

letters

placed by computers capable of far more situation possibilities than before. The design was completed in 1953.

JOHN G. BRAINERD

University of Pennsylvania
Philadelphia, Pennsylvania

6/82

Equal opportunity?

"Physics in Saudi Arabia" in May (page 11) poses a most attractive career invitation. My years in research and teaching seem to qualify me.

However, a haunting old phrase intrudes upon me. I "need not apply." For that matter, were they alive and in search of employment, Albert Einstein and J. Robert Oppenheimer, among many others, "need not apply."

As wonderful as Saudi opportunities in physics appear, I don't think I'll apply.

DANIEL M. EKSTEIN

Borough of Manhattan Community College
The City University of New York
New York City

6/82

Need for differential salaries

Your article "No federal aid for precollege science" (July, page 57) barely mentioned the biggest reason that there is a shortage of math teachers. In most school systems, math teachers are paid no more than teachers of any other subject. Salaries and raises are determined by *how long* they have been in the system and *how many* college courses they have taken past the Bachelor's degree, not by *how good* they are as teachers or by *what* courses they take. A one-week course in local history in the summer is as good as a regular course in math or physics as long as the number of credits is the same. The school systems themselves could greatly improve the situation in mathematics by adopting differential salaries based on merit and area of expertise rather than longevity.

W. THOMAS CATHEY

University of Colorado at Denver
Denver, Colorado

9/82

Third-world view

I'd like to applaud the sound stand of APS on the "creationism" issue (February, page 54).

To anyone with a dim knowledge of philosophy of science or theology it should be clear that there is an epistemological cut between science and religion. Furthermore, the theory of evolution, which again is at the focus of

debate, can be, like any other scientific theory, proved wrong sooner or later and this has nothing to do with the existence or nature of God.

The existence of God, by and large, cannot and will not be realized rationally because the perception of God is digital: total or none, at a single stroke. Those who try to prove "scientifically" the existence of the Supreme are fools, to say the least, chasing an illusion and believing in it, unable to perform an exegesis of sacred texts, and neglecting context, historical perspective and the very essence of culture, which is cumulative knowledge.

We in the Third World have a very precise notion of what blind faith can do to society, economy and culture. It is with great surprise that we see the reappearance of creationism in the classroom of the developed countries much in the same fashion as when Darwin was being ridiculed for his "absurd theory." After all, who wants a gorilla for granddaddy? By the same token, what about that "crazy feller who invented the relativity of things"?

The answer to both questions is the same: When extreme rationality takes over, intuition dies. And with it, creativity and liberty (that is, free will). Thence follow theories such as the Nazi anthropology and the Stalinist genetics—and their social consequences.

By Jove, haven't we had enough lunacy?

FELIPE RUDGE

Campinas State University
Campinas, Brazil

9/82

More on refuting God

In June (page 86) it was asserted by John Bortz that a logical refutation of the Christian God was not difficult. We wish to demonstrate that Bortz has underestimated the magnitude of his task.

It is not inconsistent to believe both that God exists and that science can reach objective truths. Science and theology are two different modes of inquiry into two different areas of knowledge. Science is the study of the elements of the physical universe and their interrelationships. For example, science can determine what Newton's laws are, but cannot determine why they are. Theology, on the other hand, is the study of God in His relationship to man. The difference between the two may be described as the difference between the "ontical" and the ontological.¹

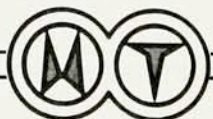
The creation narratives in Genesis need not be seen as a literal account of the physical origins of the universe. In the light of our previous definitions, we see it as an attempt to describe certain

continued on page 110

SPECTROSCOPY AMPLIFIER



MODEL 516
\$750.00



- Bipolar Gated Baseline Restorer
- Live Time Correction Output
- Automatic BLR Threshold
- Wide Range Gain & Active Shaping Controls

Mech-Tronics

NUCLEAR

430A Kay Ave., Addison, IL 60101

For more information
WRITE OR CALL COLLECT
(312) 543-9304

PHYSICS SHOW-BOOTH #44

Circle number 19 on Reader Service Card

PHYSICS TODAY / JANUARY 1983 15

NEW Model C-10 Digital Photon Counter

with Model AD-100 Amplifier Discriminator

\$975. FOB PLAINVIEW, NY

- Independent Analog and TTL Outputs
- Computer Interface via External I/O Port
- Gate Times of 10, 1, .1, and .01 seconds or Unit Count Mode for continuous data update.



The EMI Gencom Digital Photoelectron Counting System consists of a Remote Amplifier/Discriminator AD-100, Digital Display Unit C-10, and 10 ft. interconnecting cable. Compatible with any EMI Gencom ambient or cooled housing, or any other photomultiplier/housing combination capable of operating in the single photoelectron mode, the system is designed to provide photomultiplier tube users with the advantages of a photoelectron counting system at substantial savings over other currently available systems.

The AD-100 Amplifier/Discriminator Unit is packaged within a small remote unit to allow close mounting to the photomultiplier tube housing. The presence of a photomultiplier output signal pulse of 20 μ Amps (1 mv threshold voltage) or greater will cause the AD-100 to output a 50 nano-second differential ECL pulse to the C-10 Counting Unit via a 10 ft. interconnecting power/signal cable.

The C-10 Counter Unit has an 8-digit LED display, TTL and analog outputs, and can be interfaced to a microcomputer system for automated control and data reduction via an external I/O port. For further information, contact:



NORTH AMERICA:

THORN EMI Gencom Inc.

80 EXPRESS STREET, PLAINVIEW, NEW YORK 11803
(516) 433-5900 TWX: 510-221-1889

Elsewhere: THORN EMI Electron Tubes Limited Bury St., Ruislip, Middlesex, HA4 7TA England

Circle number 70 on Reader Service Card

The Most Expensive High Vacuum
Lubricant in the World. TM

TorrLube

TorrLube™

- Unsurpassed Lubricating Qualities at 10^{-8} and below.
- Extends Rotating Vacuum Seal Life 36 times (standard Viton™ 'O' ring) and 54 times plus with Viton Quadring.
- Outgassing Rate Less Than Unbaked Viton.
- Fine Tip Applicator Allows Precise Lubrication of Restricted Areas.

Call or write for detailed data sheet/test report

Sputtered Films, Inc.

P.O. Box 4700
Santa Barbara, CA 93103
(805) 963-9651

Circle number 71 on Reader Service Card

letters

continued from page 15

truths about God in terms of common experience. Thus, the creationist-evolutionist argument should never have arisen, because science and theology are distinct.

Bortz's statement that he would defend science is perhaps unnecessary. Furthermore, we intend to show that his demonstration of inconsistencies in certain attributes of God itself lack cogency. His conclusion that the attributes are logically contradictory is only true when certain *a priori* assumptions are made. These assumptions are not only unstated, but such that most theists would disagree with them.

First, Bortz accepts the absurdity of self-creation and correctly states that if God created the universe he must be separate from it. However, his statement that the universe is everything that exists is as far from verification as any statement, scientific or otherwise, could be. That God did not create himself is a tenet of modern and ancient theological thought.² But to proceed on the assumption that the natural world is everything that exists is to already deny any supernatural Being. Therefore, Bortz's argument is incorrect since his conclusion is already implicit in his premise.

The second argument concerning omniscience and omnipotence implicitly assumes that God exists in time in the same manner as we do. We reject this assumption. Human perception is confined to the dimension of time, but it is possible to conceive of God existing outside this frame, and thus being able to see the entire pattern of our choices: past, present and future.³ Thus his omniscience may be seen as an observation of what our free will has produced, and his possession of unlimited authority and power (omnipotence) does not necessarily imply that it must be used. The crux of the matter is that the human perception of time is not the only possible one.

Regarding the question of miracles, it is evident that science proceeds on the assumption that what happens today will happen tomorrow, given the same set of circumstances. Thus, just because we have never seen an apple change into a unicorn does not mean it may not occur. Uniformity of nature must be assumed before our experience proves anything.⁴

Finally, the implication of his closing statements is that reason is the only way to arrive at truth. That a supernatural entity exists may be arrived at through reason,⁵ but the nature of this entity may only be known through revelation.⁶ This does not imply that what we know about his character is any less true than his existence, but

merely that it was arrived at by a different, and equally valid, method. Science does not have a monopoly on truth. In fact, it has been said, "provability is a weaker notion than truth."⁷

We wish to thank Ian McMackin and James Zavislan for helpful comments and enjoyable discussions.

Reference

1. John Macquarrie, *An Existential Theology*, Harper & Row, New York (1965), page 29.
2. Thomas Aquinas, "Summa Theologica," Question 45, Fifth Article.
3. C. S. Lewis, *Miracles*, Appendix B, Macmillan, New York (1947).
4. David Hume, *Treatise on Human Nature*, I, II, VI.
5. Rene Descartes, *Discourse on Method*, Part four.
6. Avery Dulles, *Revelation Theology*, Seabury, New York (1969), page 9.
7. Douglas Hofstadter, *Gödel, Escher, Bach: An Eternal Golden Braid*, Vintage, New York (1980), page 19.

IAN WALMSLEY
PAUL KANE

University of Rochester
Rochester, New York

7/82

...I believe that the uproar against scientific theories of origins is a reaction to scientists who, whether knowingly or unknowingly, make philosophical assertions but present them as scientific statements or facts. In our science-education programs we need to teach what science is and what it is not. For instance, I must say in all honesty that it is not self-evident to me that the question of origins is an obviously scientific question. And if not, then the answer cannot be given by a scientific theory. Therefore, if the biblical explanation of creation *ex nihilo* is the answer, then creation cannot be a scientific theory.

We scientists ought to know our subject matter and that of others lest it be said of us: "Professing to be wise, they became fools" (Romans 1:22).

MOORAD ALEXANIAN
Centro de Investigacion
Estudios Avanzados del IPN
Mexico City

7/82

I fear that John Bortz (June, page 86) does physics and Christianity a grave disservice by his attempts to prove that "the Christian God cannot possibly exist." At best he shows that his vision of the Christian God does not exist. But for a non-Christian to attempt to codify and refute Christianity is no more realistic than asking the Moral Majority to write a text on quantum theory.

The healthy debate over whether or not fundamentalist religious views should intrude into the science classroom under the guise of "scientific

creationism" is not served by diverting the discussion to an attack on Christianity. Scientists and teachers must, for the sake of intellectual integrity, resist attempts by fragments of the religious community to dictate the content and outlook of scientific study and belief. So, too, those of us who are Christians must resist misguided attempts by others to dictate the nature of religious belief...

GEORGE SPAGNA
Rensselaer Polytechnic Institute
Troy, New York

7/82

I would agree with Bortz that creationism is bunk, as proffered by the fundamentalists who tout it. As a Roman Catholic, I was taught that the book of Genesis' creation story was merely a literary device, which leaves me free to believe modern theories of cosmology and theories of evolution toward which our science has led us.

I hardly find my faith shaken by the knowledge that the Earth and universe did not come about in the prosaic manner described in ancient Hebrew writings.

I would not argue with Bortz as to whether the Christian faith is logical. It is certainly not. There is nothing logical in the most absurd incident to transpire in human history—that God should become a man and walk among us. As I see the presence of God in my fellow human beings I cannot question his existence anymore than I question the validity of the fundamental theorem of calculus.

Many of us go through a period in life where we question everything. We incomparably wise physicists and mathematicians, nearly to the man, convince ourselves that we are too intelligent to believe in God. For those of us fortunate enough to mature at a decent rate, this phase catches up with us in early adolescence and leaves us in late adolescence when we no longer feel the impish need to flaunt our education by pointing out contradictions between Judeo-Christian doctrine and what modern science has revealed.

I agree that those who present religious belief as viable scientific theory should be set straight, but I cannot look on mocking refutation of religious faith with respect. This is pompous, malicious, counterproductive and, frankly, so much noise.

Perhaps faith or the lack of it is simply a matter of indoctrination. You have been indoctrinated by the priests or the professors or both. Those lacking in faith, however, must respect the rights of others to hold it if only in cognizance of the fact that they don't understand the nature of faith. They have trod, so to speak, out of their field. For those who have faith, no explanation is necessary. For those who lack it

no explanation is possible. People will believe what they will and are best left to it.

RODNEY B. HALL
University of Iowa
Iowa City, Iowa

7/82

THE AUTHOR COMMENTS: Paul Kane and Ian Walmsley argue that "the creationist-evolutionist argument should never have arisen." Why, then, has it? Creationists claim that life on Earth was created by means of a miracle of God and that evolution never occurred. This is a theological assertion concerning a physical occurrence in the universe. Kane and Walmsley may disagree with the creationists on the creation-evolution issue or on any other issues involving specific instances of miracles supposedly performed by God, but unless they consider the Christian God to be incapable of performing miracles and the numerous accounts of miracles found in the Bible to be mere literary devices, they cannot consistently assert that conclusions concerning "elements of the physical universe and their interrelationships" are not a part of Christian theology.

My statement that the universe is everything that exists has been criticized by Kane and Walmsley for not being subject to verification. That the universe is everything that exists, however, does not require verification because "everything that exists" is the definition of the word "universe." That God is part of the universe, and therefore could not have created the universe, follows from the assumption that God exists along with the use of the generally accepted definition of "universe." If Christians wish to use a special definition of "universe"—such as "everything that exists, except God"—then they should make it clear that they are doing so. As to the question of self-creation, I do not consider the universe to have been created at all. For the universe to have been created it would have had to have been created by a nonexistent creator, which is a logical impossibility. The universe, therefore, must have always existed.

As an objection to my arguments concerning omniscience, omnipotence and free will, Kane and Walmsley have introduced the issue of God's perception of time. I do not believe it is possible to conceive of a being that does not perceive time as we do. Human ideas are so intimately connected with the concept of time that they generally become meaningless when one tries to isolate them from that concept. However, even if it is possible to think of God as having a different perception of time, this does not resolve the contradictions of omniscience, omnipotence and free will. Whatever God's perception of time is, omniscience—if it is to retain any meaning at all—must con-

Measure Light Directly in Any Optical Unit!

... Radiometric, Photometric or
Specialized Measurements



IL700A

PORTABLE

- UV, Visible & Infrared
- Sensitivities from 10^{-13} to over 1.0 W/cm^2
- Flash Measurement Capabilities

Call Collect for Application Assistance and/or
Custom Systems



international light inc
Specialists in Light Measurement

DEXTER INDUSTRIAL GREEN, NEWBURYPORT, MASS. 01950
■ TEL 617 463-5923 ■ TELEX 94-7135

Write for name of sales representative in your area
(over 40 countries worldwide).

Circle number 72 on Reader Service Card

Need a Radar...
... Pulse Modulator
... Indicator Group
... RF Source...



...for your R&D lab?

We have it. Off-the-shelf
from our 250,000 sq. ft. inventory.
We'll even fully test it
and trial-run it for you.
Name your specifications
and have it operating in your lab
...in 60 days!

Send for FREE 24-page
catalog and facilities guide.



**Radio
Research
Instrument
Co., Inc.**

2 Lake Avenue Extension, Danbury, CT 06810
Tel: (203) 792-6666 • Tlx: 962444 Radar Dury

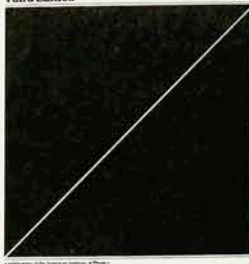
Circle number 73 on Reader Service Card

Style Manual

for guidance in the preparation of papers for periodic publication by
the American Institute of Physics and its member societies

Third Edition

1978



STYLE MANUAL

This edition of the valuable AIP STYLE MANUAL serves both as a practical reference for experienced authors and as a thorough compendium for the novice. Authors, editors and publishers will find this manual a helpful guide to consistent and acceptable manuscript preparation.

Many of the problems and questions that may arise in the process of publication are anticipated and answered in the five chapters and dozen appendices:

Summary information for journal contributors

Highlights important points to remember while preparing a paper—useful as a checklist before sending off the manuscript.

Preparing a scientific paper for publication

Parts A & B devoted to how to write a scientific paper—essential for all new authors. Part C stresses the mechanics of preparing the actual typescript—indispensable to the author's typist.

General style

Deals with relevant details of English grammar, punctuation and proper use of metric units.

Mathematical expressions

Informs authors about the availability of characters and indicates standard methods of presentation that will ensure correct and efficient typesetting.

Figures

Detailed instructions are given for the use of the two kinds of figures: line drawings and continuous-tone photographs.

**ORDER YOUR STYLE MANUAL
TODAY!**

PRICE: \$7.50 prepaid (\$2.00 billing charge if not prepaid).

Send all orders to:
AMERICAN INSTITUTE OF PHYSICS
Department BN
335 East 45 Street
New York, NY 10017

tinue to mean that God has perfect knowledge of all events in the universe. That knowledge, if it really is knowledge, renders God powerless to effect changes that contradict that knowledge. All human actions must also conform to that knowledge, thereby making free will an impossibility.

In their treatment of miracles, Kane and Walmsley have stated that science requires "the assumption that what happens today will happen tomorrow, given the same set of circumstances." They have called this assumption "the uniformity of nature." I agree that science requires this assumption. This was, in fact, a major point of my letter. Christians assume that God makes science possible by providing the uniformity of nature. This is fine as far as it goes. The problem arises when Christians make the additional assumption that miracles occur. Miracles are events that violate the uniformity of nature. The assumption that such events occur contradicts the previous assumption that nature has this uniformity.

Kane and Walmsley have claimed that the existence of God may be known through reason while his attributes may be known only through faith. This claim may easily be shown to be absurd. If a person decides to acquire his beliefs concerning God by this method, he has two choices. His first choice is to attempt to determine rationally whether or not God exists—without knowing what God is—and then to attempt to determine what God is by means of faith. The only problem is that if he does not first know what is meant by the word "God," the question "does God exist?" can have no meaning to him. He may as well ask himself, "does snarb exist?" His second choice is to attempt to determine, by means of faith, a definition of the word "God" and then attempt to determine rationally whether or not an entity conforming to this definition exists. The problem with this is that because the definition of any word is a matter of choice, it cannot be a matter of faith. To define "God" as "a pencil," "a car," or "a cigarette" has as much validity as the use of any of the more traditional definitions as long as the intended meaning is clarified by the user of the word.

Truth, as Kane and Walmsley have implied in their conclusion, may be arrived at through faith. Knowledge, however, may not. A man in a completely dark room may happen to make a correct guess as to the color of the walls, but he will not know his guess was correct until someone turns on the lights. Science does not have a monopoly on truth. It has managed, however, to acquire a disproportion-

ately large share of the market.

Moorad Alexanian has attempted to discredit my refutation of the God of Christianity by branding it as philosophical and, therefore, in his view, unscientific. In taking such a position he has disregarded the fact that not only is philosophy itself a science, but it is the science which makes all other sciences possible. Without a proper philosophical foundation, the physical sciences cannot survive for long. The fact that the ridiculous theories of the creationists have gained such widespread acceptance is a result of the lack of understanding on the part of scientists as to the importance of such a foundation. If the destruction of science is to be prevented, it is imperative that scientists become much more aware of the value of a rational philosophy in defending their profession against the onslaughts of religion and other forms of organized irrationalism.

The letter of Rodney Hall is the most blatantly irrational. After correctly stating that Christian doctrines are illogical, Hall confesses that he believes in them anyway. The consequences of such a position are evident when he equates a questioning attitude with immaturity. Asking questions is a necessary part of the process of obtaining knowledge. If this is a sign of immaturity then I hope to remain immature for the rest of my life.

Faith is not a valid cognitive procedure. When it is accepted as such, the process of rational argumentation degenerates into a contest of whims, and any idea, no matter how absurd or evil, may be successfully defended by claiming that those who advocate it feel, somehow, that it is right. In such a philosophical environment ideas are accepted not on the basis of how logical they are but rather on the basis of how much "feeling" their advocates seem to have. Unfortunately, the acceptance of ideas on this basis has been and continues to be the dominant epistemological trend in the world.

It is possible to ignore the facts of reality but it is not possible to avoid the consequences of doing so. For example, it was Hitler's appeals to faith and his denunciations of reason that convinced people in Germany that mass murder was necessary for the common good of civilization.

Without a widespread rejection of faith in favor of reason it will not be possible to alleviate the problems faced by civilization. For those interested in promoting such a rejection, I recommend the following books: *Atheism: The Case Against God* by George Smith, *The Ominous Parallels* by Leonard Peikoff, and all books by Ayn Rand.

JOHN C. BORTZ
University of Rochester
Rochester, New York

10/82

More on fear

I would like to thank you for giving me the opportunity to respond to W. H. Henry's comments (July, page 13) concerning my response to J. A. Eades in January's issue. I say "would like to." I'm not *going* to thank you because you did, in fact, not give me such an opportunity. Therefore, I am requesting it now. I'm not sure whether I was not given this opportunity because of a simple oversight or because of censorship. However, I'll be charitable and assume the former—in spite of the fact that this appears to be the third such occurrence. I'm certain that you are aware of the solely negative results of censorship and I cannot believe that you would resort to it.

I am surprised that W. H. Henry finds it so unexpected to be frightened by reading *PHYSICS TODAY*. One of the purposes, if not the sole purpose, of the letters section, I would think, is to encourage and promote the free exchange of ideas. I think that ideas are probably the most dangerous things that there are. (Think how much easier it would be for "the powers that be" to maintain the status quo if all the intelligent people in the world would just quit thinking!) For an idea to be frightening must mean that the idea was radically new and the reader's mind was engaged and working while receiving the idea. I am flattered that I am the first person to present Henry with such a new idea. I do not feel that Henry has any reason to be afraid of me. However, he does have a reason to be afraid in general and I can't understand why he wasn't before reading my letter. I'm glad my letter "woke him up."

Henry appears to have somehow concluded that, because I can conceive of things more detrimental to human happiness than a nuclear war (but admittedly, those things aren't numerous), that I would therefore want to have one—I can't think of anything else he could have been scared of in my response to Eades. I have to say that I resent his attitude and think that he should take some elementary lessons in logic. Nothing that I have ever said in these letters pages or anywhere else could possibly indicate that I think that a nuclear war is a desirable thing to occur! Although I've never done it, I'm quite sure that there are a lot of tragedies, for example, worse than having my hand exposed to a high-energy CO₂ laser beam. Nevertheless, just because there are things worse than that, I wouldn't want it to happen to me or anyone else!

There are, however, people on the other side of the ocean that sure seem to be behaving as if a nuclear war is not only not the absolute worst thing that could possibly occur but isn't even all