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THE SCIENTIFIC METHOD AND AUTHORITY[1]

But the mortellest enemy unto knowledge, and that which hath done the greatest execution unto truth, hath beene a peremptory adhesion unto *Authority*, and especially the establishing of our beliefs upon the dictates of Antiquites. For (as every capacity may observe) most men of Ages present, so supersticiously do look upon Ages past, that the *Authorities* of the one excel the reasons of the other.—*Sir Thomas Browne.*

One who is ignorant of the history of science is ignorant of the struggle by which mankind has passed from routine and caprice, from superstitious subjection to nature, from efforts to see it magically, to intellectual self-possession.—*John Dewey.*

Discussion stimulates while controversy depresses.
—*Dr. Florence Sabin.*

The Scientific method must ultimately spread out to every human affair.—*H. G. Wells.*

A religion of authority gives rise to a scholastic theology; by the same necessity the religion of the spirit seeks to find form and expression in a theology which is increasingly scientific.—*Auguste Sabatier.*

Prove all things; hold fast that which is good.
—*St. Paul.*

In every true searcher of nature there is a kind of religious reverence.—*Einstein.*

> For who would keep an ancient form
> Thro' which the spirit breathes no more?
> —*Tennyson.*

THE struggle between that spirit in man which urges him to seek an explanation of things as they are and that spirit which prefers to rest upon the slumber-wooing bosom of tradition has been the theme of many learned treatises and of innumerable disputations.

To Dr. John W. Draper it seemed best described as a conflict between science and religion.

When Andrew D. White came to tell the story of the actions and reactions between the desire to know and the will to believe he gave to the world his admirable "History of the Warfare between Science and Theology."

[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.

In its present-day development it has assumed an aspect in which the line of cleavage does not, if it ever did, run between science and religion, neither does it divide one science from another; although some religionists confuse the issue, and, for the moment create the belief in some minds that there is an irrepressible conflict between science and religion. The real line of cleavage, however, is that which separates those who arrive at truth by way of the scientific method from those who frame their beliefs in accordance with some traditional authority.

THE SCIENTIFIC METHOD

It would be unnecessary, if I had in mind no other audience than the zoologists present, to define the term scientific method.

When reduced to its simplest expression it is no more than those processes which every normal person employs, whereby, through observation, experimental tests, and comparison with knowledge already possessed, he arrives at a reasoned conclusion.

An example of the employment of the scientific method, while it may seem trivial, since it is drawn from the experiences of a boy who, at the time he first used it, probably never had heard of the word science, will serve my purpose rather better than one which might call for the use of technical terms.

On a morning following a night during the latter part of which there has been a fall of snow, a boy, out hunting, notices certain marks in the snow which, instead of being haphazard, as are other marks which he sees have been made by small masses of snow which are falling from the branches of the trees as they are swayed by the wind, are in quite orderly arrangement. They are in groups of four, much as he could make by pressing two of his fingers, held some two or three inches apart and nearly side by side, and two other impressions made in the same way but one in front of the other and some eight or ten inches from the pair of parallel marks. Moreover, a line joining the paired impressions is nearly at right angles to the line which joins the other two.

He observes that these groups follow one after the other, a few feet apart, and form an unbroken line which stretches between a patch of blackberry briars and a brush-heap. His discerning eye notes that the two parallel impressions are consistently at that end of the group which points towards the brush-heap. So much for his observation of facts. Next follows what might be called an experimental test, at least a search for additional facts. Keeping at some distance from the brush-heap, he walks around it, meanwhile carefully examining the snow. Suppose that he finds the snow which surrounds the brush-heap free from orderly placed markings other than the one line of impressions which connects it with the briar-patch. His acquaintance with such signs as these teaches him that a short time before a rabbit left the briars and hopped in the direction of the brush-heap. His investigation of the available facts thus far, since in the language of the fable, there are no returning footprints, justifies his very reasonable hypothesis that there is a rabbit in that brush-heap. Imagine that boy's disgust if some traditionalist passer-by should object to the validity of his reasoned conclusion, call it impious and inform him that these marks were placed there by the creator of the snow or else were freaks of nature.

This would be no more an affront to reason than much which stands written against the rational interpretation of fossil footprints. Even in this year 1925 a book has appeared, "The Dogma of Evolution," in which (p. 155) is printed this criticism of paleontological conclusions: "The positive evidence of so momentous a change of structure (appearance of Amphibia) to be derived from six footprints seems a slender one on which to base the continuity of evolution." Which naturally makes one wonder whether eight footprints would be convincing, or if there had been but four, whether they could be admitted as evidence at all.

Of course our hunter may be quite ready to admit that, while the evidence at hand points to the conclusion that there is a rabbit in the brush-heap, further investigation may show that there is no rabbit there. For example, a hawk may have swooped down and carried it off through the trackless air, but if that were the case there would be some evidence that such a tragedy had been enacted.

Some thirty years ago, more or less, towards the close of the day, I unpacked a lot of material which had been collected by the Rev. W. E. Johnston, missionary to West Africa. Among much other interesting and valuable material were the skull, the bones of a hand, and the skin of a hand of a large male gorilla. This material I had left lying on a table in my room in the college. When I entered this room on the following morning, I found the janitor, John Washington, so deeply engrossed in an investigation in comparative anatomy that he did not reply to my morning greeting. He was holding the little finger of the gorilla beside the corresponding finger of his own hand. The nails on the fifth digits of these representatives of two genera of primates, *Troglodytes gorilla* and *Homo sapiens*, var. *Africanus*, thus laid side by side, were practically identical in shape, color, and differed not greatly in size. Instead of answering me in his usually polite manner, he said: "What is this?" I told him that it was the hand of a gorilla. His next question, and there

was in it a tone of mingled awe and reasoned conclusion, was: "Are they like us?"

Indeed the scientific method is simply the natural reaction of man to his surroundings when not hampered by the taboo of traditional authority. His method of arriving at truth is in no way changed when he is assisted by instruments of precision, or by devices which increase the range of his sense organs.

If those zealous people who have appropriated, without what seems to be an appealing justification, the name Fundamentalist would consult their own common sense, and apply the scientific method to an examination of the anti-science tenets of their theology, they might be led to remove a lot of the hay and stubble which has got into their foundations. Reason is a talent entrusted to man, and the failure to use it aright brings its own appropriate penalty. If after rejecting the rubbish they build into their religious foundations those experiences which Fosdick happily terms reproducible, they may themselves become guides to a religion the abiding truth of which they would demonstrate by their own manner of life.

AUTHORITY

The word authority is employed in two quite different ways.

(1) There is a common use of the word of which there is no possibility of a misunderstanding, although there may be inaccuracy in its application in given cases.

When we speak of T. C. Chamberlin as an authority in dynamic geology, of H. S. Jennings as an authority in biology, of Robert A. Millikan as an authority in molecular physics, of Henry Fairchild Osborn as an authority in vertebrate paleontology, we are speaking of savants whose wide experience and expert knowledge in their several fields of research are recognized by their fellow-workers in those fields, and we are making a proper use of the word.

It should be noted that no one, least of all any one of the persons thus designated as an authority, would ever dream of ascribing anything approaching infallibility to his opinions. Obviously it is a matter of considerable moment that the one who is cited as an authority should be recognized as such by those who are qualified to judge.

In my reading of the past few months I have gone through a fairly representative collection of anti-evolution books and pamphlets, and note that, like the anti-vaccinationists, and anti-animal-experimentalists, the writers of this eccentric literature have an unerring instinct which leads them to quote as authorities persons who are unknown to specialists in the subjects concerned or, if indubitable authorities are quoted, the extracts selected belong to a time when knowledge of the subject had not advanced to its present stage. They quote authorities to win decisions or to capture votes, not to establish truth. If these people were as reckless in their choice of a surgeon or architect or mechanic as they are in the matter of attributing authority to a mountebank whose chief recommendation is a certain skill in handling piously sounding phrases, it is reasonably certain that the most fundamental of them would soon be taught a practical lesson in truthfulness which he would lay to heart.

(2) Another use of the word authority is one liable to be misunderstood, because of its popular confusion with the ideas of infallibility and inspiration. Perhaps the term traditional authority will best describe this use of the word. And here, as I am brought to the border of a province but little traversed by biologists, I shall quote from a theological writer who, to the best of my knowledge, is worthy of attention:

> The notion of authority and inspiration have reacted inextricably upon each other: they can hardly in their relations to Christianity be studied apart: and both have been injuriously affected by that spirit of legalism, begotten ultimately of the Roman imperial system, from the cramped tyranny of which in one form or another the whole of Christendom still suffers.
>
> Here it may be sufficient to remark that we have no more reason *a priori*, to look for infallibility in the sphere of intelligence, as the result of the operation of the Divine Spirit which we call inspiration, than we have to look for impeccability in the sphere of conduct, as the result of that parallel operation of the same Spirit which we call grace.
>
> There is a sense, indeed, in which the so-called orthodox Protestantism which for three hundred years dominated Northern Europe and in which our fathers for the most part believed, was not Protestantism at all, but only mutilated Catholicism. Its intellectual basis, that is to say, was equally authoritarian with that of Rome, from which it differed merely in the substitution of the infallible Book for the infallible Church: a substitution which in itself was by no means an improvement.
>
> Such, it is only fair to say, had not been the position of the original Reformers. Luther, for instance, found the seat of authority not in the letter of the Bible but in the self-authenticating witness of the spirit of God speaking through its pages and discerned by the spiritual man: he proceeded on this basis to exalt such of the Bible books as particularly appealed to him and to depreciate others. . . . Historically Protestantism as a whole lost sight of it and fell back upon infallibility and verbal inspiration.[2]

[2] "Foundations, Christian Belief in Terms of Modern Thought," pp. 368, 372; "The Principle of Authority," A. E. J. Rawlinson, Keble College, Oxford.

. . . Both infallibilities, we may say, are to-day discarded; the infallible book has gone the way of the infallible Church.

These quotations enable us to understand something of the historical development of the idea of an infallible authority.

The topic which I have chosen for discussion, it is to be observed, is "The Scientific Method *and* Authority," not "The Scientific Method *or* Authority." Authority, even if it be of the traditional kind, is not necessarily erroneous, and with authority which is true science can never come into conflict.

It can not be stated too emphatically, however, that for an authority which is not ready and willing to reexamine its foundations in the light of advancing knowledge, science can have but little regard.

ANTI-SCIENCE TO-DAY

Five years ago no one would have thought of discussing a semi-theological topic before Section F.

To one taking a superficial view of science in this country it might appear that Bateson's fateful speech at Toronto four years ago was the Sarajevo shot which precipitated war. However that may be, the scientific population, being of peaceful habits, were at first not disturbed by the noise and the shoutings. They are not much disturbed yet. They may be a contemptible little army politically in the eyes of the anti-science swashbucklers, but they are confident in the righteousness of their cause and unafraid. Their weapons are those with which science has aforetime battled, the discovery of new knowledge and demonstration of the truth. Science has won her way to her present position of dominance in the world's thought along the peaceful and pleasant paths of wisdom and knowledge. Entrenched authority from time to time, as new knowledge appeared to threaten vested interests or ancient beliefs, has resorted to opposition, oppression, persecution, hangings, burnings, torturings in ways of unbelievable cruelty. Until the Dayton, Tennessee, tragicomedy of last summer the land had enjoyed peace from outbreaks of religious violence since the epidemic of witchcraft hysteria in Massachusetts near the close of the seventeenth century. The total number of victims of the literalism of that unhappy time, we are told, were nineteen human beings hanged, one pressed to death for refusing to plead, according to the old criminal law practice: two dogs, accused of witchcraft, were also put to death.[3]

Bad as it was, this was trifling compared with the vast numbers put to death in Europe on the charge of witchcraft. Thus, speaking of Germany from the middle of the sixteenth to the middle of the seventeenth century, White says: "An eminent authority on this subject estimates the number of victims thus sacrified during that century in Germany alone at over a hundred thousand."[4]

It is significant that just as the witchcraft superstition was dying out in Europe there was a temporary flare-up of the same in this country so, in this twentieth century, with evolution accepted in Europe after an intellectual conflict, ended more than a generation ago, there is a backfire of anti-scientific frenzy among the ill-informed, scientifically, and the badly instructed, religiously, of portions of this country.

That the old spirit of persecution has not died out may be read in a typical emotional outburst, quoted by Charles T. Sprading.[5] One of those gentle well-wishers of humanity is thus reported:

> Take the evolutionists, infidels and no-hell teachers out somewhere and crucify them, head downwards, and we will have a better country to live in and, instead of these evolution and easy-way ideas, teach people the Word of God to go by, and all will be well.

This has all the marks of a hasty and ill-considered proposition. A better plan would seem to be, first to teach the people the word of God to go by, and then all will be well, and it will not be necessary to crucify anybody, head downwards or otherwise.

This twentieth-century echoer of the old mob cry, "Crucify him, Crucify him!" would do well to heed the words of a student of authority:

> Summing up, we may lay it down as the function of authority in religion neither to compel assent nor to override reason, but to testify to spiritual experience.[6]

And here I may be permitted to remark that it was not until I had given considerable time to the study of the situation that I came to the conclusion that the apparent distrust of science noted by students of present-day tendencies, and the ill-informed criticism of the theory of the origin of species by descent with modification, are but incidental to a larger conflict of ideas, *viz.*, that between the so-called Modernists and the self-styled Fundamentalists.

The situation, therefore, resolves itself into the inevitable conflict between the scientific method of arriving at reasoned conclusions, and reliance upon an authority to which the attribute of infallibility is imputed.

When it is taken into consideration that there is

[3] "Wonders of the Invisible World," Cotton Mather. Volume printed in London by John Russel Smith, 1862, p. viii.

[4] "Warfare of Science," II, p. 75.

[5] "Science *versus* Dogma," p. 119.

[6] Rawlinson, *l. c.*, p. 380.

practical unanimity of opinion among scientific investigators, not only in the strictly biological sciences, including all sciences relating to man, such as anthropology, ethnology, philology, and the like, but also the sciences of astronomy and geology, to go no farther, as to the truth which the application of the scientific method to their several departments of research reveals in accounting for things as they are, then it becomes apparent that the agitation against the teaching of a reasonable explanation of natural processes, to which the name evolution is given, is at bottom an emotional as distinguished from an intellectual movement.

The word "religious" is not the proper one to use in such connection, for religion that is pure and undefiled is separate from the anti-evolutionists, and, in view of the fact that theologians of the present day are far from being hostile to evolution, one is barred from characterizing the movement as a theological one.

It may be that others beside myself, absorbed as we have been in the cultivation of physical science, have not thought of theology as a science. This must be my excuse for devoting a short time to this question, and, incidentally, to make amends for the injustice which I have unintentionally done to a noble company of seekers for the truth, by thinking of theologians as being either indifferent or actually hostile to science.

There have been notable examples of theologians who have assented readily to the conclusions of scientific workers, as there have been men of science who have yielded but slowly. The accord between theology and the physical sciences has been growing closer since the universal acceptance, after years of opposition, of that interpretation of the cosmos, including organic beings, which goes by the name of evolution. And I have yet to hear of any hostility on the part of theologians to the revelations which the science of physics is making to the world. The only thing in the way of ill-natured criticism of sub-atomic physics which I have seen is in that exasperating book, "Dogma of Evolution," written by a physicist, where the author says: "Our debauch of evolution, of aethers and of electrons is fast carrying us back into the state of medieval absurdities."[7] My feeling of gratification that I am here doing the theologians a good turn is somewhat chilled by the suspicion that the author of "Dogma of Evolution" is something of a dilettante theologian as well as a professional physicist.

My friend, Dr. James H. Snowden, has kindly let me read the manuscript of a paper, "Teaching Theology in an Age of Change," which he presented at the Theological Seminary Conference at Grand Rapids, May 21, 1924. From which I take the liberty of quoting as follows:

> Last came evolution and again the theologians made a loud outcry as though the heavens of religious truth were passing away with a great noise. There has recently been a recrudescence of this disturbance, and some good people are alarmed, but the problem has been well worked out into adjustment and is generally accepted even in theological seminaries. When the Professor of Apologetics in Princeton Seminary publishes a paper in which he says: "The doctrine of evolution is taught in this institution as one of the ways of God's working," we may conclude that the truth on this belief has been seen and said even in the schools of theology.

It may be that some of us who have a low expectancy of years to come may live to see the day when there will be an exchange of professors of theology between, say Princeton and Union Seminary, New York. When that day comes who can question the claim of theology, in Sabatier's fine phrase, to "a place in the consecrated choir of modern sciences?" [7a]

In passing it may not be inappropriate to advert to the title "Queen of the Sciences," which one sometimes sees given to philosophy and sometimes to theology. As a graceful title, stripped of every attribute of royalty or power, there may be no objection to such designation. At any rate those of us who contribute to the music of the choir in a humble way (for even of parasitologists it may be said, They also serve who study only worms) may take comfort in the thought that there are queens and queens of infinite variety of temperament, from the Queen of Hearts, of Alice's Wonderland adventures, who shouted, in real Fundamentalist fashion, "Off with his head!" at the slightest provocation, to the amiable White Queen, who was so proud of her ability to spell words of one letter.

Although I am convinced that this wave of anti-science which is sweeping over parts of our country is essentially an emotional movement, the situation is rendered somewhat difficult to analyze on account of the diversity of the forms of attack on scientific activities. In fact the movement has opened a veritable cave of Adullam, from which primitive abode issue emotional exhorters for tradition against knowledge; vested interests whose traffic of iniquity is threatened by scientifically framed pure food laws; vendors of quack medicines and practicers of magic, who hate that science whose light is as deadly to them as is the light of the sun to anaerobic bacteria. Thence also issue many bizarre cults of pseudo-science, or mutilated science, wearing names borrowed

[7] P. 111.

[7a] "Religions of Authority," p. 345.

from the language of medical knowledge, such as chiropractic, osteopathy, Christian Science, and the like, not evil in themselves, but certain to do harm when employed in cases where a regard for the demonstrated truths of science would forbid their entrance.

In this motley anti-science mob also appear such anti-social eccentrics as anti-vaccinationists, anti-animal-experimentalists, and the like ilk. Each and every of this pernicious horde can be definitely and effectually disposed of by the irrefragable logic of scientifically tested fact. I shall take time to deal with but one case, and that but briefly, *viz.*, that of the opposition to vaccination against smallpox.

Here is a convincing example of the efficacy of preventive measures against that highly contagious disease:

> In the Philippines prior to the occupation by the American Army, more than 40,000 smallpox deaths occurred every year in the Islands, and 6,000 deaths occurred annually in Manila. Vaccination was introduced by the Americans and smallpox diminished in the Islands. In 1903 there were 18,989 smallpox deaths and this number decreased year by year to a minimum of 239 in the year 1916. By that time the effect of the vaccination performed during the early years of American occupation had worn off and vaccination had been practically abandoned by the local officials. The neglect of this law enforcement led to a tremendous epidemic in 1918–19, resulting in 60,447 deaths.
>
> During the epidemic of 1918–19 our troops stationed in the Philippines were in constant contact with the native population, carrying aid to the stricken natives. They were surrounded by thousands of cases of one of the most contagious diseases known to man. Only one case developed among our 5,442 vaccinated troops.
>
> During the year 1923 there was an intensive campaign to vaccinate and, according to the annual report of the Philippine Islands, 2,132,653 individuals were vaccinated out of a total estimated population of 11,000,000. There were but four deaths from smallpox in the Islands that year.[8]

Such facts as these, taken from the recent history of the Philippine Islands, are corroborated by similar experiences in every country where compulsory vaccination has been introduced.

One would think that such evidence would convince every reasoning person of the folly and harm of opposing vaccination, and I think that where the evidence is properly presented, it does carry conviction. There will always remain a certain percentage of humanity who will be unconvinced, because unconvincible. These are the abnormal, if we are to regard man as being normally a reasoning being, persons of fixed ideas, among whom must be placed, temporarily at least, those who are enthralled by the fixed idea that their will to believe is warranted by their interpretation of an authority which they do not admit to be itself subject to scientific examination.

What is to be done to save our civilization from this threatened backset to medievalism? An appeal to that worthy body of our citizens who are to be found in the organized churches is sufficient, in ordinary cases, to enlist a powerful force against any evil. But here right and truth are wounded in the house of those who should be their friends. This return to unguided literalism, under the name of Fundamentalism, is something in the nature of an emotional cyclonic area of low intellectual pressure which is passing over the churches and generating, as it progresses, a crop of local, sub-theological twisters, and vocal vortices which are doing much damage to the reputation for truthful and temperate statement and for ordinary fair dealing, except where covered by the cloak of a feeble understanding, of many who imagine that they are the called of the Lord against the mighty.

Of course, if these for the most part well-meaning people, who are suffering from this epidemic of traditionitis and have not immunized themselves against superstition by putting on the armor of common sense, would listen to their own educated teachers in the theological schools, no alarm need be felt. Sound scholarship, based as it is on a rigorous application of the scientific method, can be trusted to get at the truth in all departments of inquiry. Even the turbulent emotions of this mob which has turned against its qualified leaders, to follow for the moment frantics more emotional, and no better informed than itself, is a proper subject for study. It is a good time now for some student of mob psychology to give a proper diagnosis of this particular emotionalism which has taken the form of fear and hatred of a creature of its own imagination, which it calls evolution, and prescribe the proper treatment.

It might be worth while to ask those agitators who are attacking scientific investigators to appoint a committee that shall accompany a number of trained workers in the public health service in making a survey of various localities where scientifically directed public health work has been allowed to be carried on unopposed for a series of years, and has been given as generous support as has been afforded to the organized church work in the same localities. Also the joint committee shall make a survey of localities where public health work has not yet been inaugurated, but where Christian churches have ex-

[8] "Smallpox, a Preventable Disease," American Association for Medical Progress, pp. 16–17.

isted for long enough time to allow of a study of their work.

If such surveys do not show that the people in those communities who have heeded the gospel of science, who have been instructed as to the causes and prevention of such debilitating parasitic diseases as hookworm and malaria, of such devastating scourges as typhoid, diphtheria and smallpox, of such dread calamity as rabies, are happier, more prosperous and better disposed to help their fellow men: if they are not more earnest and efficient in the promotion of righteousness and true religion than are those who have enjoyed only the benefits that come from the organized church, which no unprejudiced person denies, then we may begin to think that after all this world may not be what science teaches us that it is.

We may then be ready to go back to the days when humanity was passive under the visitation of pestilence and plague, reading in them punishments inflicted by an angry god or gods, for neglecting to offer sacrifices of the proper odor; to those bad times when demons lurked beside the way, and witches wrought their nightly deeds of evil; to that dread age when men cowered in terror at the appearance of a comet in the sky, interpreting it to be a fiery messenger from an angry and jealous potentate above the firmament, who at any time might open gigantic flood-gates in the dome above our heads and bring another Sinflood upon mankind.

ANTI-SCIENCE LEGISLATION

That the emotional anti-science elements in society are still running true to form in this twentieth century is shown by organized efforts to control, limit or prohibit scientific instruction in our schools by legislation.

A brief review of some of this legislation which has been enacted or proposed will be instructive.

Section I, of the Tennessee anti-science law (March, 1925), reads as follows:

> Be it enacted by the General Assembly of the State of Tennessee, That it shall be unlawful for any teacher in any of the universities, normals, and all other public schools of the State which are supported in whole or in part by the public school funds of the State, to teach any theory that denies the story of the Divine Creation of man as taught in the Bible, and to teach instead that man descended from a lower order of animals.

A joint resolution of the House of Representatives, and Senate, in 1923, of the Florida legislature is of similar purport.

> Be it resolved by the House of Representatives, the Senate concurring: That it is the sense of the legislature of the State of Florida that it is improper and subversive of the best interest of the people of this State for any professor, teacher or instructor in the public schools of this State, supported in whole or in part by public taxation, to teach, or permit to be taught atheism, or agnosticism, or to teach as true Darwinism, or any hypothesis that links man in blood relationship to any other form of life.

A similar bill, in 1921, was defeated in the Kentucky legislature by a vote of 42 to 41. In 1921 a rider attached to the general appropriation bill by the Senate of South Carolina provided that:

> No moneys appropriated for public education or for the maintenance or support of State-supported institutions shall be used or paid to any such school or institution teaching, or permitting to be taught, as a creed to be followed, the cult known as Darwinism.

Senator Miller, who introduced the proviso, explained that it applied only to "Darwinism" and not to such theories of evolution as are advocated by Lamarck, Bergson, Osborn and others. The amendment passed the Senate but was stricken out of the bill by the joint committee.

Plainly, Senator Miller is something of a joker and deserves the thanks of all those who are acquainted with the work and writings of the worthies named by him for thus injecting into the current of anti-science literature this joyous elixir.

The teaching of evolution in the public schools of the states of Oklahoma and Texas has also been prohibited by law.

The last Congress attached a rider to the appropriation bill prohibiting the teaching of anything implying disrespect to the Bible in the schools of the District of Columbia; and I am informed that the Fundamentalists, having obtained a majority in Congress, have had prepared a very strict anti-evolution bill for introduction into the new Congress which will prohibit the teaching of anything of the sort at Annapolis, West Point or in the schools of the District of Columbia.

Such laws reflect the spirit which was dominant in the direction of public education in Prussia before the World War, of which it has been said: "The avowed purpose of the schools in Prussia was not for the spread of the truth but for the war against social democracy."[9]

A more ominous portent is that which is reported in the Springfield, Kentucky, *Sun* for February 14, 1924. At a meeting of the citizens and patrons of the schools the following resolution was passed:

> That the teaching of biology or any kindred subject is objectionable to a large majority of the patrons of the school; and whereas we have found from experience that the subject of biology so readily lends itself to the teach-

[9] Graham Wallar, "The Great Society," p. 153.

ing of evolution, we ask that it be eliminated from the curriculum of said school and some other subject taught instead.

The use which anti-science lawmakers in this country at the present day would make of our schools would seem to be, not as training grounds for the development of leaders in the discovery of new knowledge, but rostra for the training of declaimers against all knowledge that is not in accord with traditional beliefs.

EDWIN LINTON

MEDICAL DEPARTMENT,
UNIVERSITY OF GEORGIA

(To be concluded)

PLATFORM OF THE ENGINEERING FOUNDATION

WHEN, in 1914, Ambrose Swasey, honorary member of the American Societies of Civil and Mechanical Engineers, proposed an Engineering Foundation to aid engineering research and made a generous gift as a "nest-egg" for its endowment, he put up to the national societies of civil, mining and metallurgical, mechanical, and electrical engineers a problem of more than passing interest and difficulty. It was the problem of organized engineering research under the auspices of these societies. Sooner or later, through one channel or another, this problem must have come before them, but theretofore it had not received their formal consideration.

Even in that advanced year of grace, very few engineers outside the electrical branch of the profession, had much understanding of research as conceived by scientists. The world war soon after Mr. Swasey's gift diverted effort to special services. "Reconstruction," with its peculiar problems, followed and other complications arose. Consequently, it was not until ten years after Mr. Swasey first made his proposal that attention was concentrated upon the main question of determining what the functions of an Engineering Foundation could best be as a joint instrumentality of the four societies just named and frequently designated as the Founder Societies.

Among questions demanding answer were the following:

1. Should Engineering Foundation directly organize and conduct research?
2. Should Engineering Foundation only support researches conducted by its Founder Societies, other organizations and individuals?
3. What relations should Engineering Foundation sustain to its Founder Societies, to other technical and scientific societies, to research organizations, to governmental departments, to industries, to educational institutions and to individuals?
4. With small income how could Engineering Foundation do most to promote and accomplish research in its field?
5. How could researches be increased directly or indirectly?

Naturally there were varieties of opinion on all sides. While discussion of these questions was going on, work was proceeding. Various elements of solutions of the problem were being tried out practically and many useful results were being achieved. Increments to the endowment have been received. Supplementing its direct income, Engineering Foundation during recent years has helped to bring about an average yearly expenditure of approximately one hundred thousand dollars for projects in which it has participated.

About a year ago, Engineering Foundation, as a step toward an acceptable solution of its organizational problems, formally requested of the boards of its Founder Societies a new expression of views on fundamental policies. Finally, in the fall of 1925, at the suggestion of the new chairman, L. B. Stillwell, out of accumulated experience and opinion, and from among many tentative formulations of policy and practise, drafted in preceding years, an answer appeared. A platform was unanimously accepted by the Founder Societies and was adopted by Engineering Foundation December 10. It follows:

Desiring to promote active and wisely directed research as a means to scientific and technical progress and believing that systematic cooperation by Engineering Foundation and the several Founder Societies is essential to any development of the research work of the societies commensurate with the dignity, influence and resources of the profession, Engineering Foundation, while reserving entire liberty of action under the authority conferred upon it by the Founder Societies, through United Engineering Society, adopts the following declaration of its present plan and policy:

1. Engineering Foundation regards engineering research as the preferred field for its activities.
2. It will select or approve specific researches which it will assist by appropriation of funds or otherwise.
3. It will select for each project the agency, collective or individual, which it deems most effective.
4. It will assume no direct responsibility for the prosecution of any specific research.
5. It will cooperate with the national Engineering Societies and preferably support researches approved by it sponsored by one or more of them.
6. A member of Engineering Foundation, or of its staff, may be an advisory, but not an active, member of any committee or other organization in immediate charge of a research assisted financially by the