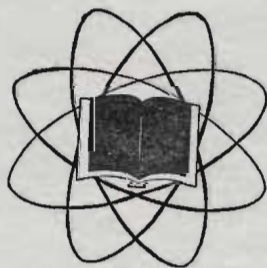


# JOURNAL

*of the*

# AMERICAN SCIENTIFIC AFFILIATION



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

Vol. 9

DECEMBER, 1957

No. 4

# 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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# The Journal Of The American Scientific Affiliation

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## EDITORIAL

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### General Secretary for the A.S.A.

It has for some time been pointed out that the American Scientific Affiliation should have a full-time Permanent Secretary. As indicated in a previous editorial (December, 1956) the magnitude of work, particularly that of the Secretary-Treasurer, has become so great that it is difficult to persuade someone to take over the task. Other important reasons cited for having a full-time officer are that increased publicity, contact, and membership would very probably result. A good example is the Intervarsity Christian Fellowship with its tremendous growth after the appointment of C. Stacey Woods as its General Secretary.

Recently another example of the benefits of a permanent secretary has been noted.

The Officers' Christian Union, a group of Christian military officers, was established in 1943. By 1951 their membership was about 50 officers and associates. In 1952, in spite of what might appear to be an inability to finance such a step, a General Secretary was appointed, Mr. Cleo W. Buxton. The result of this step of faith is that in 1957 they count a membership of 1,300 officers in addition to a mailing list of 300 associates and other interested people. They have added staff members, have established over thirty active chapters and publish a monthly organ *Command*.

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## NEW MEMBERS

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**Frances B. Key**, c/o Mrs. Curtis Simpson, Rt. 1, Poneto, Indiana, received a B.S. degree from Bob Jones University.

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# Report On 1957 A.S.A.-E.T.S. Joint Meeting\*

JAMES O. BUSWELL, III

On June 21 to 24 of 1955 there was initiated at Winona Lake, Indiana, what now promises to be a continuing series of joint conferences between members of the American Scientific Affiliation and the Evangelical Theological Society. Being very much the same in doctrinal beliefs, and having a great area of overlapping interests and common problems, and needing each other for a full and profitable discussion of these problems, it was believed that only in joint session, and in the use of a continuing liaison between the two societies, could such problems be efficiently treated.

The initial meeting was designed with the idea of sticking to fundamentals of methodology and basic approach. It was realized by all concerned that the theologians needed to teach the scientists some particulars about the scientific approach to scriptural analysis and interpretation just as much as they were in need, themselves, of instruction by the scientists on scientific particulars and data whose acceptance is virtually demanded, but about which many theologians still held honest reservations.

The results of that first joint convention, which in many respects constitute the most important single set of papers ever assembled in connection with the A. S. A., are published in Vol. 7, No. 3 of the *Journal*. (Sept. 1955)

On June 12-14, 1957, the second joint meeting of the A. S. A. and E. T. S. was held at Wheaton College. (Since all members undoubtedly received a copy of the program, it will not be necessary for me to review its contents at this time.) This report will be confined to matters of summary and evaluation which, with the aid of a selected representation of members have been accumulated for the dual purpose of reporting to those who could not attend, and of guiding our preparation for a third joint session presumably to be held in June of 1959.

One of the provisions made at the first joint session was for continuing liaison between the two societies on matters of common interest and relevance in order to obviate the necessity of succeeding joint sessions going back unnecessarily over the same ground. Thus it is important for the consideration of future plans, to examine this year's joint session in light of the question, "Did the second joint session proceed from methodological base lines established at the first session, without returning unnecessarily to debates of only limited or secondary joint concern?"

In spite of the excellent subject continuity envisaged by the planning committees, and embodied in the program, an affirmative answer to this question cannot be given without reservation. It was felt by some that the historical surveys of the achievements of each society might have been of more mutual interest if they had been devoted to a consideration of the function of *joint* conferences in achieving the purposes of each. Not that we were wasting each others' time, but that for *joint conference fare* the subject could have been oriented more profitably.

The presentation of specific problem areas, in some cases, tended to take too much for granted on the part of the opposite society. This is to be tolerated within science or within theology where frontiers of research and theory must be pushed; but it is fatal to productive joint discussion of problems in areas whose implications for various fields demand a level of presentation somewhat lower than otherwise. For example, with reference to the Wednesday evening session, intended as theological orientation for scientists, it was too technical for some. The discussion made it clear that many scientists did not understand the orthodox view, let alone the neo-orthodox.

One speaker voiced a caution, with reference to the question of building one meeting upon the progress of the last, that unless each member determines to *operate* in terms of these methodological guide posts, and base future efforts upon them, we may as well have a merry free-for-all merely for the fun (and who will deny that it is fun) of the intellectual interchange of ideas -- but get nowhere. One correspondent wrote me along this line, as follows:

"A round robin which goes from one end of the sciences to the other, and from the influences of verb tenses in Greek, Hebrew, and Aramaic upon eschatological questions to epistemological irregularities of phenomenology may show our diversity but what does one take home from such an intellectual roller coaster?"<sup>1</sup>

(This was not with specific reference to any one session at this year's joint meeting but only in considering the general topic of what is the best type of program to plan.)

At this year's joint meeting there was certainly no lack of profit and stimulation and real benefit from the interchange of ideas and discussion of common problems, despite certain weaknesses which this report is attempting to point out. One of the greatest values for many was in the very continuation of building methodological sign-posts which constituted the

\*Presented at the 12th annual convention of the A.S.A., Gordon College, Aug. 27-29, 1957

1. Dr. Berkeley Michelsen, personal communication.

objectives of the first joint session. Dr. Charles F. Pfeiffer delivered an admirably conceived set of postulates which should be restudied by every one of us and adopted into our future thinking if they are not there already.

Among other highlights was the degree of focus obtained upon the question of "What is evidence?" Complete agreement was not achieved, (and I think we all agree that complete agreement is *not* a primary objective,) but some clear things were said and profitable cross-fertilization of ideas was achieved.

Still another highlight was the "Block-buster" dropped by Douglas Block who presented an exceptionally provocative and suggestive defense of a world-wide Deluge supported not by the so-called "Deluge Geology" arguments with which our society has long since become familiar, but from the data of so-called "ages" or uniformitarian geology, leaving some of us, who had supported a limited flood, supposedly from the same geological premises, looking at each other, completely inundated!

Summing up, then, for the consideration of future joint meetings with the E. T. S. there have been precipitated since the last meeting several specific proposals which can be profitably brought to the attention of both bodies at this time, at least in tentative or provisional form:

1. That subjects for discussion should be handled by 2, 3, or 4 specialists rather than necessarily by individuals.

We need a Christian philosophy of man, with help from anthropologist, psychologist, sociologist, philosopher and Biblical exegete. Can we bring these minds together? Psychology and Anatomy of Religious Experience in terms of psychology, anthropology, sociology, etc. Philosophy of Science: concept of natural law, its relevance in the social sciences, scientific method, problems of induction, and causation, etc. The bearing of all this on theistic proofs, miracles, providence, and limited evolution, etc.<sup>2</sup>

Let four people present their views if the topic cuts across both the A.S.A. and E.T.S. fields, or two people if the topic is in the A.S.A. or E.T.S. area. Be sure that each person will present different viewpoints. If this is done, I cannot see how one could avoid a good discussion. I personally think that the people who attend these societies do not come just to be lectured at, or just to make new personal friends and contacts, but they come to learn through group participation.<sup>3</sup>

I had the impression that more was accomplished when different aspects of a single subject were discussed from different points of view rather than where isolated papers were presented. These became more specialized and of less interest to those in fields other than that of the writer of the paper.<sup>4</sup>

2. Have fewer papers, and fewer subjects per hour and more time for discussion.

2. Dr. Arthur Holmes, personal communication.

3. Dr. Berkeley Michelsen

4. Mr. Douglas Block, personal communication.

If I go to a meeting and see a whole series of papers listed as being given, I might have a lot to ask a fellow reading a paper in the areas of Hermeneutics, Biblical Theology, Interpretation, etc., but I wouldn't say a thing, since if any discussion develops we would never finish the papers. The fear that there will be no discussion must be the cause of the three-papers-per-hour agendas of many meetings.<sup>5</sup>

3. Maintain a standing liaison committee of three from each society with one from each society replaced every two years, whose chief responsibility would be (a) the planning of the agenda for the joint sessions; a specific program committee being selected to implement and fill out the over-all agenda handed down from the liaison committee; (b) to act as a publications committee, to see the proceedings of joint sessions through publication, unless the editorial committees of the publications of the two societies would be in a better position to implement this; (c) to entertain the possibility of inviting other bodies (such as the Christian Medical Assn.) into joint session, and even representation on the liaison committee for the planning of the agenda of such a joint session.

4. That those in charge of each and every meeting of the main bodies and regional groups of both societies make it a matter of regular business to report to the liaison committee their recommendations of any subject or problem, growing out of local discussions, which they deem of sufficient value for extension into the agenda of a future joint session.

5. That the editorial committee of the Journal solicit through the liaison committee, some opinion, comment, or statement from the E. T. S. on the doctrinal or theological implications of key articles submitted for publication, when, in the opinion of the editorial committee, such accompanying information is warranted.

6. That we constantly remain aware of the importance of maintaining a significant amount of emphasis in future joint sessions upon simple matters of *effective communication of ideas* through the utmost care in matters of terminology and methods of approach.

Do we understand each other's terms? I understand some A.S.A. people use the terms "vitalism", "creative evolution", "emergent evolution", etc. These are technical philosophical views—all of them essentially naturalistic. Likewise re: "image of God", "Soul", etc. Theologians need help in such concepts as "transcendentalism", "indeterminism", "quantum theory", etc.—as well as to be kept up to date on cosmology, biochemistry (is life manufacturable?), psych, etc.<sup>6</sup>

7. That some attention be given to the possibility of examining for example, Dr. Pfeiffer's paper of this year's meeting, and Dr. Michelsen's and others of the first joint meeting, specifically for the purpose of adopting certain elements *officially* as guiding methodologies and principles, upon which we could

5. Dr. Berkeley Michelsen

6. Dr. Arthur Holmes

all agree, for the planning of future investigation, convention fare, and publication.

It seems that over the years, time has been wasted simply because we have, on occasion, failed to take into account work that has already been done. It is not that each one must agree necessarily with all previous statements on a subject in order to do a paper on it; but he should be able to make the gains of others his own, methodologically, if not always

possible in data and theory, so that the calibre of A. S. A. publications and programs alike break new ground, gain increasing stature, and, with continuing collaboration with the E. T. S. develop a consistent, yet dynamic frame of reference for its philosophy of science which will enable the discussion of any specific subject to be adequate and expandable without unnecessary repetition.

## *Crossing In Relation to the Origin of New Groups\**

WM. J. TINKLE  
Anderson College

In this program we are considering the nature of change, as applied to groups of living things. Should we agree with the ancient Greek philosopher, Heraclitus, that all is in a state of flux, to the extent that we can count on nothing except change? Perhaps he, like some modern people, felt that the easiest way to get a hearing is to shock people.

In the beginning, let us notice some principles upon which there is general agreement. The diversity which we see among living things is not to be accounted for as response to diverse environments. These so-called "acquired characters" last but a single generation and since they do not modify the germplasm they are not passed on to the next generation<sup>1</sup>. Many experiments have proved that the new generation starts, like its parents, from the base line of the hereditary factors in its chromosomes.

There is general agreement, furthermore, that these hereditary factors or genes do not undergo gradual change.<sup>2</sup> At each cell division they are carefully split into two equal genes, and the daughter genes are pulled by the spindle fibers into the newly formed cells. The only way in which a hereditary factor changes is by the reorganization called mutation, which will be discussed in detail later.

### **The Role of Crossing**

I have been asked the question as to whether species can be crossed, and if the answer is in the affirmative, how much change this may effect. The question can not be given a simple and definite answer because there is not agreement as to what a species is. Certain criteria have been proposed but they are not applied alike by different classifiers.

A species is a group of plants or animals which is

different from any other group and the individuals within the group resemble each other. But how much resemblance is required? Some say they must be as much alike as litter mates, but other classifiers would say that this criterion exacts too much likeness and splits up the animals into too many species. If a classifier is a splitter he makes a large number of small species, while a lumper describes fewer species but makes them larger.

Another criterion is that a species maintains its identity in nature. Thus a two-headed calf is not a member of a new species because it is not the beginning of a new natural group. Now, in order for a species to keep its identity through a series of generations, its members must mate only among themselves. It is clear that if they mate with other species, the offspring will lose the distinctive morphology which justifies calling the group a species.

This rule also has been applied diversely however, for some groups have been split into different species simply because they are found living in different places. Linnaeus called the European buffalo *Bos bonasus* and the similar American animal *Bos bison*, but when brought together they mated and produced fertile offspring. Separated groups of the ibex, genus *Capra*, likewise were assigned specific names, but were found to be cross fertile.<sup>3</sup>

A group smaller than a species, called a race, variety, or breed, mixes freely with other groups and so loses its identity unless isolated by natural features such as islands or mountains or segregation by man. The crossing of these forms by such investigators as Mendel and Morgan has added many new varieties of plants and animals. The novelty consists of a new combination of existing traits, rather than the creation of new traits.

\*Paper presented at the Second Joint A.S.A.-E.T.S. meeting at Wheaton, Illinois, June, 1957.

In a few cases, even a new trait or character has been formed without a change in genes, but by bringing new genes together. For example a white rooster with black markings is mated with a black hen and the offspring are blue, called blue Andalusian chickens<sup>4</sup>.

It is readily seen, however, that these are not changes such as would bring about the postulated evolution of palms and pines, apes and peacocks from a blob of protoplasm. They are cyclic or alternative, not progressive, and in future generations the old characters reappear; for instance some chickens are splashed with white and some are black, along with the Andalusian blue.

#### Genetic Innovations

A change which reorganizes a gene, or replaces it with a new one -- trades an old lamp for a new one, so to speak -- is called a mutation, and the animal or plant having this new gene is called a mutant. It is to be expected that a complex process such as reproduction would suffer an accident once in a while. If this accident results in a new character which is heritable we call it a mutation.

Let us look first at some of the mutants which are supposed to be good. The Ancon sheep had short legs and was kept because it could be easily fenced in, but later the breed was discontinued because it was painful for them to walk around and it seemed a pity to keep such animals. At the Connecticut Experiment Station a tobacco plant grew six feet tall with big leaves all the way up, but it forgot to go to seed<sup>5</sup>. We prize seedless grapes, seedless oranges, stringless green beans and hornless cattle, but it is hard to see how these mutations benefit the organisms which have suffered such a change. Typical human mutations include albinism, short fingers, and lack of tooth enamel.

H. J. Muller, who won the Nobel prize for his work in mutations, in Washington, 1946, was cornered by a group of newspaper men who asked him to discuss the outlook for improving the human race. He answered, "Most mutations are bad. In fact, good ones are so rare that we can consider them all as bad."<sup>6</sup>

Now it might be said that beneficial mutations are being overlooked, that it is not enough to say that we have not found them. But Austin Clark of the U. S. National Museum says they are naturally defective. "A subtraction of something. Those differing widely from normal cannot develop past the embryo."<sup>7</sup> Dobzhansky also states that mutations which differ most from the normal are the most viable.<sup>8</sup> Now if the biggest changes are the worst it must be that the whole lot is bad, and we are not simply overlooking the good ones. Julian Huxley also agrees,<sup>9</sup> stating the larger the change the less likely it is to be an improvement.

Although a number of mutations have been seen to appear, we have not observed in them the advanced characters which would account for evolution. For instance, if evolution occurred it would be necessary that a mutation took place which changed a food vacuole to a stomach, one which substituted lungs for gills, another changing a nerve net into a brain. Still others would have to initiate a pancreas, an eye, and a mammary gland, even without precursor organs. Such changes have not been observed. In spite of the handicaps of changed form however, and the loss of vigor which usually accompany mutant organisms, some of them manage to survive. The large wingless bird, *Apteryx australis* and different species of wingless grasshoppers have the appearance of mutants. It may also be that the legs of snakes and the hind legs of whales were victims of this destructive type of change. The giant silk worms, *Samia cecropia*, whose pointed cocoons are marked here and there in trees by sharp eyes, seem to have lost their mouth parts by this process. But having stored much fat in the larval period, they are able to mate and lay their eggs before they die. In a changed environment a mutant character might even be an advantage, as an albino fox in the Arctic region. Thus the diversity of nature is increased.

#### Original Latent Traits

This paper would not be complete without presenting the suggestion of a professor in a medical college in Los Angeles. The probability is that the original kinds were created with genes for characters which were latent and did not appear until later generations. Such a plant or animal, having diverse genes and more of them than can be expressed in one individual, is said to be heterozygous. This mixed condition is found in a plant or animal in a generation following a cross, and it is altogether possible that they were created mixed.

For instance, a heterozygous black, rough-coated guinea pig mated with another having the same characteristics will produce guinea pigs of that type and also three other types: namely white, rough-coated; white, smooth-coated; and black smooth-coated.

If such characters do not arise from latent original genes we would say that they arose from mutation. But it seems to me this explanation does not fit so well for they do not carry the reduced vigor found in mutants, nor lack of any normal part.

#### Conclusion

In answer to the question, "Do species cross"?, it seems that some which have been so classified do cross, producing fertile offspring. Any such crossing tends to increase the diversity in animate nature, by making new combinations of genes.

New genes arise by mutation, but such as would account for advanced characters have not been ob-



served. Diversity may be accounted for by also postulating that the original plants and animals were created heterozygous.

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## How the Study of Science Has Increased My Faith\*

H. HAROLD HARTZLER, Ph.D.

Goshen College

I wish to express my appreciation to the faculty and administration of Eastern Baptist College and also to the local members of the American Scientific Affiliation for planning this Scientific Symposium on the subject, "Science and the Christian Faith."

Today as never before we are daily affected by the discoveries and development in the field of science. The whole world is now aware of recent scientific developments as is evidenced by the great amount of attention given in the press to the Sputnik. This present age can rightly be called the Age of Science.

However for the Christian the present intense interest in science is in many cases discouraging, for as man goes forward in science, he so often does not retain a faith in a personal God and Savior nor in the written record which God has given in His Word. Several hundred years ago this condition was not true. At that time practically every scientist was a firm believer in the Bible as the infallible word of God. Now, however, it is the exception rather than the rule, to find a scientist who is a believer in the inspiration of the Bible. Thank God, there are a few hundred Christian men and women of scientific training and ability who have banded themselves together for the purpose of integrating and organizing the efforts of many individuals who desire to correlate the facts of science and the Holy Scriptures. Each of these individuals has signed the following statement: "I believe the whole Bible as originally given to be the inspired Word of God, the only unerring guide of faith and conduct. Since God is the Author of this Book, as well as the Creator and Sustainer of the physical world about us, I believe there can be no discrepancies when both are properly interpreted. Accordingly, trusting in

the Lord Jesus Christ, the Son of God, my Savior for strength, I pledge myself as a member of this organization to the furtherance of its task."<sup>1</sup>

Now it has been my happy privilege to have been a member of this Christian group known as the American Scientific Affiliation for the past thirteen years. It is my personal testimony that in no other Christian group do I find such sweet Christian fellowship. My Christian faith has been strengthened and deepened during the years as I have met and worked with these men of science. However, I now wish to go back a few years and relate a number of experiences which show how the study of science has increased my faith.

First of all I want to pay tribute to my Christian parents who early taught me how to live a Christian life. I well recall how father, a minister of the Gospel, would tell Bible stories to his children. These wonderful stories of Old Testament characters will continue to live in my memory as long as the Lord grants me grace to live in this world. I was always taken to Sunday School and Sunday Morning Worship service. After a number of years I was also taken to the evening service of the church. I can also recall the concern which my Mother had with reference to the type of college which I should attend. Through her influence I had the privilege of attending a Christian College. Having always been very much interested in Mathematics, I searched for those subjects which contained the most mathematics. This led me to the study of Physics with the result that I did most of my graduate work in that subject.

Here I would like to relate an experience with a fellow student of my undergraduate days. This young man was in the habit of studying his General Physics

\*Paper presented as a part of a Symposium on Science and Christian Faith, Eastern Baptist College, Oct. 26, 1957.

1. Article II of the U. S. A. Constitution.

lessons with me. By this means we became very well acquainted. One evening he told me of his spiritual condition. He had been brought up in a Christian home, was in the habit of attending church services and had been a Sunday School teacher before coming to college. After studying science for several years he began to lose his faith in God and in the Bible as God's revelation to man. Thus by the time he was a Sophomore in college he felt that he had very little faith left. However, when he went home, he would always go to church and would teach his Sunday School class since he did not want his friends to know of his loss of faith and of his true spiritual condition. So he was a most miserable man. Yet he felt that he could do nothing about it.

This young man's story made a profound impression upon me. I had resolved when I started to college that by God's help I would retain my faith in God and his word. I was especially anxious about this matter since I had been warned by a minister that I would probably lose my faith if I would go to college. So the story of another who had lost his faith continued in my memory for a number of years. Recently I visited this former schoolmate in his home. On that occasion I inquired of his present spiritual condition. He told me that he had regained his Christian faith, is again a member of the church and in fact, is now a lay preacher. I then inquired how it was that he had regained his faith. He gave the credit to the good life and word of a local pastor.

I relate the experience of this young man as an illustration of that which has happened to so many students in our schools. They start out with a fine Christian experience, then under the influence of teachers and others through the study of science they begin to lose their faith and in many cases they become hopelessly lost. This experience of losing one's faith need not take place provided we have the proper conditions. These include the following: A good home and church environment, a strong personal faith, and awareness of the problem, Christian teachers of science who take a personal interest in their students, good literature which is relevant to the problem, and association with other Christians who are strong in the faith.

In my own case, as before stated, I did have the advantage of a good home and church environment. As concerns the matter of a strong personal faith I would say that my faith, while firm and steadfast, was not very strong at the time of my entrance to college. When it comes to the matter of being aware of the fact that one's faith may be lost or weakened, I am quite certain that I was fully conscious of this point. The church group from which I came had experienced this over and over as their young people left home and went to college. In so many cases those persons left their church either during or following

their college days. In a number of instances they completely lost their Christian faith.

I can still recall the saying of my Mother that no one from our denomination who had studied to be a medical doctor remained true to his denomination. There were a few exceptions, but this was the general rule. Therefore, I realized that I might expect some conflict between my Christian experience and those experiences which I might have while in college. So I had the advantage of an awareness of the problem.

I did have a number of fine Christian teachers both in High School and in College. However, I had very few who really took a personal interest in my problems. Right here I would like to put in a plea for many more Christian teachers in our schools and colleges who are personally interested in the welfare of their students. We as teachers should never be so busy that we do not have time to sit down and talk personally with individual students. There is a large field here for personal witnessing for our Lord Jesus Christ.

A rather large number of books have been appearing in recent years which may be of help to students who have difficulties in the area of science and Christian faith. However, in my own experience, I did not have access to much written material to help me. It may have been my own fault, but the fact remains that very little help came my way in book form.

It seems to me that probably the best method to aid a student of science to become stronger in the Christian faith is association with other Christians. I have had that experience through the years and especially during the last ten or more years. I would like to pay tribute here to my room mate in college. He was never very outspoken but in his quiet way he influenced me greatly. We were both members of the college track team, he running the two-mile and I the mile. I will never forget the wonderful lesson in endurance which I learned from my room mate as he ran the two-mile and never failed to make points for the team.

The study of Mathematics may appear to be rather dry and a bit irksome to many. However, to me it is a joy and a delight. Here is the discipline in which man can demonstrate to the full that he is quite different from others of God's creation. This is the area in which reason, imagination, and creative activity may be exercised to the utmost. The Bible says that, "God created man in His own image, in the image of God created He him." Genesis 1:27. It seems to me that one of the best demonstrations showing that man is created in God's image and therefore possessing, in some measure, His attributes is in the development of new mathematical systems.

In order to go very far in the field of mathematics one must be able to do some abstract reasoning. That is, one forgets all notions of the physical universe and

delves into the area of pure thought. Starting with a few fundamental concepts, definitions and axioms, one then develops a large number of theorems. The theorems are valid statements derived by rigorous reasoning from the original concepts. Then one finds that many of the theorems derived in this manner apply to the physical universe. To me this is, in a sense thinking God's thoughts after Him. He planned this universe, thought of man's place in it and even provided for our redemption before a single creative act was performed. Then He spoke the word and the universe with its wonderful order and all of its intricacies was created.

As Mathematicians we are able to continue to create new mathematical models, many of which become applicable to the universe. Thus as I have continued in my study of mathematics I find that I am drawn closer to God and my faith in Him grows continually.

I have previously stated that I did most of my graduate work in the subject of Physics. Here we study matter and energy in their interaction with each other and their various changes. As is now well known, matter may be converted into energy and this energy in turn may be converted into other forms or into matter again. When one studies these entities in great detail and tries to think upon the problem of their origin and destiny, it becomes necessary to either assume a creator and a sustainer of the universe or allow these problems to remain unsolved. In my own case, I have never had a very big problem there. It seems to me that the Biblical concept of God the Creator and Sustainer of the universe is intellectually satisfactory. No theory of science which has been used to remove the need for a creator seems very satisfactory, so the longer I study Physics, the greater does my faith grow in a personal God who is concerned about the whole universe. And He is concerned about me. This is another Biblical concept which is very satisfactory.

But you may ask the question, "Does the study of science lead one to believe that God, the Creator of the whole universe, cares about one individual on this small planet revolving about a rather small star, this star, which we call our sun, being a member of the Milky Way containing about one-hundred billion stars and the Milky Way being but one of one-hundred million known galaxies?" Yes, that is what the study of science has done for me. In particular the study of Physics and Astronomy causes me to believe that God cares for His own. Did you ever think of the fact that God has provided the sun for the purpose of supplying us with the proper amount of light and heat? Through the study of Astronomy we learn that the sun, instead of being a rather small object not too far away, is in fact a huge mass of gigantic proportions. It is so large that its volume is more than one

million times the volume of the earth. Its mass is about one-third of a million times that of the earth. Its surface temperature is so high that it exceeds that of the hottest blast furnace. The energy given off by the sun is so great, that if all of it fell on a cylindrical column of ice two miles in diameter and extending from the earth to the sun this entire column of ice would be melted in a second. The earth receives but one part in two billion of its energy and yet that is sufficient to keep this old earth going merrily on its way.

Then, too, the earth is located the proper distance from the sun with the result that in the main we are not too hot or too cold. As further proof that God is interested in His children we might mention the fact that the earth keeps rotating on its axis with the result that all sides of the earth are equally heated. Also this axis of rotation is inclined to the plane of the orbit of the earth about the sun with the result that we have our seasonal changes.

Like a great ocean about the earth we have an atmosphere which besides being essential for living plants and animals, also serves to make airplane travel possible, prevents thousands of meteors from falling to the earth and also prevents a large part of the injurious ultra violet portion of the spectrum from striking us. Then, again, God has provided the right amount of water on the surface of the earth so that we may have proper rainfall which is necessary for plant growth. In addition He has provided us with these plants and animals which we may use for our daily food. He has not forgotten anything to make our stay here on earth an enjoyable experience. Even the right kind of bacteria are present to cause decay of plants and dead animals so that the elements from their dead bodies can be assimilated by living things. Let us now take a look at the very small unit in God's creation. First as one takes a good look through a microscope at the marvelous order exhibited in both the animate and the inanimate world, we are made to marvel and exclaim that surely there is a Creator responsible for it all. Now the electron microscope enables us to delve more deeply into some of the wonderful handiwork of God. Beyond this the scientist has probed by indirect means into units of such small size that they seem almost to reach beyond our imagination.

We have often smiled when informed that the ancient theologians and philosophers were accustomed to discuss such things as how many angels could stand on the end of a pin. Yet no scientist smiles when informed that atoms of a simple substance like hydrogen are so small that if placed side by side, about five million such atoms would be necessary to cover the distance across the head of a pin. Such a statement is a scientific fact supported by a number of different lines

of evidence. But, again, does not this line of evidence support the idea that there is a God who is the Creator of all atoms?

For a long time the atom, as its very name indicates, was considered to be indivisible. Now in the twentieth century we feel quite confident that the atom can be divided into component parts. Usually we designate these parts as the nucleus and the extra-nuclear electrons surrounding the nucleus. Even though no scientist has ever seen an atom, a nucleus or an electron, yet the evidence seems to compel us to believe in their existence. Here we have a close analogy with the spiritual world. No man has ever seen God and yet we believe in His existence because of the evidence. Neither have we seen God's Son, Jesus Christ our Lord, nor yet have we seen the Holy Spirit, our guide in this life. Yet we do believe that they are just as real as anything because of the effect which they have had in our lives.

Now the scientists are attempting to see what is happening inside the nucleus of the atom. We might question whether this is at all possible since it is of such small size. It is well for us to consider the nucleus of an atom as to its size and possible structure. Not too much is known about the latter, though a number of theories have been proposed. We do know by indirect evidence again that its diameter is about one ten-thousandth of that of an atom. I think that it is safe to say that such small size mystifies us all. How can we very well think in terms of such dimensions when it would take more than two billion of them placed side by side to reach across the diameter of a human hair? Such small sizes evade us. However, we can marvel when we think of the God of the universe who made all of these small things.

We certainly can be grateful that this same God is one who is concerned about each one of us. More than that he is concerned about such small details as that of the very number of hairs of our head. I am led to praise Him more and more as I continue to study His word and the universe which He has created.

I would now like to briefly consider with you another area of science, the study of which has greatly increased my Christian faith. In almost no other area of science can the work of a Creator be better seen than in that of Astronomy. This is a vast field which truly shows us something of the omnipotence and omniscience of God. Let us begin by thinking together about the earth. You must remember that the Astronomer considers the study of the earth as falling within his province. As compared to man the earth is very, very large. We have been able to measure the earth quite accurately as to size, average density and mass. The size of the earth can be directly measured by essentially the same tools as one uses to measure the number of acres

in a given plot of land. The method of measuring its mass and hence its average density must of necessity be indirect. By making use of Newton's law of gravitation we come out with an answer which is so huge that we cannot well comprehend its magnitude. In terms of tons the mass of the earth is six thousand million million million tons. This number is so large that it would require the entire population of the earth, counting at the rate of one every second, nearly one hundred thousand years to count the number of tons equal to the mass of the earth. So that, as seen from man's point of view, (and from what other point of view can we proceed), the earth is quite large, but on the other hand it is small as compared with a number of the other planets which are revolving around the sun. For instance the diameter of the earth is but one-tenth of that of the planet Jupiter. When compared to the size of the average star the size of the earth seems to be quite insignificant. As we have previously mentioned the volume of the earth is less than one-millionth of that of the sun. Since the sun is but an average star and stars do vary greatly in size it is at once apparent that the whole earth is quite tiny when compared to a large star. Thus the Creator and Lord of the universe is seen to be One who has exhibited to us in some small way a part of His omnipotence. Just take a look up into the star lit sky some clear night and think again of the wonder of it all and of the Creator, who is even now concerned about your welfare.

Before leaving the subject of the earth I would like to think with you of some of its motions in space. To us who live on the surface of the earth it appears quite motionless. This is just one good illustration of the fact that appearances are often deceiving. The scientist must ever be on the alert to be quite certain that he is not being led astray by the report of his senses. And yet the scientist must in the final analysis depend upon the reliability of his senses.

We know that the earth rotates on its axis making one complete turn every twenty-four hours. The earth also revolves around the sun once every year. Then the earth and moon taken together as a gravitational unit rotate about their common center once each month. The axis of rotation of the earth which appears to have a fixed direction is in reality slowly changing its direction which adds another motion to the earth. The whole solar system, sun and all of the planets, is moving rapidly with reference to the stars toward the Constellation of Hercules. Finally the entire galaxy of stars known as the Milky Way and of which the sun is a member, is rotating on its axis. Thus this so-called stable earth is continually moving in at least six different ways in space. You may well ask the question, "Who guides all of this complicated motion." The answer of Paul in writing to

the Colossians appears to me to be the most satisfactory. "For by Him were all things created, that are in heaven, and that are in earth, visible and invisible, whether they be thrones, or dominions, or principalities, or powers: All things are created by Him, and for Him: And He is before all things, and by Him all things consist." Col. 1:16-17.

May we never cease to thank God, our Father,

Jesus Christ, his Son, and the Holy Spirit, our guide for the wonderful universe which has been prepared for us. By studying this universe in all of its various manifestations we are able to gain a more complete comprehension of our great God who has created everything for our enjoyment. Certainly the faith of all of us should continue to grow stronger as we learn more in the area of science.



# *The Scientific Method and Faith*

JOHN C. SINCLAIR  
U.C.L.A.

The phenomenal growth of science in the last few hundred years is so amazing that people in general have come to think that if given enough time and money, science can do anything. It will be able to find a cure for cancer, provide honeymoons on Mars, and even create life itself. How, may we ask, does science go about getting its results? The controlled experiment is the key. It starts by asking a question such as, what one substance is most essential for the growing cancer cell? Then an hypothesis or educated guess is made and an experiment is devised to test it. In the example chosen, cancer cells are isolated and grown in tissue culture, a tremendous feat in itself, then specific growth substances (metabolites) are withheld one by one and their effect on cancer cell division noted. The results are evaluated, and a new experiment is devised to test the conclusions. Thus experiment by experiment science moves ahead.

Men have not always experimented to find answers to their questions. In the Middle Ages men sought their answers from authorities such as Galen in Medicine, or the Church. In fact they did not dare do otherwise. Galileo demonstrated that all objects close to the earth's surface fall with the same acceleration. This contradicted what Aristotle taught; namely, that things move toward the earth because of their badness, a heavy stone contains more badness and so should fall faster than a light one. For contradicting Aristotle, Galileo lost his professorship at Pisa. With his telescope he brilliantly supported the Copernican heresy. This brought him before the Church Inquisition at Rome, where he was ruthlessly and unjustly condemned.

Some questions were thought to be unanswerable because an immaterial, vital force was responsible. Berzelius (1820), a leading chemist of his day, believed that the synthetic production of organic compounds was impossible, for a "vital principle" associated with living organisms was required. Wohler's synthetic urea (1828) refuted this idea and suggested that the body also produces urea according to chemical laws.

Pasteur believed that so called unorganized ferments or albuminoid substances were not ferments (enzymes) but the nutriment of organized beings. His disproof of spontaneous generation was intended to refute the possibility of fermentation apart from the presence of organized beings. In this respect he was a vitalist, for he believed that a vital force was essential for fermentations and organic syntheses. Liebig believed that

non-living ferments caused fermentation just as they cause digestion, (ie. pepsin in gastric juice), by a chemical process.

Edward Buchner (1897) attempting to preserve medicinal yeast extracts with sugar noticed that bubbles of carbon dioxide were formed. This fermentation process occurred in solutions passed through a Berkefeldt filter so it could not be due to yeast cells or bacteria. This discovery settled the Liebig-Pasteur controversy about the nature of ferments. Both men were partially right. The so called organized ferments acted within the cell whereas the unorganized ferments acted outside the cell.

As late as 1900 the ferments were still considered by many leading chemists as the peculiar domain of life, and hence could not be explained in ordinary chemical terms. Sumner (1926) succeeded in preparing urease in pure crystalline form. Its activity was due to its protein structure and was lost through denaturation. A crystalline enzyme can hardly allow for a vital principle, unless life is defined as the undenatured, active state of an enzyme. Today the total structure and function of living cells are considered understandable in terms of the relative concentration, activation and spacial orientation of the enzymes that compose them.

Gradually the areas in which life is considered to be distinct from chemistry and physics have diminished. One of the last strongholds of a vital force is still holding out. It is the phenomenon of regulatory behavior in embryological development. This is considered today by such men as E. Sinnott, to be inexplicable by chemical and physical mechanisms, and to be essentially the same as the mental and spiritual capacities of man in his purposeful goal-seeking.

The assumption that all life processes are essentially chemical and physical ones is the very heart of the experiment. The success of scientific experimentation has justified, and in the thinking of many scientists, has proven this assumption. I believe that a materialistic explanation is of necessity a complete one, but it is not the *only* explanation, though it is the only one which science is able to study. A painting, for example, can be completely described by measuring the amounts and the locations of the various pigments which compose it. We can all agree on such a description, and if anyone doubts it, he is at liberty to measure it for himself. But the effect the painting has on a person and so its beauty or value, can not be universally

agreed upon. (Hubble) But that it *does* have an effect we all agree. Such a description is complementary to a materialistic one and makes it meaningful to us.

In view of the necessarily materialistic basis of science no one should be disturbed when a scientific explanation leaves God out or contradicts a revelation from God. The Bible states that God created the plants and animals to reproduce their kind. Science explains the diversity of plant and animal life, and the ingenious way in which they are adapted to live where they live and do what they do, by a process of evolution. Organic evolution starts with a primaeval soup of organic compounds. Life, then, gradually evolved by the right combinations just happening at the right time. Random hereditary changes without any purpose or design, if they proved to be an advantage in the struggle for existence, were preserved. These fortunate occurrences accumulated through the ages, adding up to life as we know it. If those who believe the Bible had to imagine how it could have happened by natural processes *alone*, how else would they explain it?

The issue involved is one of faith. If a person believes in God he will see God's hand in many natural phenomena. If he does not believe in God, he will only see the natural processes. It is possible to say that God is responsible for *all* natural phenomena for He made the laws which they obey. But it is impossible to objectively know the existence or nature of God, unless it is possible to distinguish natural processes *alone* from natural processes through which God is working.

Faith in God assumes a knowledge of God. For the Christian this knowledge is revealed by God to man through the Bible. We believe that the statements of the Bible, as originally inspired by God, are true. The Bible then in addition to the world about us, is a source of truth. But our understanding of the statements of the Bible as also our understanding of the world, is not perfect and may not be correct. Scientists believe that the Universe is orderly and simple; therefore, they assume that the simplest explanation that accounts best for all the known facts, with the fewest exceptions, is closest to the truth. People untroubled by this conviction may find complex or unrealistic explanations quite satisfying. Our scientific theories are tentative, subject to new knowledge. Our religious beliefs should also be subject to new knowledge and simple. Not all theories of science are equally probable. Some theories are so well authenticated that they are considered to be laws. Some of the doctrines of the Bible are repeated so often and in so many different ways that the possibility of misunderstanding them is slight, and so they too could be considered as laws.

### Summary

An attempt has been made to convey a feeling for

the way biological science has developed. Its necessary disregard for religious beliefs and hence its limitation has been shown. Attention has been called to its unassuming simplicity as a desirable ideal for theology.

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## OF INTEREST

"Life 8,000 years ago uncovered in an Alabama cave," C. Miller, *National Geographic Magazine* 110 542, (October, 1956). Russell cave, near Bridgeport, Alabama, has yielded charcoal dated by radioactive carbon 14 as 8,000 years old. A series of strata covering the span to modern times were intact in the cave. An Indian skeleton 4,000 years old was found. Numerous pictures of diggings and artifacts are included.

"Jerusalem to Rome in the path of St. Paul," D. S. Boyer, *National Geographic Magazine* 110, 707 (December 1956). This is an excellent study of the 12,000-mile travels of the Apostle Paul with numerous photographs of the places Paul visited. Accompanying the article is a large annotated map covering Bible lands.

"The principle of uniformity in geology, biology, and theology" R. Hooykaas, *The Christian Graduate* 9, 153 (September, 1956). In a short paper, Professor Hooykaas of Free University in Amsterdam points out that the question of uniformity should be put into its proper place in philosophical thought. Both uniformity and miracle can find their places in Christian theology and science.

"Modern science and Christian faith" is a review in *The Christian Graduate* 9, 217 (December 1956) of the American Scientific Affiliation book.

"Science and theology in the Middle Ages" is another review in *The Christian Graduate* 9, 216 (December 1956). It concerns R. Hooykaas' article in the *Free University Quarterly* 3, 77-163 (1955). An interesting quote is (p. 137) "We conclude therefore that theology, the more it is free from philosophical stains, will be less at war with science, and science, the more

it is free from the influence of philosophical (quasi-religious) systems, the less it will be at war with theology."

"Evolutionary theory," *The Christian Graduate* 10, 40-41 (March 1957). This is a summary of two papers given at a meeting of the Christian Education Fellowship. One, by Dr. MacKay, Lecturer in Physics at King's College, London, was on the "Origin of the universe"; the other, by Dr. Aitken, Reader in Anatomy at University College Hospital, concerned the "Origin of man." The essential points of the papers are given.

"Modern psychology and the validity of Christian experience" M. A. Jeeves, *The Christian Graduate* 10, 67-73 (June 1957). The author, a Lecturer in Psychology at the University of Leeds, discusses clearly and concisely, Freud, emotion, conversion and mental illness.

"Radiocarbon dating" W. F. Libby, *American Scientist* 44, 98-112 (January 1956). This is an excellent general article on the subject of carbon 14 dating.

"Evolution of protein molecules and thermal synthesis of biochemical substances" S. W. Fox, *American Scientist* 44, 349-359 (October 1956). This paper and one by Melvin Calvin in the July 1956 issue are representative of one direction in which considerable work is being done in attempting to solve the problem of origin of living things.

"Psi phenomena and methodology" R. A. McConnell, *American Scientist* 45, 125-136 (March 1957). The author, a professor of biophysics at the University of Pittsburg, summarizes some of the problems and considerations of extrasensory perception.

## ANTHROPOLOGY

James O. Buswell III, M.A.

### Anthropology on L.P., "The Ways of Mankind"

Two fascinating albums consisting of twenty-six 29-minute programs of dramatized anthropological fare are available through the National Association of Educational Broadcasters.\*

Each album consists of seven records. Series I introduces the listener to fundamental anthropological subjects such as "culture", "language", "technology", "religion", etc. Series II contains six programs on Law and Justice, highlighting legal procedures of various peoples; a series of four programs on the life of the Yurok Indians; and three programs on Bali.

All of the programs contain a cross-cultural approach with narrator-lecturer combined with a skillfully dram-

atized story illustrating each subject. All are so rich with important teaching, dramatic excitement and humor that it is hard to single out those which are "best". Nevertheless, it can be said that two of these programs are particularly noteworthy: Program I of the first series, "A Word in Your Ear: A Study in Language" is tremendously instructive in presenting a conception of the functions of human speech in relation to culture in time and space which would be impossible outside of a cross-cultural framework. Also program 8 in the second series, "The Reluctant Shaman", (Yurok), is particularly outstanding in communicating the personal and cultural values, their initial opposition and subsequent change, in the call, training and practice of a native girl who becomes a tribal doctor or shaman.

The rest of the programs are as follows: 2. Stand-in for a Murderer: A study in Culture. (Tlingit). 3. Desert Soliloquy: A Study in Education. (Hopi). 4. When Greek Meets Greek: A Study in Values. (Athens and Sparta). 5. The Sea Lion Flippers: A Study in Ethics. (Yurok). 6. Sticks and Stones: A Study in Religion. (Arunta). 7. Legend of the Long House: A study in Authority. (The Iroquois League). 8. You Are Not Alone: A Study in Groups. (Sociology). 9. All the World's a Stage: A Study in Status and Role. (Sociology). 10. Home Sweet Home: A Study in Family. (Chinese). 11. Survival: A Study in Technology. (Eskimo). 12. I Know What I Like: A Study in Art. 13. Museum of Man: A Study in Society. (Summary).

Series II. Subseries on Law and Justice: 1. The Case of the Borrowed Wife. (Eskimo). 2. The Case of the Bamboo-sized Pigs. (Ifugao). 3. The Repentant Horse Thief. (Cheyenne). 4. Lion Bites Man. (Ba.Ila). 5. The Forbidden Name of Wednesday. (Ashanti). 6. Laying Down the Law. (Summary).

Subseries on Yurok: 7. Life of a Yurok. 8. The Reluctant Shaman. 9. The Sea-Monster and the Bride. 10. World Renewal.

Subseries on Bali: 11. The Isle is Full of Voices. 12. The Coming Out. 13. The Fighting Cock Refrain.

Expert consultants were used in the preparation of these valuable programs, all under the direction of Dr. Walter Goldschmidt, of the Department of Anthropology and Sociology, University of California. The special consultants were, for the subseries on Law, Dr. E. A. Hoebel; for the subseries on the Yurok, Dr. Alfred L. Kroeber; and for the subseries on Bali, Colin McPhee, Claire Holt, and Dr. Margaret Mead.

These programs are exceedingly useful not only in the classroom, but in missionary orientation programs and for adult discussion groups as well. The five Yurok programs provide a fairly detailed understanding of this tribe, their system of values, and how these structure the everyday behavior of the

\*Address orders to the N.A.E.B., 14 Gregory Hall, University of Illinois, Urbana, Illinois. \$25 per album. The scripts for the first album, Series I, have been published in book form: *The Ways of Mankind*, (ed. by Walter Goldschmidt, Beacon Press, 1954).

people. Series I can be easily correlated with the teaching of almost any introductory course, particularly since the half-hour programs leave ample time for discussion.

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## ARCHAEOLOGY

Allan A. MacRae, Ph.D.

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### The Relation of the Dead Sea Scrolls to Christianity

Although there have been many interesting developments in Biblical archaeology in the last few years, no other is quite as outstanding as the discovery and study of the so-called Dead Sea Scrolls. In my column on archaeology some months ago I outlined the history of the discovery and told something of the bearing of the scrolls.

Since that time evidence as to the genuineness of the scrolls has constantly been increasing until today most scholars are ready to admit that they came from the time of Christ and from the two centuries immediately preceding. The evidence for this is so extensive that it has become almost impossible to believe anything else. Although many scholars originally greeted their discovery with great scepticism, only one outstanding professor is still standing by his original position. This man, Professor Zeitlin, of the Dropsie College, gives frequent lectures in Philadelphia and New York attacking the genuineness of the discoveries. At the Twenty-fourth International Congress of Orientalists, held in Munich this summer, he spent over an hour presenting his claims that they are from the Middle Ages and worthless as far as giving evidence of the time of Christ is concerned. However, hardly another outstanding scholar agrees with him. The scholarly world has largely passed him by.

As we noted in the previous article, the Dead Sea Scrolls are of great interest for the striking evidence that they give of the remarkable accuracy with which the text of the Old Testament has been preserved during the many centuries in which it was copied and recopied. This is bound to increase the confidence in the Hebrew Bible of many who formerly were inclined to scepticism regarding the accuracy of its transmission.

Yet, most unfortunately, more people have heard of the Dead Sea Scrolls because of false inferences that have been drawn from them, than because of their true significance. An American journalist, Edmund Wilson, has written a romantic story of the finding of the scrolls, and has proceeded to draw from the non-Biblical scrolls all sorts of utterly unwarranted conclusions, detrimental to Christianity, and these have been widely publicized. Wilson's book has been trans-

lated into many languages. Wilson says: "The monastery of the Essenes, more than Bethlehem or Nazareth, is the cradle of Christianity." An English scholar, J. M. Allegro, has declared over the radio that Christian ideas about Christ were derived from the Qumran sect's ideas of their own teacher, who, he says, they thought of as "persecuted and crucified, and expected to rise again as priestly Messiah". A French scholar, Professor Dupont-Sommer, says that "the Galilean Teacher, as he is presented to us in the New Testament writings, appears in many respects as an astonishing re-incarnation of the Teacher of Righteousness." A Swedish journalist has concluded as follows: "Christianity has come into existence in a completely natural way, as a Jewish sect. It is not necessary to believe in the miracle that God has interfered by a special act of mercy in order to save humanity."

Such sweeping statements make one wonder what has been discovered, that has so destroyed the foundations of Christianity. The answer is, nothing. The statements quoted represent the imaginations of their authors. Perhaps they are the result of wishful thinking. Ninety per cent of the serious scholars who have studied the Dead Sea Scrolls will readily agree that no evidence has been found that warrants such statements.

Let us examine the basis upon which these revolutionary statements are made. The Qumran sect held in high esteem an individual whom they called "the Teacher of Righteousness". It is reasonable to think that he must have been a man of ability and energy, whose ideas found expression in the organization and continuance of the Qumran sect. But nowhere do we find an orderly account of his life and achievements. His name is never given, nor is there any clear indication of the time at which he lived. Many attempts have been made to identify him with some person known from other sources, but none of these can be proven. These attempts select individuals scattered over a period of more than two hundred years. A few hints of the opposition that he faced are given, but these are rather vaguely stated. Almost every movement that has continued for any length of time has had a leader and founder, and Qumran was no exception. Christianity also has a leader, whose memory it reveres, and whose teachings it seeks to follow. Is there enough similarity to say that one was derived from the other? Those already noted could be found in almost every movement that ever existed.

Those who claim that the Qumran material destroys the basis of Christianity, insist that the outstanding ideas of Christianity, instead of representing actual facts, are simply taken over from the ideas of the Qumran sect. But one looks in vain in the Qumran material for the basic features of Christianity. Only an overactive imagination can find them there.

Dupont-Sommer declares that "the Galilean teacher, as he is presented to us in the New Testament writings, appears in many respects as an astonishing re-incarnation of the Teacher of Righteousness". This is a tremendous statement, but what are the facts?

Christians believe that Jesus was God Himself, incarnate in human form. He was miraculously born. He was tempted of Satan. He went about through Judæa and Galilee preaching. He was no ascetic, but took part in the happy occasions of life. He Himself said, "The Son of Man came eating and drinking" (Matt. 11:19). The New Testament declares that He performed great miracles of healing, even raising people from the dead. He claimed to be the Messiah, and declared that He would return on the clouds of heaven (Mark 14:62). He said that He would give His life as a ransom for many (Mark 10:45). He was seized, accused of blasphemy for declaring Himself to be God, crucified, and buried. On the third day He was raised from the dead. His disciples went all through the world declaring these facts, and asserting that all who would accept His atoning death as the propitiation for their sins could be saved, and that He would come to dwell in their hearts.

These are the outstanding things that were claimed by Jesus and taught about Him by His followers. This is "the Galilean teacher, as He is presented to us in the New Testament writings." Is he "an astonishing reincarnation of the Teacher of Righteousness"? Just how many of these features do we find in the Qumran pictures of that individual?

We find only this, that he was a teacher, who gathered disciples and established a sect, and that he was persecuted by those who disapproved of Him. This much could also be found in the history of almost every man who ever founded a sect.

In all the Qumran material that has yet been discovered and published, there is nowhere any statement that the Teacher of Righteousness was God, or that he claimed to be God, or that anyone else ever thought him to be God. There is no statement that he was born in any different way than other mortals. There is no reference to his having been tempted by the devil. It is true that he, like many another, was interested in spreading his views, but whether he went about preaching, as Jesus did, is not known. He made his followers take very strict ascetic vows, quite contrary to all that we find in the life of Jesus or in the attitude of the early church. There is no statement in the Qumran literature that he ever performed miracles of healing, and certainly no suggestion that he ever raised anyone from the dead. There is no evidence that he ever thought himself to be the Messiah. The Qumran sect seems to have expected that ultimately two Messiahs would come, a priestly Messiah and a kingly Messiah, but there is no proof that it expected that either of

them would be the same person as the Teacher of Righteousness. There is no evidence that the Teacher of Righteousness ever said that he would return to earth on the clouds of heaven. There is no evidence that the Teacher ever said, or that anybody else ever thought, that there would be any special significance to his death. There is no real evidence that the Teacher of Righteousness was crucified. In fact it is not even stated that he was put to death, in any of the material that has come to light thus far. There is no evidence that the Teacher of Righteousness was raised from the dead, or that anybody ever thought he had been raised from the dead, though there is reason to think that he may have been dead many years when the last of the scrolls was written. There is no evidence that the Qumran people ever thought that the Teacher of Righteousness could do something that would save an individual. Their only hope lay in following his teaching. Their faith was in what he had said, not, as in the case of Christianity, in him personally or in anything he had done or could do. The followers of the Teacher of Righteousness formed a closed group, which no one could join without years of probation and the taking of very strict vows. This is entirely different from the procedure followed in the establishment of Christianity, as even a superficial glance at the Book of Acts will clearly show.

Mr. Allegro claims that the texts prove that the Teacher of Righteousness was crucified. However, this is purely an inference, and, in the opinion of most scholars, an unjustified inference. Nowhere do the texts say that he was put to death, merely that he was "gathered in", a phrase which could just as well refer to death from natural causes. Even if Mr. Allegro's claim that the Teacher was crucified should eventually prove to be true, there is still no slightest evidence that he or anyone else attached any atoning significance to his death.

What a great number of differences between Christ and the Teacher of Righteousness! None of the distinctive points of Christianity are found in him at all.

It is true, of course, that some of the teachings of Jesus can be paralleled by statements in the scrolls. For that matter, many of them can be paralleled in the teaching of the Rabbis, known to us as the Talmud. Along with the similarities are also found very considerable differences. Such parallels may in some cases enable us to understand His meaning better, but they do not in any way detract from His claims about Himself. He was the Son of God, come down to die for our sins. Through faith in Him we can be saved. The beginning of Christianity was a miraculous interposition of God into human life, opening the way for lost humanity to find eternal life.

The Dead Sea Scrolls give wonderful evidence of the dependability of our Old Testament text. They tell



us some previously unknown facts about life in Palestine in the first century A.D. and before. But they neither add to nor detract from the unique achievements of the Son of God, who died that we might live.

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## BIOLOGY

Guest Columnist, Dr. John W. Klotz

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One of the most compelling evidences for the existence of God and for Creation by Him rather than by blind chance is the existence of so many complexities, intricacies, and balances in the biological world. These are so finely adjusted that when man interferes with them or attempts to improve on them he is likely to cause tremendous upsets and bring harm down on his own head.

Perhaps the best example of man's attempt to improve on the balance of nature was the importation into Australia of 24 English rabbits by Thomas Austin in 1859. Because they had no natural enemies they multiplied beyond all expectations and did serious damage. They destroyed much of the grass on which the sheep fed and upset the Australian economy which was dependent on wool. Now that the rabbits have been brought under control through myxomatosis, prairies once ravaged by erosion and hills grazed to the soil for decades are miraculously clothed with green. In one recent year the sheep industry alone showed an increased productivity worth about \$84,000,000.

A similar situation exists on the Lacquarie Islands where rabbits were introduced to improve the food resources. Soon they began to destroy crops. Here man attempted to repair the damage for which he was responsible by introducing cats. For a time the cats preyed on the rabbits and this was successful. But once the rabbits had been disposed of, the cats attacked the seabirds which the natives greatly prized. Once more man intervened. This time he released dogs to reduce the number of cats. But the dogs preferred seals, which are important adjuncts to the natives' food supply. And so at present, attempts are being made to destroy the dog that man introduced to destroy the cat that man introduced to destroy the rabbit that man introduced.

It is not uncommon that interference with nature to deal with one problem raises another. Such has been the case with the various drainage projects intended to increase the amount of land available for agricultural purposes or to decrease the number of mosquitoes by decreasing their breeding grounds. Though these projects are well intentioned, they are also likely to decrease the number of ducks, for ponds and marshes are their breeding grounds. At one time ducks bred throughout the upper Mississippi Valley; today because of the drainage of swamps and ponds very few ducks

breed in the United States: breeding is restricted almost entirely to Canada.

Indeed such an apparently unrelated thing as an increase in the price of less desirable furs may lead to a decrease in the number of ducks. One of these less desirable furs is that of the skunk. Turtle eggs form a very important part of the diet of skunks. Turtles, in turn, are important enemies of small ducklings. An increase in the price paid for skunk fur might well lead to an increased trapping of skunks. This might well lead to an increase in turtles and a consequent decrease in the number of ducks.

Another example of upsetting the balance of nature by trying to solve a biological problem may be seen in what is happening today in one section of Colorado. The ranchers of the Toponas district there, wishing to save their cattle, carried out a campaign to exterminate the coyotes who were attacking their lambs and young calves. The campaign was successful and the coyotes disappeared. Then the ranchers noticed that their pasture land was no longer able to support as many animals as before. With no coyotes to keep them in check, rabbits, gophers, and other rodents began to attack the meadows. While coyotes ate an occasional lamb or calf, they actually did the rancher a favor by keeping these pests under control. At present the ranchers there are encouraging the coyotes to breed.

A similar problem is the control of flies and mosquitoes by spraying with DDT and other insecticides. At one time insecticides—and also herbicides—were rarely necessary. There were a great many birds around to eat insects and weed seeds. Today chemical control measures are necessary because the birds have in many cases been driven away. Yet the insecticides being used today are effective not only against mosquitoes and flies but also against useful insects such as the honey bee. Extensive use of DDT in an area might actually reduce the fruit crop in a given area by killing off the pollinating bees and flies, and might upset the balance of nature in other ways. In July 1955 extensive DDT spraying was carried out in Yellowstone National Park and north of the park to control the spruce budworm which attacks the conifers. The result was a reduction in the number of fish in the Yellowstone River. White fish and brown trout were especially adversely affected. These died because of a lack of aquatic insect life on which they relied for food.

The gypsy moth was imported into the United States in 1886. It was hoped that by using this moth a native silk industry could be established. Accidentally it escaped, and the moth has proven to be a serious pest. In 1953 1,500,000 acres of trees in New England were defoliated. About \$9,000,000 will be spent this year by federal and state governments to control this pest. It is hard to conceive of the extent of this insect's activities. While walking through the woods on Cape Cod

several years ago it was actually possible to hear the larvæ chewing. Auto accidents occurred on highways made slippery by the crushed bodies of thousands of the larvæ.

The English sparrow was brought to the United States in the 1850's to control insect pests. By 1875 it had crossed the continent, and today it is itself a serious pest. In 1890 sixty starlings were released in Central Park in New York. Today the starling is also a serious pest.

Even plants can become serious pests. The Canada thistle is an example of such a plant pest. It was introduced into Canada from England and has now become the most noxious weed in our northern states. It spreads rapidly. In some states there are severe penalties for letting it ripen or selling seed which is contaminated with thistle seed.

Actually in most cases God maintains a good balance in nature so long as man does not interfere. And by interfering even with the best of intentions he is more likely to do harm than good. Often we think of the supposed needs of wild animals in our national parks. We attempt to protect them by killing predators and by providing winter feeding for them. Yet in most cases we are not really helping them. The animals killed by predators are relatively few in number. They are the weaklings and probably would not survive long anyhow. In most cases our actual choice is a threefold one: permitting them to be killed by predators, allowing hunters to shoot them, or permitting them to die from exposure during the winter. Yellowstone National Park is an example of a situation in which the balance of nature has been upset. The elk there have few natural enemies because of intensive anti-predator campaigns. They have multiplied to such an extent that they are a real problem. Moreover, they have extended their range into the swamps and marshes which are the ordinary feeding grounds of the moose. The result is that the number of moose is declining.

Now all of this is a powerful testimony to God's wisdom. The balances which He has established are delicate and in most cases almost perfect. Man interferes with them at the risk of doing considerable damage. Man should be very hesitant to attempt to improve on the balance of nature. He is more likely to upset one of these delicate balances than he is to effect real improvement.

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## CHEMISTRY

Walter R. Hearn, Ph.D.

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A.S.A. Conventions are always exciting and stimulating to me and the 1957 Convention was particularly so. I came back from Gordon College more convinced

than ever of the importance of our role as a group of Christian men of science, and resolved to devote more of my time and effort to the cause of our Affiliation. One of the suggestions that came up in our scheduled discussion on the Future of the A.S.A. and that was echoed in many an unscheduled "bull session" was the need of fostering closer fellowship among A.S.A. members. It seems obvious that the best place to begin is among those of us in the same scientific field. The new section of the Journal represents an attempt to do this for the chemists of the A.S.A. My idea is for only a part of the Chemistry Section to be a review of literature in the field bearing on our Christian faith. I do hope that many of you who are active in the various branches of chemistry and who keep up to date with the literature in your own corner of the field will contribute frequently to this section. But in addition to this part *by* Chemists for the rest of the A.S.A., I hope that a large part of the column will be *about* chemists in the A.S.A. and written *for* them specifically. In other words, this section of the Journal may serve as a forum for the exchange of ideas and information among those of us who are chemists.

A casual glance at the directory reveals that many of our members have degrees in chemistry. Some of us are teaching in high schools, others in small colleges, and still others in large universities. Some of us have little or no opportunity to do research, some are working alone on small problems, and still others are making major research contributions in academic institutions, government laboratories, or industrial concerns. Some of us are involved in administrative or managerial positions related to chemistry or chemical engineering. But we all regard ourselves as chemists, and we do have many common interests and problems in connection with doing our daily work and integrating it with our Christian philosophy of life. I always look forward to the opportunity of discussing these problems with the friends I make at our Annual Conventions, but I know that many of you seldom attend an A.S.A. Convention and might welcome a chance to discuss some of these things through the Journal. I can think of several times when Christian friends have meant much to me in my professional development, and I can think of many ways in which we might be of help to each other if we were only better acquainted.

For one thing, many of us attend the same professional meetings and would enjoy getting together for at least a chat and possibly for a meal or even to room together at meetings of the American Chemical Society or other meetings we attend. It would be relatively easy to arrange such contacts through the medium of this column. Of course we don't all go to the same meetings, but I'm sure that Christian

fellowship means so much to each of us that we would be glad to know of even one other Christian who would be at the same meeting we plan to attend. We might even schedule a breakfast or luncheon meeting at the A.C.S. and get it on the program of events. A notice on the bulletin board explaining the nature of the A.S.A. and announcing such an event might attract some new members to the Affiliation. I understand a few of our members have been getting together during A.A.A.S. meetings, but most chemists seem to go to A.C.S. meetings instead. Many of us in biochemistry attend the spring "Federation" meetings instead of or in addition to, the American Chemical Society. Discovering other Christians in my own field is always stimulating to me, and it always gives me a thrill when I later see their papers in the literature. The week this column was written, for example, I came across three papers by A.S.A. friends in three different journals, and may have missed many more simply because I didn't know the authors personally as A.S.A. members!

Also, there is the service we could render each other in the matter of counselling students. If we knew more about the research programs of our members on university faculties, we could give better advice to prospective graduate students who wish to work with Christian professors. In fact, there is no reason why we couldn't be of real help to each other in the matter of our own employment. For example, I know right now of a liberal arts college in the Midwest which is actively looking for a Christian to become Head of their department of chemistry. From what I know about the situation, this seems to be an excellent opportunity for the right person, and I would like to be able to suggest someone for the position. Incidentally, if any of you feel you are perhaps qualified for this position or would care to suggest a candidate, I will be happy to pass your name or your suggestion on to the president of the college. If I knew more of you personally, or had an up-to-date file on what A.S.A. chemists are doing, I could probably have easily made several suggestions already.

An important function we could perform for the A.S.A. if we were better acquainted with each other is that of serving as referees of papers for the Journal and for our Annual Conventions. The Program Chairman for the 1957 Convention told me that there is a real need for referees but that often the Chairman doesn't know which members are qualified by their experience to serve as referees in the particular area covered by a submitted paper. As the Affiliation grows in size and gains maturity it becomes more and more essential to utilize the experience of our members in various scientific fields.

There are still other benefits to be gained from

our having a forum such as this column if those of you who are chemists are willing to take an active part in it. The Editor has kindly agreed to let us try it on this basis, and I have volunteered to serve as "Chemistry Editor" of this Section until someone else wants to take over, or until I can stir up so much interest among biochemists that we want to start our own "Biochemistry" Section. If we had a Biochemistry Section, we might even let a few of you physiologists share it with us! Seriously, if you think such a column as this is a good idea, I hope you will write to me, especially if you have some specific suggestions for future issues. When you write, why not tell me what kind of position you hold, what courses you teach, what research you are doing, what you have published lately, what meetings you usually attend, what sort of Christian activities you participate in, and, in general, the kind of things you would like to know about other chemists in the A.S.A. Are there problems which have come up in your professional life which you would like to see discussed? Have you had opportunities to witness for Christ through your professional activities that you would like to share with us? Do you have any suggestions for making the A.S.A. more effective?

Well, let me hear from you, and we will get the column off to a good start in the next issue. Incidentally, the Editor's deadlines are the first of November, February, May, and August for the issues which come out the following month. By the way, I expect I may attend the Federation Meetings in Philadelphia in April and the A.C.S. in Chicago next September. Do any of you plan to be there? How about the A.C.S. meeting in San Francisco in April? Drop me a letter or a postcard if you plan to attend one of these meetings and I will let you know of other A.S.A. members who tell me they plan to attend. My address is:  
Dr. Walter R. Hearn  
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Ames, Iowa

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## PHILOSOPHY

Robert D. Knudsen, S.T.M.

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### Sputnik and the Philosophy of Education

The firing of the Russian sputniks has naturally stimulated the discussion about American education. We have been used to the discussions about the "three R's" in our primary education. We have been warned that our educational facilities will be greatly overburdened in the next few years and that we shall have great need for teaching personnel of high ability. But these discussions which have been going

on for a number of years have suddenly taken on a desperate note, since it has been driven home to us that America has not been providing experts in the quantity and of the caliber to keep abreast of the all-out technical program in Russia. For one who is not actually on the scene in America it is not easy to get an accurate picture; but it appears that the American public has been shocked by the recent demonstration of the Russian lead, which seems to grow bigger with each satellite rocketed into space.

This shock will undoubtedly give a big push to a program to better our schools for the training of scientists. Such a program is certainly necessary, and the world being what it is, the failure to succeed in such a program will mean the loss of leadership for the United States and might possibly mean destruction. This shock will also mean that intellectual laxness and anti-intellectualism will become less popular. School children will be coddled less and will be urged to enter scientific careers where hard thinking is a necessity, not only something for a few "egghead" intellectuals.

In the discussion, however, as I have followed it up to now, there is often a tacit assumption that must be uncovered and criticized. It is that the ultimate problems of man and of this world can be overcome by means of human technical planning. It is the same assumption about which Eliot has written, when he has criticized those "who dream of systems so perfect that no one needs to be good." It is the assumption that C. S. Lewis has presented in its logical extreme in his novel, *That Hideous Strength*.

It appears that this assumption is that which guides the Russian social architects also. They are driven by the faith in the inevitable collapse of capitalistic society and in the coming of the world revolution, whether it be by violent means or by more peaceful ones. They have been leashing all their forces to cooperate with this dialectic of history, excising by mass murder the elements which will not cooperate. Fundamental to Marxism is an interest that the person not be exploited. It is possible to speak therefore of a "personalistic" element in Marxism. It is nevertheless true that the individual has never been more subjected to a socially planned machine than under the rule of Communism. Individual worth is measured in terms of its contribution to the cause of world revolution, which means the production of the necessary instruments for world revolution, as measured e.g. in machines and "realistic" political strategy. This paradox finds its relative justification in the fact that this subservience to the cause of world revolution is thought to be the only means of attaining the idyllic personal freedom which will naturally come after the revolution has eliminated the socioeconomic cause of human misery.

On the side of the West a strong objection is raised to this program in terms of the belief in the absolute worth of the individual, in other words, in human freedom. Kant expressed this faith when he said that the individual was not to be treated as a means but as an end. This faith is very active in the West, where it appears periodically in declarations of human rights, which assert the inalienable rights of the individual, which are his because of his human nature. This common human nature is traditionally found by Humanism in man's reason.

There is not a sufficient recognition, however, of the crisis which this Humanistic ideal has undergone in our culture, because of the relativisms e.g. of psychologism and historicism. It is not often known how far the faith in a common human nature and in inalienable human rights has been undermined.

A symptom of this crisis and a huge attempt at a cure is found, for instance, in the existentialistic thought of Karl Jaspers. Jaspers says that there is no knowable human nature on the basis of which one could express a body of inalienable human rights. His philosophy expresses the crisis of our humanistic culture. Jaspers is engaged, on the other hand, in overcoming this crisis by opening up a new level of human freedom, of Existenz before the transcendent. We have discussed this attempt in earlier columns, and we shall also have occasion to discuss it in later ones.

It is part of the crisis of our Western world that this threatened ideal of absolute human worth has always had to wage battle with the idea that man has worth in terms of a "function." As Herman Dooyeweerd has shown, this antithesis has been present in humanistic culture from the very first. In his language it is the antithesis of the "personality ideal" as over against the "ideal of science." The present crisis in our Western world is partly that we are continually threatened with the idea that man's worth is in terms of one or another function and with the idea that social planning or human engineering is the way to solve the human problem, and that we are at the same time trying to throw up a dike against this faith in terms of what seems to many to be an outworn rationalistic faith in inalienable human rights.

It is an oversimplification to think that the West stands for human personality and human freedom and that Communism stands for man's worth only as a function; for this antithesis has been present in our humanistic West from the very first. It is not in Russia that the faith in technology was born; it was in the West. Further, it is this faith which animates a surprising number of our Western thinkers. It is true that this faith is continually held back by the antagonistic faith in human personality and freedom. The latter faith is still strong enough to stop



us from totally mobilizing human resources in mass planning. But we should not oversimplify. It may sound extreme, but I believe that in the Communism of Russia the West is faced with some of its own worst products. Here the "ideal of science" has fewer brakes than in the West; it has been able to show more of its "hideous strength." But this ideal is first of all a product of the West itself. The same can be said of the Communistic atheism and materialism.

With the coming of the sputniks and the opening of the interplanetary age (It was a short "atomic age," wasn't it!) the question of education will become more acute. That will also inevitably raise the question, "Education for what?" Loosely expressed, this is the question of the philosophy of education. The way our predominately humanistic West will pose the question will divide along the lines of the antithesis we have been discussing. Will it be education of cogs for a machine? Will it be an education with the presupposition that human ills can be finally erased by means of human planning? Or will it be an education which tries to defend a humanistic ideal of the absolute worth of the individual?

During this discussion the Christian should be ready to unmask the false belief in the scope and power of human engineering. He should also be aware of the crisis in which the humanistic alternative, the faith in the absolute worth of the individual, is involved. He should also ask himself seriously whether there is not an alternative statement of both the human problem and of the solution for that problem, to which Humanism is blind, but which he can discover, led by the revelation of God in the Scriptures.

Schiedam, Holland.

November 15, 1957.

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## PSYCHOLOGY

P. D. Marquart, M.D.

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This is an instructive experiment to try upon a group of people as a parlor game. Give each one a blank card on which they can keep tally for themselves. Tell them that you are going to utter a "bad word" which they are to try their utmost to keep out of their minds. They must work hard and keep their minds on the task at hand. Every time a naughty word comes into their minds they are instructed to give themselves a black mark. Time them sixty seconds for the task and continue to suggest to them that they try hard. The word given may be "devil" or "sin" etc, changing the word each time the task is repeated. They will be surprised at the number of black marks they accumulate. Some of them will have

fewer black marks. Inquire how they controlled their thoughts and the chances are that they were trying some indirect way of replacing other fascinating topics in their minds, perhaps even Bible verses. Then repeat the experiment with instructions for the whole group to try these methods of letting such a mind be in them.

You will find that some in the group have had difficulty in controlling their thoughts and they will tell you about it privately. They will have learned a valuable lesson in controlling their thoughts. It is surprising how many people have trouble with unwelcome thoughts coming into their minds. They blame themselves for it and consider that these suggestions are their own guilty sin and not mere suggestions which are cast into their minds from the outside. It is better for them to realize that these are solicitations and temptations rather than personal sins, but that something must be done about them lest they become an integral part of the thinking. It is evidence that evil beings exist who are able to influence the superficial consciousness with wicked ideas. Christians often struggle against these blasphemous and often impure ideas, and failing in the struggle against them, they sometimes listen to the accuser of the brethren and believe they are actually headed for perdition. To such, this valuable lesson in psychology for the glory of God may help them a little. However the Christian should remember that any purely secular struggle against the enemy will end in failure unless we are ready to plead the finished work of Christ, in the full armor of God. One such believer resisted the devil and made him flee from him by simply repeating the name "Jesus, Jesus, Jesus". We should remember that the enemy is already overcome and that he is a defeated foe (Col. 2:15, Heb. 2:14) We ourselves, moreover, are already translated into the kingdom of His own dear Son (Col. 1:13). "Nay, we are more than conquerors," but we cannot win on our own power alone.