dividend, in the answer to the problem in question. Here it is to be noted that the partial products 8×128 or 1024 and 4×128 or 512 do not appear at all, but are subtracted immediately, leaving as remainders 62 and 113, which are written down directly.

A problem on fol. 5 verso reads as though from a recent American text-book.

John owes Peter 2386 pesos. He has received from Peter 295 pesos. The question, how much will he owe John. Place the numbers as you have been told above, and it appears here.

	Deue	2386 pesos	2386 ps
	Pago	295 pesos	295 ps
			1
2386 ps	Deue	2386 pesos	
295 ps	Pago	0295 pesos	
91	Resta	2091 pesos	

The explanation is lengthy, borrowing one above and decreasing the upper digit, which is even to-day the most common method in America.

The multiplication table is in column form, with nine entries in the table of ones, and decreasing to two entries, "8, 8. 64" and "8.9. 72" in the table of 8's, closing with 9 times 10 and finally "10. 10. 100."

Historically, the most interesting section in the book is the final chapter which treats in detail the method of distribution of the income (tithes) received by the Mexican churches. Application is made to the income (assumed) of the Cathedral of the Puebla de los Angeles. This minute account of the allocation of the considerable funds received by the churches of New Spain presents material probably not found in any historical work and yet of the greatest historical value in the discussion of the Spanish empire in America where the priests played so large a rôle. Such discussion appears also in the arithmetic of Pedro Paz, indicated by the preface which has been published by Medina.

This arithmetic is indeed a precious document in the history of science in America, revealing a breadth of interest in arithmetic not to have been expected in Mexico at this period.

LOUIS C. KARPINSKI

UNIVERSITY OF MICHIGAN

THE SCIENTIFIC METHOD AND AUTHORITY. II[1]

DISTRUST OF SCIENCE

Another phase of anti-science emotionalism, not always assuming the attitude of actual hostility, but better described as suspicion or distrust of science, may be noticed briefly. This is evidenced by the charges which are made, violently and even abusively by the uncultured, seriously and earnestly by cultured church leaders, against some of the teaching in our colleges and universities. These charges, so far as I have found them specific, are to the effect that certain young men and young women, following upon their university courses, not always in the physical sciences, however, such subjects as philosophy and sociology also being censured, have become so unsettled in their beliefs that even the ethical standards of some of them have been distinctly altered.

That some students, whose early training had led them to regard the mythical portions of Canonical Scriptures as veritable history and inseparable from the ethical values of those writings as guides to right living, when they become acquainted with the truths which science has brought to light may, in that period of revolt through which all active-minded youth is apt to pass, speak words which seem to be disturbing to well-established ways of thinking, is not a matter of wonder, nor should it be an occasion for alarm. Not all the young people who are exposed to new knowledge suffer mental distress in adjusting themselves to the changed outlook thus necessitated; and not all the young people whose formal intellectual training ends with the high school live lives that are above reproach.

I have had the pleasant experience of associating with many college and university young people through a long series of years, and find nothing in their manner of life to give me uneasiness for the future which is to be moulded by their influence.

Some attempts have been made by the somewhat doubtful method of questionnaires to discover how much basis there is for the charges which have been made that the teaching of biological facts and theories is damaging to religious beliefs. These inquiries thus far seem to give the rather surprising result that such courses tend to strengthen rather than weaken Christian faith. Thus a case reported by Goldsmith[10] resulted in sixty-six reporting that their Christian faith had been strengthened, twenty reported no effect, one way or the other, and two said it had been weakened. Many of the first group told in what ways their faith had been strengthened but, unfortunately, neither of the two whose faith had been weakened told in what way, or to what extent damage had been done.

From a rather extensive acquaintance with teachers of science, more particularly of the biological sciences, I feel warranted in saying that not one of them would intentionally present his subject or arrange his laboratory courses in any other way than

[1] Address of the retiring vice-president of Section F—Zoology—American Association for the Advancement of Science—given at Kansas City, December 29, 1925.

[10] "Evolution versus Christianity," p. 34.

as tending toward the building up of the highest type of character in his students.

Indeed, I am inclined to think that it was intimacy with such characters as are to be found among teachers of science which led a recent clerical writer to say: "It is perhaps not in the churches that the best mind and conscience of our age is to be found."[11]

I may be permitted to remark that there must be something out of adjustment in a system of primary and secondary education, the product of which, after having been trained therein until near maturity, is in danger of experiencing agony of spirit when he attempts to bring the instruction in tradition which he has received, into harmony with facts with which he becomes acquainted in a few weeks' study of natural processes.

But who can forecast with any degree of confidence the outcome of such present-day portents as those which we find in the publications of The Science League of America? Thus, two examples out of many:

A New Jersey minister says: "We are not going to stop until we have driven every Modernist out of our pulpits and seminaries and editorial chairs. We are going to put them out *if it takes our lives to do it.*"

A Kansas City minister, speaking at a Christian Endeavor meeting at Denver, announces: "Worse than an assassin who kills the body is he who shatters the faith of youth"—in which characterization he includes the Modernists, whatever their personal religious views. He goes on to say that rape-fiends are burnt, but they are saints in comparison with the teachers of modern science.

One is curious to know how this proposed burning of Modernists, as a part of the agenda of the Christian Endeavor movement, was received by that audience.

Then there are those examples of what come perilously near pulpit profanity which one now and then sees in newspaper reports of sermons. Thus the Reverend William Ashley Sunday, in a sermon delivered in Los Angeles, is reported to have said: "If a minister believes and teaches Evolution, he is a stinking skunk and a liar." Again he said: "The consensus of scholarship can go to hell for all I care"; and again "Old Darwin is in hell."[12]

Maynard Shipley has this to say, which, since it is drawn from his own experience, commands attention:

Any one who has faced, as the President of the Science League has done, 5,000 furious Fundamentalists, laughing aloud at the simplest scientific statement, and roaring and howling their rage at the slightest opposition to the ignorant and prejudiced statements of their spokesman, will realize the grave danger involved in such utterances as those just quoted. Every one of these Fundamentalists is a voter, and they will all vote against evolution. We shall be fortunate if they do not carry the lynching spirit incited by their speakers and writers to an even more extreme point than the passage of anti-evolution laws.

He continues:

The Fundamentalist geologist Price has even gone so far as to attack the U. S. Coast and Geodetic Survey as "a wholesale official propaganda in favor of the evolution theory," and to suggest thus a new point of attack on science. The Smithsonian Institution and the Bureau of American Ethnology are also under Fundamentalist attack.

I still have an abiding confidence that there exists a large enough measure of common sense in the American people to avert the appalling calamity which a general belief in such ravings as those which I have just cited portends. Perhaps I am over-confident; if so, then a cynical passage in Voltaire's "A Dialogue" has application:

Diogenes: . . . So long as it endures the world will continue to be ruled by Cajolery, by Injustice and by Imposition.

Mr. Loke: If that be so I must take leave to lament the Destiny of the Human Race.

Quite a different note is sounded by the editor-in-chief of the *Christian Herald,* who, in an article in the *Atlantic Monthly* for October last (p. 468), says:

Jesus never said a word about evolution, about His own birth, about the absolute inerrancy of the Scriptures, about the necessity of assenting to a long doctrinal creed before one could be called a Christian and be saved. In His tremendous picture of the Last Judgment He based the final destiny of mankind on the way mankind had behaved, not on doctrinal or theological beliefs.

Having in mind some of the "fundamentals" of which St. Paul either had never heard, or at least did not think of sufficient importance to mention in any of his writings that have been preserved, I asked a member of the faculty of one of our best known theological seminaries, whom I chanced to meet last summer, what chance St. Paul would have of being received into a present-day Fundamentalist communion. His answer was, in effect, that he would not have a ghost of a chance.

SOME RECENT ANTI-SCIENCE LITERATURE

Time can be taken for no more than a brief consideration of the literature which has appeared of late, reopening a controversy which the informed por-

[11] Rev. Alfred Fawkes, *Contemporary Review,* Vol. 115, p. 299.

[12] "Science versus Dogma," pp. 144–5.

tion of the public supposed had been settled as much as a generation ago. My predecessor, of a year ago, discussed examples of this thrashing over of old straw by the ill-informed and the prejudiced. No comments on that literature, whose futility Dr. Rice so ably demonstrated, will be made in this paper.

At the outset of these brief comments I must be permitted to express my deep sense of shame and confusion, as a member of the organized church, when I see publishing houses of respectable Christian denominations either recommending to their readers, or actually issuing books which are obscurantist and misleading in high degree, and, worst of all, liable to lead properly informed people to judge the church by the low standard of knowledge which this misinforming and baneful literature sets.

There, for example, is the booklet "Evolution a Menace," by the Reverend J. W. Porter, and published by the Baptist Book Concern, of Louisville, Kentucky. After reading this little book, including the amazing dedication, in which the author suggests a much more formidable dogma than that proclaimed by Pope Pius IX, known as the immaculate conception, I wrote the following letter, which, however, was never sent, but is here produced as an open letter to all publishers of such intemperate, anti-science literature:

Dear Sirs:

I have read Porter's "Evolution a Menace," a copy of which you kindly sent me at my request, and am moved, as my Quaker forebears would have put it, to write you a brief note concerning it.

First let me say, by way of introduction, that I am a member of the Presbyterian Church, and taught Biology and Geology in Washington and Jefferson College, from 1882 until my retirement in 1920.

If I were hostile to Christian theology, which I am not, I have difficulty in imagining a greater injury that I could inflict upon it than to circulate "Evolution a Menace" among students in our better colleges and universities.

We who are older can be patient with ignorance, and feel only sorrow when, with the best of intentions, and in the best of causes, although not always in the best of tempers, some zealot undertakes to pronounce judgment without adequate information. But the young are not apt to be so charitable, and one who is acquainted with the interpretation of such facts as disturbed geological strata, would not only give the author of "Evolution a Menace" a very low rating in geology, after reading portions of Chapter III, for example, but finding him so ignorant of the things that are seen, might in addition doubt his fitness to testify of things unseen.

After reading "Evolution a Menace," I read George McCready Price's "The New Geology," and immediately absolved the Rev. Mr. Porter from what had appeared to be an inexcusable misunderstanding of obvious interpretations of the facts dealt with in stratigraphical geology. The internal evidence points clearly to the conclusion that he had been led astray by reading "The New Geology," or some other of Price's publications.

And who can be surprised that one, to whom science is evidently a sealed book, should thus follow a blind leader! For does it not stand written in a pamphlet by Marion McH. Hull, M.Sc., M.D., entitled "Evolution, What it is and What it does," an address delivered at the summer Bible School, Atlanta, Georgia, that George McCready Price is a "present day scientist of the highest repute?" (For a geologist's opinion of Price's claim to be a geologist, see Professor Arthur Miller, SCIENCE, June 30, 1922.) Unlike the Rev. Mr. Porter, who, so far as I noted, quotes fairly, Dr. Hull, after the manner of anti-vivisection writers, is unmindful of the dates of the authorities whom he quotes. Thus it appears that he quotes no opinions adverse to the theory of evolution later than Sir William Dawson and Louis Agassiz. The latter died December 14, 1873 (fifty-three years and fifteen days ago). In the college year 1881–2 I had the privilege of listening to a series of lectures by Principal Dawson, delivered at the Divinity School of Yale. Professor Verrill advised a group of us, to whom he was lecturing, to attend these lectures as it would be, in all probability, our last opportunity to hear an eminent scientific man who still held to views concerning the processes of nature which had been abandoned, or greatly modified, by scientific investigators at that time.

The lecturer had little to say on theoretical matters. Most of his time was taken up by arguments to show that his *Eozoon canadense* was the fossil remains of a low form of life. It might be added that if he had succeeded in convincing his fellow-workers in paleontology that Eozoon is a fossil organism, and not a mechanical association of serpentine and calcite, the result would have had no other bearing on evolution theories than to push the proved existence of life an unnumbered millions of years back of any then known record.

In like manner, if one may be permitted to turn from the thoughts of great men of the past to the fancies of one who has not achieved greatness, McCann's Triassic fossil, which he figures in that rawhead and bloody-bones book, "God—or Gorilla," if correctly interpreted by him, would give to man an antiquity exceeding by many millions of years even Scheuchzer's *Homo diluvii testis* of the Upper Miocene.

One does not have to read far in "The New Geology" to find abundant justification for the observa-

tion of Professor Gregory, of Yale, on hindrances to progress in geological knowledge:

> The history of geology is essentially the history of the intelligent observation of rocks, fossils, and land forms. Progress is marked by progressive increase in exactness and completeness of observation. In an atmosphere saturated with tradition and personal bias the making of observations and interpretation of observations present but a sickly growth; and when the intellectual environment includes authority and a complete outfit of supernatural causes, growth is stopped entirely.[13]

Price, enveloped as he is in an atmosphere of authority which is saturated with supernatural possibilities, has undertaken the task of placing two ill-matched and flimsy patches on a perfectly good garment.

The first of these patches, designed to cover up evidence of an orderly appearance of organic forms throughout geological time, may be designated as his theory of contemporaneity. The second is his search for a stupendous world catastrophe which may be made to confirm the accounts of a universal deluge which are given in the book of Genesis.

The following extract from his account of life in the Ordovician illustrates his tailorship in the matter of contemporaneity of fossil forms:

> It is the first grand display of ocean life which we meet with in the fossiliferous series; but at the most it is only a partial display of *the total* marine life which may have existed contemporaneously, the fossils of which geologists may have assigned to the Jurassic, the Cretaceous, or the Tertiary system. What glimmer of a scientific reason is there for saying that these Ordovician forms of life occupied the oceans exclusively, and that examples of the higher forms of life, such as the teliost fishes, or the ammonites and the nummulites [here the reader expects the author to continue: "or the Hittites and the Perizzites"], or even the mammals, were not then in existence anywhere on earth.[14]

And the following, in which shreds of both patches appear:

> And how much stronger, how irresistible, is the evidence, when we remember that such forms as the dinosaurs and the ammonites, the semi-tropical florae of the Cretaceous and Carboniferous coal beds, with the trilobites and all their associated companions, can not be separated in time from this common catastrophe, which thus becomes literally and absolutely world wide in extent![15]

We may expect a chapter from Conan Doyle's delightful book, "A Lost World," to appear in a new edition of "The New Geology." It would add to the entertainment of the reader and would not in the least mar the symmetry of the author's contentions.

It will be a shock to members of Section F to read on page 584 that "Lake Onondaga . . . contains marine squids." Since real paleontologists have been victims of that fake, a stay of sentence may be granted with the understanding that this untruth be elided from subsequent editions.[16]

On pages 608–9 the author indulges in a rhetoric which will make pleasant reading to those who are unfamiliar with the facts with which geology has to do, but who are accustomed to the flamboyant language of orators who allow their feelings to lull to sleep their own and their auditors' common sense. He closes his rhapsody with one of the most beautiful passages in all literature: "And there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain; for the former things have passed away." Those who have greatest reason for protesting against this prostitution of the grand apocalyptic vision of the Seer of Patmos, in order to embellish a theory of geological history which is grotesquely and demonstrably contrary to fact, are the persons to whose prejudices he is making his appeal.

The great catastrophe is accounted for on pages 684–5. After speaking of the inclination of the earth's axis to the plane of its orbit, he continues:

> But if we may suppose such a change possible—that is, if the earth's axis had been formerly perpendicular to the plane of its orbit, and some external force had changed the earth to its present inclined position, and changed it suddenly—there would be forces let loose on the earth's surface sufficient to do an inconceivable amount of geological work. . . . In the mean time the surface of the earth would be shattered and dislocated beyond all description; and twice each day the ocean would sweep a mighty tidal wave around the world, attaining a maximum; *every 150 days*, of about six miles in height at the equator (Twisden). Such translation wave traveling at the rate of 1,000 miles an hour at the equator, and proportionally in the other latitudes, would certainly leave no dry land anywhere on earth, and would seem to give us a wonderfully competent cause for the production of the geological changes. And it is at least a remarkable coincidence that a period of 150 days is twice mentioned in the Bible account of the Deluge.[17]

The author has here unloosed forces the result of whose action, contrasted with the world's experience in the days of Noah, are beyond comparison; a hurricane to a summer zephyr would be far from coming in the same class.

[13] "The Development of Sciences," p. 169.

[14] p. 370.

[15] p. 585.

[16] See Ortman, SCIENCE, Jan. 2, 1903, p. 30.

[17] Gen. 7: 24; 8: 3.

It is not, however, with the grand style that the author closes all his sonorous paragraphs. Sometimes he adopts a style which has been found very effective in proving to popular audiences that the reasoned conclusions of science are wrong. Thus:

> How can alleged "widespread" unconformity be used to supplement the historical succession of life? Can one lift one's self by the top of one's boots? Can a bobtail dog catch his tail by chasing it? p. 673.

My venerated teacher James D. Dana (whose remarks on the formation of coal beds Price calls naïve, p. 461) was a devout man. I am glad that he was spared such a trial to his habitual Christian forbearance as he would have been subjected to if "The New Geology" had been published thirty-five years ago.

Of course it is scarcely necessary to say that the book would be quite unworthy of notice if it did not represent itself as "A Text-book for Colleges, Normal Schools and Training Schools; and for the General Reader."

This exhibit of vapid argumentation, of shameless desecration of the temple of truth, of obscurantism masquerading in the lion's skin of science, is one aspect of the embattled forces of ignorance and superstition with which friends of the truth that is revealed in nature, as well as friends of the truth that maketh free, have at this late day to contend.

The imprimatur of the Princeton University Press gives to "The Dogma of Evolution," by Louis T. More, professor of physics, University of Cincinnati, a claim upon the reader's attention which the book itself fails to vindicate.

This book enjoys the singular distinction of having a place among recent books on evolution cited by *Science Service,* and also of being named in a list of "helpful" books, where it follows immediately McCann's "God—or Gorilla," kindly furnished me by the Bible Institute Colporterage Association of Chicago ("The Moody Press"). The letter-head on the sheet which contains this list of "helpful" literature carries also these words: "Best Evangelical Literature" and "Take the Gospel to the People."

This is an exasperating book to any one who is reasonably well informed on the literature of the biological sciences. It is likely to be equally exasperating to the Fundamentalist reader when he encounters such passages as:

> I shall not use the word miracle as descriptive of the legendary stories of early peoples or as indicative of the supernatural events used to strengthen the faith of the credulous; these for the most part are insignificant and puerile. p. 354.

The purpose of the book, as stated on page 34, "is not to discuss the validity of evolution (which he admits, and of which he gives a good definition on page 303) but rather to trace the effects of its application to the broader fields of social life and religion."

One wonders why, with such a purpose in mind, he finds it necessary to accuse Conklin of "confusing the clarity of his scientific reasoning," p. 24; to impute disingenuous practices to Huxley (p. 110); and jealousy of rivals to Darwin (p. 183); to sneer at the cytological work of E. B. Wilson (p. 288), etc., etc.; and, as a sin of omission, to neglect to inform himself of the work, even of his own countrymen, such as Castle, Davenport and Morgan, in genetics, the outstanding contributions of biology to science in the present century.

The demand of the author that biologists, before such a theory as evolution may be established, should be able to predict the course of events in a living organism with the same certainty as the physicist and the astronomer can do, is sufficiently answered by the remark of J. Arthur Thomson[18] that while it is possible to calculate the movements of a comet, and to predict its appearance at a certain time and place, no one can with certainty predict in what direction a cat will jump next.

The reader discovers before going far that the author thinks that he is a follower of Lamarck. This interesting fact may account for the puzzling exception in favor of the Lamarckian theory already cited. And how simple the process of reasoning by which such a conclusion is reached. Thus, Professor More, along with McCann, is recommended to us as an author who will be "helpful" to us in our fight against Darwinism. Lamarck's theory is anti-Darwin. Professor More accepts the Lamarck theory. Therefore, down with Darwin, great is the theory of the inheritance of acquired characters!

Time does not permit of a discussion of such items as the author's misunderstanding of Bateson (pp. 158–9); his amazing remarks on the origin of feathers (p. 156); and his occasional lapses from his usually chaste diction into what may be termed a Bryanesque floridity. Thus:

> The biologists rejoice to mortify us by saying that we are but an aggregation of cells and so is the amoeba; then they show us by the microscope that our cells and the amoeba's cells are just alike (p. 243).

If the timorous defenders of authority at Baylor, Denison and Mercer Universities, and at the Universities of Mississippi and Tennessee found the professors, whom they recently dismissed, guilty of showing Professor More, or any one else, an amoeba with

[18] "Science and Religion," p. 6.

cells just like his, they were amply justified in their several summary procedures.

The thought should not be entertained by any one that Professor More's criticism of present-day biologists and their works is resented because the criticism is made by a physicist. Criticism of scientific conclusions is the high privilege of any one who chooses to make it, and none are more given to criticize biological theories than biologists themselves. But the critic can not be granted immunity from criticism of his own criticisms of others. Professor More, therefore, will not, it is to be hoped, take it amiss, when it is suggested that he ponder his own words of wisdom, what time, in reference to the remarks of Linnaeus on Mt. Ararat, being fitted to serve as a temporary refuge for diverse animals, tropical at its base, and suitable for the polar bear at top, he says:

> This anecdote is not given to sneer at the frailty of a great man but rather to show that profundity in a special field of work is very frequently accompanied by naïveté when the subject is a little foreign to one's specialty (p. 131).

Reaction of the Legal Mind to Scientific Conclusions

The line of cleavage which separates those who reach reasoned conclusions by way of the scientific method from those who rely upon authority to which they attribute infallibility runs through the legal as well as through the theological fraternity.

The two divisions into which those learned in the law fall are typified by Judge Raulston, brought to public attention in the recent trial at Dayton, Tennessee, who represents the traditional, authoritarian or Fundamentalist point of view. The other finds its prototype in Ex-Secretary Hughes.

Judge Raulston, in an address which he delivered in Calvary Baptist Church, is reported in the New York *Times* for November 9, 1925, as saying:

> If I listen to evolution and lose my faith in Genesis I am afraid I'll lose my faith in the rest of the Bible; and if I want to commit a larceny I'll say I don't believe in that part of the Bible that says: "Thou shalt not steal."

If the judge really feels that way about his ethical foundations his neighbors should see to it that all reputable literature which deals with scientific conclusions, including those of the best Biblical critics, be kept away from him, else they may find it necessary to put extra padlocks on their smokehouses.

In spite of what the judge says of himself I am not inclined to doubt either his goodness or his sincerity. If he is also wise, and really desirous of knowing what the scholarship of his church has to say on the subjects of evolution and Biblical criticism, it may be worth while to suggest that he make a trip to Chicago, and there consult Dr. Shailer Mathews, who, if I am not in error, is of the same communion as he. After sitting at the feet of that eminent scholar and teacher he may come to some realization of the immense harm he is doing to the cause which he is so zealous to promote, by such utterances as those given in the report of his New York address, the worst parts of which I refrain from quoting.

And now, emerging from the medieval gloom which still broods over a portion of the bar, turn to the light, listen to the words of Ex-Secretary Hughes and take courage.

To show that he has an intelligent appreciation of the value of the scientific method I quote briefly from an address which he delivered before the American Association for the Advancement of Science at its meeting in Washington a year ago:

> If to an increasing degree we have the security of sound public opinion, if the extravagance and diatribes of political appeals fail of their object, and if notwithstanding the apparent confusion and welter of our life, we are able to find a steadiness of purpose and a quiet, dominating intelligence, it is largely because of the multitude of our people who have been trained to a considerable extent in scientific method, who look for facts, who have cultivated the habit of inquiry, and in a thousand callings face the test of definite investigations. With scientific applications on every hand the American people are daily winning their escape from the danger of being fooled. There are, it is true, many false prophets who are active in those areas of exertion where patient inquiry and regard for facts are not much prized, but their following, while strident, is apparently not increasing.
>
> We need your method in government: we need it in law making and in law administering. We need your interest in knowledge for its own sake; . . . your ceaseless search for the truth; your distrust of phrases and catch-words; your rejection of every plausible counterfeit; your willingness to discard every unproved theory, however honored by tradition; . . . and above all your faith in humanity and your zeal to promote social welfare.

The Outlook

To many, as they see the rising tide of ignorance which is manifesting itself in reactionary legislation designed to mould the modern mind after the pattern of an age unlearned in the interpretation of nature, the situation appears to be serious. To some this disposition to exalt traditional authority over the demonstrated truths of science portends another dark age for civilization. I do not so read the signs. As I recall the reactions of science to theology fifty years ago, they were for the most part either attempts to reconcile the established truths of science with the record in the book of Genesis, or expressions of in-

difference, tinged perhaps with contempt for that ancient record. Meanwhile, theological opponents to science were either retiring defeated from the field of debate, or were taking up the task of adjusting their systems of philosophy to the new knowledge.

In contrast with the intellectual combats of a half century ago the present is characterized by a rapprochement between informed theologians and leaders in scientific investigation which is marked by a growing mutual understanding and respect. As a warrant for this statement it is necessary to refer only to such an organization as the American Institute of Sacred Literature of Chicago under the leadership of Professor Shailer Mathews, and the cooperation of such well-known scientific men as E. G. Conklin, Robert A. Millikan, Edwin B. Frost, Henry Fairfield Osborn, and others. A correspondent puts it this way:

> It seems to me that one can hardly say that there has been a recrudescence of medievalism; there has rather been an awakening on the part of some of the traditionalists to the rapid spread of a real interest in religion among men of scientific spirit. These men have the scientific habit, and they carry it with them into fields that such men would hardly have chosen for their specialty in former generations.[19]

Whether that be a correct diagnosis of the situation or not, I think that between the intellectual leaders in the physical sciences and in theology there is a growing disposition to work, each in his own field, without fear and without distrust, each desirous to press outwards, as far as may be, the boundaries of the known.

As for the active enemies of science, they may be dismissed as portents of evil with the Psalmist's words: "Why do the nations rage (marginal reading, "tumultuously assemble"), and the peoples imagine (marginal reading, "meditate") a vain thing?" The hope may still be entertained that, in spite of their emotional hostility to knowledge, their bondage to superstition, and their fear of the truth, they may yet adopt the scientific method of investigation suggested by Philip to Nathanael, and "come and see."

EDWIN LINTON

MEDICAL DEPARTMENT,
UNIVERSITY OF GEORGIA

ELLSWORTH BETHEL

ELLSWORTH BETHEL was born at Smyrna, Ohio, in 1863. In 1890 he became instructor in biology in the East Side High School, Denver, a position which he held until 1917. During this long period he enthusiastically studied the plant and animal life of Colorado, paying special attention to those obscure and difficult groups, such as the fungi and slime molds, which had been little investigated in the West. Many hundreds of pupils passed through his hands, and to the great majority he was able to communicate a fair measure of his own interest in nature. Some eventually became competent investigators, and all spoke of him with affection and respect. As a collector, Bethel was extraordinarily active, by no means confining himself to those groups which he personally studied. He was continually calling attention to facts and problems in such fields as entomology and conchology, in which he did not pretend to be an expert. The great accumulations of plants, especially fungi, in the State Museum at Denver, ran far ahead of the possibility of critical study with the available resources. It was always Bethel's hope that he would be able, in his later years, to thoroughly revise many of these materials. Unfortunately, the state of Colorado could not appreciate the importance of work on the native fauna and flora, and in the absence of financial support progress was difficult. Thus Bethel was led to take up work on economic mycology with the U. S. Department of Agriculture, and in this field has left a distinguished record.

Bethel's scientific discoveries were numerous. In the grand canyon of the Colorado, close to the trail where hundreds of tourists pass every year, his keen eyes detected a peculiar snail, which proved entirely new to science, and was named after him by Professor Junius Henderson. In California, one April day in 1923, Bethel picked a mariposa lily, and noticed an unusual looking bee in the flower. It turned out to be a new genus, which received the name *Betheliella*. Among the insects, those forming galls came in for special attention, and many new species were discovered. There are very few whose natural history interests are so wide, and fewer still who have the sort of intuition which leads them to collect unknown or little known species in groups they do not personally study. In these respects Bethel combined the qualities of a naturalist of the old school with aptitudes more characteristic of modern times. He was a pioneer in the West, and although cut short in his prime, and variously handicapped during his life, he has left a name which will not be forgotten.

Dr. Haven Metcalf, Bethel's chief in Washington, sends me the following statement, with permission to quote:

> In 1917 Bethel was appointed to the office of Forest Pathology as an associate pathologist. At the time we were in confusion over the question whether the white pine blister rust was or was not a native of America. A rust had been collected in Kansas many years ago, which

[19] Hon. Henry W. Temple, M.C.