to report on in this issue. The author of this column has found himself with two additional responsibilities this year, that of being Secretary-Treasurer of A. S. A., and that of being the father of a second child, Russell Houston Hearn, born September 25, 1959. If any of you have been planning to contribute to this column "eventually," now is the time!

I can't close without referring to a paper in the August 5th issue of the *Journal of the American Chemical Society,* Vol. *81,* pp. 3944-8. The title is "Re-

solutions and an Attempted Partial Asymmetric Synthesis in Papain-Catalyzed Syntheses of N, N'-Diacylhydrazines from Hydrazides and Acylated Amino Acids." It caught my eye first of all because it is in my own field of amino acid chemistry, and secondly because I noticed that the senior author is one of our A. S. A. members, JOHN LEO ABERNETHY, of Fresno State College in Califnornia. Finally, I was fascinated by the unusually long section at the end entitled "Acknowledgements." That section of the paper modestly but eloquently tells a story of patient, dogged determination to accomplish something in research in spite of circumstances. Those of you who are teaching in small colleges with no funds for research and only undergraduate students with whom to work should gain inspiration from this example. John enlisted financial support from several different sources to buy chemicals and equipment, obtained an undergraduate research fellowship for one of his students, utilized half a dozen other students in the project, and got help from several well-known investigators in the form of discussion of the problem and advice on the organization of the final manuscript. It *can* be done, even in small Christian schools where research has never been done before, if we really want to do it, and if we go about it in the right way. If you are in such a situation, be sure to read John's paper. I expect he would be glad to send you a reprint.

GEOLOGY

Wayne U. Ault, Ph.D.

In this issue we'll continue to introduce more of our ASA earth-scientists. Also, let us encourage others to write in with news of new activities, advancement, relocation and anything else that will help us keep in touch with each other.

Donald F. Beaumont is geologist with the Texas Company and resides at 4859 Gawain Drive, New Orleans 22, La. Don received his B. S. from Wheaton College in 1949 and the M. A. and Ph. D. from Columbia Univ. in 1951 and 1953. He is a member of the Geol. Soc. of Amer. and joined the ASA in 1950. His work is chiefly the structural and stratigraphic studies of subsurface geology in Louisiana. He has also studied the black shales in the southeast Missouri lead district. Don is active in the Presbyterian church where he teaches in the church school. He would like to meet with other ASA members at annual professional conventions.

Donald C. Boardman is chairman of the Geology Dept. at Wheaton College from which he received his B.S. in 1938. Don obtained his M.S. from the State Univ. of Iowa in 1942 and Ph. D. from the Univ. of Wisconsin in 1952. He is a member of Sigma Xi, Illinois Acad. of Sci., Iowa Acad. of Sci., Geol. Soc. of America., Amer. Assoc. of Petrol. Geol, Soc. of Econ. Paleont. and Mineral., Amer. Assoc. for the Adv. of Sci., the Mexican Geol. Soc., and the Assoc. of Geol. Teachers. He has served as president of the central section of AGT and also as a member of the National Board for AGT. He became a member of ASA about 1947. Don normally teaches sedimentation and stratigraphy, structural and general geology, but presently is on a leave of absence and is lecturing in East Pakistan under the Southeast Asia Treaty Organization. His research interests are in sedimentation and carbonate rocks and he has written on the determination of Ca-Mg ratios in sedimentary rocks. His interest in AGT is in correlating the geology curriculum with the general educational requirements of college. Don is active in the College Church of Christ where he is an elder and member of the Christian Education Committee.

Robert Wayne Cooke is a rural science teacher and missionary with the Sudan Interior Mission in Nigeria, W. Africa. He received his B.S. from Cornell Univ. in 1952, a diploma from Providence-Barrington Bible College, and has done graduate work at Cornell Univ. toward the M. S. in science education. His work involves teaching agriculture, general science, health, hygiene, geography and arithmetic to future elementary school teachers. He joined the ASA in 1952 and is a member of the Bible Protestant Church. Robert writes that he "is only a geoscientist in so far as it touches on agricultural sciences such as agronomy, etc." and also that there are five ASA members in Nigeria. Perhaps he can organize a Nigeria ASA section there.

Thomas H. Leith is Chairman of the Science Department at Gordon College and resides at 4 Meadow Lane, Danvers, Mass. Harry received his B. A. in physics and geology in 1949 and the M. A. in geophysics in 1950 from the Univ. of Toronto. He completed the residence and comprehensives for the Ph. D. in geophysics at Mass. Inst. of Technology and the residence work in philosophy of science at Boston Univ. He is a member of Sigma Xi, Amer. Geophys. Union, Soc. of Explor. Geophy., Geol. Teachers Assoc., Geologische Vereinigung, Hist. of Science Soc., British and Amer. Phil. of Sci. Soc., Geo. Soc. of Amer., and became a member of ASA in 1949. Harry has contributed technical articles on the heat flow in mines and on geochronology as well as philosophically on belief in God. His teaching is likewise in both fields: introductory chemistry, physics, and geology and philosophy of science. He is book review editor for the *Gordon Review* and is active in the Baptist Church. Harry would like to see a local Boston ASA section organized and is desirous of meeting with other ASA members at the yearly GSA meeting.

Carl A. Moore is Professor of Geology at the Univ. of Oklahoma and resides at 926 W. Eufaula, Norman, Okla. He obtained his Ph.D. from the State Univ. of Iowa in 1940. Carl is a member of Sigma Xi, Amer. Assoc. of Petrol. Geol., Soc. of Econ. Paleo. and Mineral., Okla. City Geol. Soc. and became a member of ASA in 1954. He has contributed technical articles on the geology of South America, occurrence of oil in basins, subsurface stratigraphy of Okla. and techniques applicable to subsurface geology. In addition to teaching petroleum geol., subsurface geol., geol. of S. Amer., and intro. to geol. engineering, Carl is busy counseling and directing research leading to the M. S. He is an active member in the Baptist church as Chairman of the Board of Deacons, and as counselor and leader in youth groups. He directs summer field camps for three months each summer so cannot attend the A.S.A. convention but writes that he would like to meet with other ASA members at the AAPG meetings which he attends regularly.

Paul M. Wright is Chairman of the Chemistry Dept. at Wheaton College and resides at 717 N. Washington, Wheaton, Ill. He received his B. S. from Wheaton in 1926 and the M. Sc. (1928) and Ph. D. (1930) from Ohio State Univ. Paul ("Doc" to former Wheatonites) is a fellow of the Amer. Inst. of Chem., fellow of the Amer. Assoc. for the Adv. of Science, and a member of the Amer. Chem. Soc., Ill. Acad. of Sci., Sigma Pi Sigma and joined ASA about 1950. He has been a committee member for the ACS Cooperative physical chemistry exam. Besides his administrative duties Paul specializes in teaching physical chemistry. For many years he also taught general and field geology and was director of the Wheaton Science Station (Summer Campus) in the Black Hills of South Dakota. His current research is in radio-Chemistry at Argonne National Laboratory during the summer with some also at Wheaton. Paul is active in the Wheaton Bible Church and frequently speaks to church groups on science and on S. Amer. missions which he has visited. He is a member of the Chicago Council of the Wycliffe Bible Translators and a member of Missionary Aviation Fellowship.

PHILOSOPHY

Robert D. Knudsen, Ph.D.

For this issue I requested Professor Vivian Dow to take the column. Miss Dow taught philosophy as assistant professor for two years at Taylor University, Upland, Indiana. At the present she is working to complete her Ph.D. at Boston University. The first part of her contribution follows; the second part is scheduled to appear in a subsequent issue of the *Journal*.

The Christian Faith and the Public School

The question of religion and the public school has been discussed so much that I shall be charged by some of my readers with whipping a dead horse. Others will consider the topic out of place in a scientific journal. But scientists once attended school, and the status of religion in the schools to which they send their children should be of interest to them as Christian parents.

It can be demonstrated, I believe, that the public schools of America are, at best, unfriendly to the Christian religion, at worst avowedly atheistic. I do not expect all of my readers to agree with me, nor all of those who do agree to be unduly concerned. I am not the first person to have made the charge, however, as a glance at recent periodical literature will show. Let us examine the causes of irreligion in the public schools, and then ask ourselves what should be our response as intelligent Christians with a stake in education.

First of all, unfriendliness to religion in the public schools is a direct result of the American doctrine of separation of church and state, coupled with our heterogeneous religious population. While it is probably quite true, as the Reverend John L. Murphy asserts, that our forefathers were men of religious ideals who, in establishing the dictum, never intended that democracy and religion should be divorced,[1] it is also true that a policy of fairness to all of our many religious sects demands that civil institutions favor no one religion above another. Most, if not all Christians would agree that the dictum of separation of church and state is the protector of our religious freedom; if the Christian teacher may not preach the Gospel to the Jewish child in the classroom, neither may the Catholic teacher indoctrinate the child of evangelical persuasion.

But we must recognize that we pay a price for this protection. The price is the inevitably secular nature of our schools. No one would deny that the public schools are and must be secular. Virgil M. Rogers, writing in *The Christian Century* says, "There is nothing sinister and unclean about that word. It is not to say 'godless,' 'antireligious,' 'in league with evil,' but merely 'secular'—like the courts or the presidency."[2]

In a sense this is true. The dictionary defines "secular" as "pertaining to the worldly or temporal as distinguished from the spiritual or eternal . . . not under church control; nonecclesiastical; civil; as secular courts or education."[3] But the dictionary continues: "*secularist* . . . one who rejects every form of religious faith and worship, and undertakes to live accordingly; also, one who believes that education and other civil matters should be without religious element . . . *secularize* . . . to deprive of a religious character, observance, etc. . . . to convert to, or imbue with, secularism."[4] These latter definitions, I believe, spell out the deeper implications of school secu-

larization: the schools are "without religious element" whether we like it or not.

In his article, Mr. Rogers does his best to show that the public schools are not irreligious, but his argument is not convincing. He tells us that the schools of America exemplify the Christian ideals of love to one's neighbor and the brotherhood of man, and he paints an endearing picture of innocent little children all religiously engaged in searching for "meanings," in sharing across the lines of race, class, and creed, and in helping their fellows to find "the more abundant life which comes from entering into a creative relationship with the universe."[5] Scoffing at the idea that God has been taken out of the classroom, he asks, "How is that which was 'before Abraham was' to be thus easily exorcised?" and tells us that "no principle underlying the American public school system is in conflict at any point with the Judæo-Christian ethic."[6]

Now it does not take a professor of philosophy to see that the "religion" described here is too diluted to deserve the name. We do and should laud every effort by the public schools to foster charity, eradicate race prejudice, and insure the emotional integration of the individual; but let us not mistake these efforts for religious instructon. Their goals may be quite compatible with Christianity, but they do not exhaust its doctrines. The religion eulogized by Mr. Rogers ignores the Bible's teaching that depraved man cannot, by unaided search, find out God, that the relationship demanded of us is with the Creator rather than the creation, and that in spite of God's omnipresence in His universe, men can still exorcise Him from their conscious thought and action. It is a religion of sheer humanism.

Another cause of irreligion in the schools is the Progressivist philosophy of education in vogue in America for the past generation. The chief apostles of Progressivism are John Dewey and his disciple and popularizer, William Heard Kilpatrick. A new and vociferous group of opponents are now proclaiming that Progressivism is dead and that all things in the philosophy of education have become new, but a perusal of the educational journals reveals little change in the philosophic party line. In any case, we do not need a crystal ball to tell us that it will be some time before the last vestiges of Progressivist "life-adjustment" philosophy vanish from the scene; too many educators have been too thoroughly indoctrinated with it for too long a time for it to fold its tent and steal away overnight.

Neither John Dewey nor William Heard Kilpatrick hesitates to proclaim his unalterable opposition to religion. For Dewey, the origin of religion lies in man's fear of the unknown, and the origin of theology is myth and legend. The idea of the supernatural is an "encumbrance" in the way of moral progress, and all religious beliefs are relative to culture. "The religious," which is "the uniting of the ideal and the actual," should be purged of irrelevant "notions of unseen powers, controlling human destiny to which obedience, reverence and worship are due." Dewey considers religion to be inherently obscurantist, declares that there is outright opposition between his conception of religious values and traditional religions, calls for a "release" of these values by dissolution of "their identification with the creeds and cults of religions," and commends a "natural piety" embodying a "sense of the dignity of human nature . . . that rests upon a sense of human nature as a cooperating part of a larger whole." He is opposed to any sort of religious instruction connected in any way with the public schools.[7]

Kilpatrick's opposition to traditional religion is even more uncompromising than Dewey's. He deplores the identification of religion with theology, which he considers "pre-scientific" and "no longer acceptable," lists religion with astrology and numerology as a "retreat from reason" and a deterrent to progress, terms belief in a Creator a "medieval attitude," and tells us that the "supreme being" of religious belief, whatever we choose to name it, is merely a reification of a self-constructed ideal sounding board or "internal other which has been forced to pass supreme judgment" within our own beings upon our thoughts and actions.

Kilpatrick has fought the teaching of religion in public school on all fronts. He has opposed released-time classes, Bible reading in the classroom, the placing of Bibles in schools by the Gideons (on the ground that the King James Version is unacceptable to Catholics, the New Testament to Jews, and any Bible at all to atheists), and even the singing of Christmas carols by school children. Not only has he opposed federal aid to religious schools of any faith, but he is opposed to the very existence of private religious schools (as well as any other private primary or secondary schools) on the ground that they "create snobbishness" and develop "cultural, social and religious blocs" within our society. In place of the traditional religion which he seeks to destroy, Kilpatrick offers us faith in "the method of experimental inquiry" and a "new faith in man."[8] Can a philosophy of education developed by men with such views be anything but unfriendly to religion?

Other factors contribute to unbelief in the public schools. Textbooks, for instance, are usually written from a thoroughly secular viewpoint. Many science textbooks skirt the problems of the origin of the universe and of life,[9] but others reveal their authors' acceptance of a full evolutionary theory.[10] Authors of history texts discuss the Judæ-Christian religion from the Higher Critical point of view and the ori-

gin of human life, language, and culture from a humanistic standpoint.[11] These are far-reaching assumptions, and books predicated upon them reflect an un-Christian bias.

Another factor in the religious state of the schools is the religious situation in the adult populace. The average Protestant citizen's religious beliefs are so nebulous that he is unaware of the difference between Christianity and humanism and perfectly satisfied with his religious ignorance. With the optimism of typical self-sufficient prosperous American wordliness, he is not alarmed at the idea of excluding his unneeded God from public life. He apparently views the universe as a democracy and God as a sort of enlarged President Eisenhower, fully as genial and no more awe-inspiring.

But whatever the factors may be, I believe that the Christian who troubles himself to investigate will be forced to admit that our public schools are unfriendly to anything but the vaguest kind of religion—certainly unfriendly to evangelical Christianity—and that the child exposed to these schools five days a week and nine months of the year during the most impressionable and teachable years of his life can hardly avoid gaining the impression that if there is a God at all He is not of vital importance. What is the Christian answer to the situation?

(To be continued)

Footnotes

1. John L. Murphy, "Religious Education and Democracy." *Vital Speeches*, XXVI, 1 (October 1, 1959), pp. 30-31. Reverend Murphy is a member of the Department of Religious Education, Catholic University of America, Washington, D.C., and Associate Editor of *The American Ecclesiastical Review*.
2. Virgil M. Rogers, "Are the Public Schools 'Godless'?" *The Christian Century*, LXXIV, 37 (September 11, 1957), pp. 1065-1057, p. 1065.
3. *Webster's Collegiate Dictionary* (5th ed.). Springfield: G. & C. Merriam Co., (1936), 1943, p. 899.
4. *Idem.*
5. Rogers, *op. cit.*, p. 1066.
6. *Ibid.*, p. 1067.
7. Joseph Ratner (ed.). *Intelligence in the Modern World: John Dewey's Philosophy*. New York: Random House, 1939, pp. 1003-1035.
8. This summary is drawn from Kilpatrick's works, principally *Philosophy of Education* (New York: Macmillan Co., 1951), and *Selfhood and Civilization* (New York: Macmillan Co., 1941).
9. See, for example, Wilbur L. Beauchamp, John C. Mayfield, and Joe Young West, *Science Problems 2* (Chicago: Scott, Foresman and Company, (1953) 1957, p. 86ff). In only one of the school texts I examined did I find even a hint of the existence of God. Carpenter and Wood's *Our Environment* (New York: Allyn and Bacon, 1957) states in a discussion of the universe, "Perhaps you will discover the divine guidance in it all."
10. See Gordon H. Clark, "A Fresh Look at the Hypothesis of Evolution", *Christianity Today*, II, 23 (September 1, 1958), pp. 3-6, for a discussion of the Christian faith and evolution.
11. See, for example, William Habberton and Lawrence V. Roth, *Man's Achievements Through the Ages* [New York]: Laidlaw Brothers (1952) 1954, pp. 15ff; pp. 52ff.

SOCIOLOGY

Russell Heddendorf, M.A.

In dealing with any problem in our contemporary society, the sociologist must contend with the factor of change. The dynamism and complexity of our present social environment does not provide for the analysis of any social phenomena in a time, space vacuum. Nor is the effect of change on a social situation derived from a direct source. The effect of much change comes by indirect means and may be traced through multiple levels. Hence, change in automobile design may cause a change in idea and value patterns of families. As in too many areas of the field, instruments of measurement and conceptualization are inadequately refined to provide for accurate analysis.

When the sociologist approaches a problem involving change, therefore, he must not be deceived by the appearance of any easy solution. In the area of the sociology of religion, there has been a general tendency to explain the development of new religious groups in terms of the "charismatic leader". Unfortunately, Weber's original concept has found a readily comfortable application on too many occasions. It has been only recently that attempts to understand such types of change in terms of social mechanisms have appeared.

For the Christian sociologist, therefore, attempts to trace the development of liberal Protestantism from earlier fundamentalism pose the need to approach this practical problem through the influence of change. Such change is partially in the form of a reversal of the means-end relationship of religion. The ultimate value of religion in fundamentalism becomes a means to other values in liberalism. This is not an isolated change mechanism, however, since it appears on the secular level in the generally conceptualized change from a sacred to a secular society. Action, which was once traditional and therefore meaningful, becomes dynamic and requires constant adjustment to new goals which then acquire the meaning once attached to action. The key values of American society which existed in the religious realm may now be found in the secular world and religion merely becomes a means of obtaining them.

Another social force to which religion is highly sensitive is change in class. Original American fundamentalism had little concern for helping lower class groups, partially because they constituted an insignificant minority. Liberalistic tendencies developed largely, however, with a growing lower class of immigrants and urban population.

What is needed then is a study of social factors which are highly correlated with religion, particularly

in a changed situation. Much is known about such social mechanisms but this material needs to be refined and developed before it can supply data which is profitable for the sociologist concerned with steering religious change.

The articles found in this column during the past year have been directed toward the laymen. It has been hoped that they would provide a hasty overview of some of the main concepts and problems of the field, particularly in their practical application by the Christian. As more sociological material filters to the lay level, it will be necessary to continually keep the record of such information straight.

There is another function to be performed by the editor, however, and that is to provide communication on the specialist's level. It is hoped, therefore, that the coming year may be devoted to consideration of problems which are more insistent to the average researcher in the field. The immediate question is whether a sufficiently large group exists to warrant such an endeavor.

For this reason, the author would like to request a response on the part of all who work in the field, even in a remote way. It would be particularly helpful to know your sociological background, field of major interest, and particular problems with which you are presently concerned. Suggestions indicating the way in which this service could be developed would be most appreciated. Send the above information to:

Russell Heddendorf
RFD Kitchell Lake
Newfoundland, New Jersey

BOOK REVIEWS

The Earth and its Atmosphere, edited by D. R. Bates, F. R. S. (1957) 324 pp., Basic Books, Inc., $6.00, was also published in Great Britain as *The Planet Earth* (1957) by Pergamon Press.

It contains contributions by fifteen well known, active scientists. Although published just preceding the International Geophysical Year and giving briefly the history, scope, and need for the IGY it also presents for the non-specialist in a very readable and interesting manner an up-to-date summary in many fields of earth sciences. These summaries cover the age and origin of the earth and solar system, the structure of the earth and the origin of its surface features, the physics of the earth, hydrosphere and atmosphere, meteorology, and the origin of life. Because of the limited treatment of each of these the presentation of alternative hypotheses were not attempted. Thus the theories of origin of the solar system, of life and the causes of the ice ages are the current opinions of the authors. However, these are valid starting viewpoints for the treatment of present data. An excellent but very selective bibliography is given for each chapter.

Reviewed by Wayne U. Ault

A big gap has been filled in the undergraduate college textbook field by *Introduction to Geophysics* by B. F. Howell, Jr. (1959) 399 pp., McGraw Hill, $9.00.

Professor Howell, Head, Department of Geophysics and Geochemistry, the Pennsylvania State Univ., is well qualified in his field both by preparation and in teaching experence. His approach to the subject is historical, practical and factual with a good balance between theory and applied geophysics. The text covers the origin and age of the solar system, the origin of continents, and the temperatures, seismology, geodesy, magnetism and tectonics of the earth. Although a physical and mathematical development is necessary and desirable throughout the text, a student needs only introductory college physics, calculus and geology. The author begins with a good introductory summary of cosmological theories. Throughout the text he is fair in presenting conflicting hypotheses but gives a critical evaluation of each in view of the data available.

The text is well documented by a lengthy bibliography.

Reviewed by Wayne U. Ault

The Earth Beneath the Sea, Shepard, Francis J., 1959, John Hopkins Press, Baltimore, 275 pp., 113 Figs.

This slim book of only 275 thin pages, is a refreshing contrast to the heavy volumes which line most scientific shelves. And, once the cover has been opened, the contents inside are quite different, too.

Shepard himself, writing in his preface, admits indirectly that this is a "popularization." It is, to use his words, less technical but more up-to-date than his previous book, *Submarine Geology.*

On page 4, the reader finds himself examining Shepard's mental processes when he (the latter) completed graduate study, and began to doubt some of the armchair doctrines ladled out in formal courses of that time. On page 5, the reader is taken along with the author on a bottom-sampling expedition into Massachusetts Bay, and a book-and-chart sampling foray in various attics in Washington. In a text-book, the results are reported with a straight face—or better still, by a narrator who stands behind a faceless curtain. But Shepard doesn't hesitate to tell what he did, why he did it, and how he felt.

In chapter II, six full pages are devoted to a highly personal account of a "tidal wave," experienced by the author in Hawaii in 1946, and some of the lessons learned therefrom. This narrative includes interesting

details — like what happened to his waterproof wristwatch — as well as scientific findings of practical value.

The personal touch is carried throughout the book, in much the same fashion: recollections by the author interspersed with detailed accounts of oceanographic phenomena. Here and there, bits of advice are offered the reader: how to enjoy holiday "beachcombing," how to avoid getting cut on a coral reef.

For the trained geologist, this should make interesting reading. For the marine geologist, the interest is even higher. For the nonspecialist, however, there will be difficulties, primarily in the technical (and undefined) words which Shepard assumes that his readers will know. Terms such as "fault" and "Cretaceous" are tossed in, where needed, perhaps on the assumption that any really intelligent layman shouldn't be derailed. Despite the occasional use of technical jargon, this is no text book. The list of suggested additional readings contains ten titles, including Rachel Carson's *The Sea Around Us,* and Shepard's own earlier book. The treatment, in general, is rather offhand, with just enough detail provided to allow the reader to appreciate the problem being discussed.

This comment is not to be taken as an indication that difficult problems are avoided: they are not. Shepard does not hesitate to discuss the problem of the origin of submarine canyons, and to admit that the answer is not yet entirely clear. He also ranges from a brief bit on the mechanics of wave motion, to the workings of the Sonoprobe.

The following list of chapter headings will serve to indicate the scope of subject matter covered:

Waves and currents modify the sea floor.
Catastrophic waves from the sea.
Our transient beaches.
The continental shelves that surround the lands.
Origin of continental shelves
The world's greatest slopes.
Canyons of the sea floor.
The deep-ocean floor.
Under the ocean bottom.
Coral reefs and their undersea wonderlands.
Using the present sea-floor deposits to interpret the past.

Every geologist should be familiar with this book. It would probably be good required reading for every geology graduate student also. And certainly every scientist in non-geological disciples could enjoy, and profit from, this easy-to-read-in-one-sitting account.

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OF INTEREST

F. Alton Everest and Irwin A. Moon published a paper entitled "A Film Processing Machine of Flexible Characteristics" in the *Journal of the SMPTE 67,* 758 (November 1958). Mr. Everest and Charles V. Gratz also published "Supplementary Lens Brought up to Date" in PMI - *Photo Methods for Industry.*

"Scientific Discoveries and the Christians," Joseph T. Bayly. *The Sunday School Times 101,* 471 (June 20, 1959). Included are the I.V.C.F. Editor's observations on this vital subject.

"Human Artificial Insemination" L. G. Underwood. *Gordon Review 5,* 59 (1959). A recent development of sociological impact, the author brings the subject into the open, with the hope that it will be studied from the standpoint of Christian morals before premature judgments are made.

Some extended summaries of the 1959 A.S.A. - E.T.S. Convention in Chicago appeared in the Christion Press. *United Evangelical Action,* organ of the N.A.E. had as its feature article "No Conflict between These Scientists and Theologians" by Dr. J. Barton Payne in the August 1959 issue.

F. Alton Everest was honored recently with a Doctor of Science degree, conferred upon him by Wheaton College. Dr. Everest's leadership in the field of Christianity and Science is exemplified by his work as Associate Director of Moody Institute of Science and as the first President of the American Scientific Affiliation. He has also made major contributions in electrical engineering and, more recently, in motion pictures, not as a contender for an Oscar but in unique devices and methods in both recording and processing.

"Evolution versus Creation - In Retrospect and Prospect." Wilbur L. Bullock, *Gordon Review 5,* 74 (1959). Dr. Bullock here attempts to clear away the misinterpretations of both evolution and Biblical creation. He presents a set of working principles to keep the student of the subject on a reasonable course.

"The Nature of Theistic Apologetics." Arthur F. Holmes. *Bulletin of the Evangelical Theological Society 2,* 1 (Spring 1959). A critical survey is made of some philosophical bases of the resurgence of interest in theistic apologetics.

Several articles of anthropological and sociological interest have appeared in recent issues of *Practical Anthropology* as follows:

"The Moral Implications of Social Structure." William A. Smalley. 6, 140 (1959). A letter and reply by Dr. Smalley appears as an editorial which amplifies a similar topic published earlier.

"The Role of Cultural Anthropology in Christian Missions." Eugene A. Nida 6, 110 (1959). Dr. Nida

suggests that the most important service of the study of culture is to provide a basis of communication.

"The Function of Religion in Society." Robert B. Fox, *6*, 212 (1959). Religious beliefs and social organization are interrelated and, the author also points out, missionary efforts are sometimes followed by complicated readjustments in family life as a result of conversion.

"The Sixth Window." Irwin A. Moon. *Moody* Monthly, 13 (September 1959). The Manager of Moody Institute of Science discusses sense perception in preparation for a new film on that subject.

Eternity magazine has recently published some articles of particular interest to many in the A.S.A. A few of these follow.

"Why a Scientist Must Believe," Warren Weaver, *17* (July 1959). Dr. Weaver, a vice-president of the Rockefeller Foundation, compares and contrasts faith as applied to science and religion.

"Will We Lose God in Outer Space?" C. S. Lewis, 14 (November 1959). Always interesting reading, Lewis faces the problems that come to mind concerning life elsewhere in the universe.

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1956 - 1959

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