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Evolution and Intellectual Freedom.

THE agitation in the United States over the teaching of evolution is attracting such widespread interest that it has been proposed to build a stadium to accommodate twenty thousand people for the trial of J. T. Scopes, a Tennessee High School science teacher, for having taught the truth of evolution in defiance of the State law. The trial is to open on July 10. The charge of the judge to the grand jury began by reading the first chapter of Genesis as the account of creation which Tennessee teachers must adopt. He pointed out that part of the value of education is mental discipline, and that flagrant defiance of the law by the school authorities would not be a wholesome influence in the State. He insisted that the integrity of the law must be upheld. The main issue, however, will be decided by the Federal Court in its decision as to the right of a State to prohibit the teaching of fundamental philosophical principles.

The defence of evolution has been undertaken by the American Association for the Advancement of Science, which has appointed a committee of three distinguished biologists, Prof. E. G. Conklin, professor of biology at Princeton, Dr. C. B. Davenport, director of the Station for Experimental Evolution, Carnegie Institution of Washington, and Dr. H. F. Osborn, president of the trustees of the American Museum of Natural History, New York, to prepare a resolution upon the subject. The resolution, which has been adopted by the Council of the Association, is as follows :

"(1) The council of the association affirms that, so far as the scientific evidences of the evolution of plants and animals and man are concerned, there is no ground whatever for the assertion that these evidences constitute a 'mere guess.' No scientific generalization is more strongly supported by thoroughly tested evidence than is that of organic evolution.

(2) The council of the association affirms that the evidences in favor of the evolution of man are sufficient to convince every scientist of note in the world, and that these evidences are increasing in number and importance every year.

(3) The council of the association also affirms that the theory of evolution is one of the most potent of the great influences for good that have thus far entered into human experience ; it has promoted the progress of knowledge, it has fostered unprejudiced inquiry, and it has served as an invaluable aid in humanity's search for truth in many fields.

(4) The council of the association is convinced that any legislation attempting to limit the teaching of any scientific doctrine so well established and so widely accepted by specialists as is the doctrine of evolution would be a profound mistake, which could not fail to injure and retard the advancement of knowledge and of human welfare by denying the freedom of teaching and inquiry which is essential to all progress."

The American Medical Association has expressed itself similarly in a resolution, passed by its House of Delegates, on the question of the teaching of evolution, "that any restrictions of the proper study of scientific fact in regularly established scientific institutions be considered inimical to the progress of science and to the public welfare."

The American Association is being helped in preparing a defence by the Science League, which was founded last year in San Francisco in order to secure liberty of teaching in American education.

These organisations have to meet a widespread and well-organised attack. The teaching of evolution has already been prohibited by law in Oklahoma and Tennessee. Bills for the same purpose were submitted to the State legislatures in Kentucky and in Texas and were rejected by the Upper House, in Kentucky by a majority of one vote. In Florida the legislature passed a resolution advising the educational authorities not to employ those who teach Darwinism, and the agitation for direct prohibition is still maintained. In North and South Carolina legislative action against the teaching of evolution was defeated, but text-books and teachers who favour evolution are debarred from the State schools. Georgia has as yet no absolute legislation on the subject, but the State Education Committee last July advised the legislature to refuse grants to any school, college, or university that favoured the doctrine of evolution, and it has recently withheld a grant from a State library because it contains books on evolution. Bills against the teaching of evolution are being introduced or have been introduced into the legislatures of the States of Arizona, Arkansas, Georgia, Illinois, Indiana, Iowa, Minnesota, Mississippi, North Dakota, Oregon, and West Virginia.

In California the effort was made, as mentioned in NATURE of May 9, p. 683, to avert a struggle by reference of the question to a committee of the nine

presidents of the State universities and leading colleges. Six of these colleges are under denominational control, and the unsatisfactory compromise previously referred to in NATURE has not satisfied either side. A requisition is being signed for a reference of the question to a ballot at the next election; and the Fundamentalists are said to be confident that they will carry the State, unless books which give even a moderate approval of evolution are excluded from the schools.

The anti-evolution party is being supported to some extent by the publishers. Thus, one distinguished New York biologist has been requested by his publisher to omit any reference to evolution in any new editions of his text-book, owing to the objections of the Southern and Western States. The intellectual terrorism in some of the States may be judged by the fact that according to the *Boston Evening Transcript* of May 23, although, while the anti-evolution Bill was before the legislature in Tennessee, many clergy protested against the proposed infringement of freedom of opinion, "there was never a word of protest from the State University." The North-eastern States show by the comments of the Press their deep regret at this outbreak of intellectual obscurantism, and it is to be hoped that an authoritative expression of opinion there may help the Southern and Western States to realise the heavy handicap they would be laying upon themselves, as well as upon their universities and schools, by the legal prohibition of well-established scientific principles.

In Great Britain, State interference with university teaching would not be tolerated. The proper body to decide what may or may not be taught in a university is the Senate or Council, and not a popularly elected civic chamber of any kind. It must not be forgotten, however, that education authorities in England exercise the right of control over the teaching of religious doctrine in schools, and that they could apply the same powers to the teaching of evolution if they wished. It is not for us, therefore, to attempt to justify what seems to have been a breach of law in the State of Tennessee, however much we may deplore that a State should pass a measure which is contrary to all modern ideas of progressive thought and intellectual freedom. What we are concerned with is the principle by which a political party or organisation should be able to put obstacles in the way of human enlightenment and independent thought, and should have the power of approving, or preventing, the teaching of scientific facts or conclusions of any kind. We have long passed the stage at which this was possible in England, and cannot help being astonished, therefore, that there should be States in

the United States of America which deliberately adopt a policy of scientific stagnation.

In order to ascertain the views of leading authorities in the fields of university work, science and religious teaching, upon this attitude, advance proofs of this article have been sent to a number of representative men, whose comments, here subjoined, will, we believe, be read with interest on both sides of the Atlantic.

Prof. WM. ADAMS BROWN, Ph.D., D.D.,
Roosevelt Professor of Systematic Theology, Union
Theological Seminary, New York.

My friend, Prof. Wildon Carr, has suggested to me that it might interest readers of NATURE to learn the views of an American observer as to some of the antecedents of the singular case presently to be tried in Tennessee. The incident, dramatic as it is, is not an isolated event, but part of a movement the beginnings of which go back many years, and has already caused a serious rift in several of the more important denominations; it cannot be understood without reference to its larger setting.

The first factor to be borne in mind is geographical. The United States, in spite of its hundred and ten millions of people, is still, judged by European standards, sparsely settled, and within its ample borders includes populations separated from one another by differences of antecedents, habits, and tastes, scarcely less marked than those which separate the different countries of Europe. There are wide areas of the United States in which the inhabitants know as little of what goes on along the Atlantic seaboard as the inhabitants of China or India. To understand the psychology of Fundamentalism, one must see such a play as "Sun-up," and remember that it truthfully describes the mental attitude of hundreds of thousands of American citizens of the purest English stock.

A second factor to be reckoned with is the tendency of Americans to standardise their thinking. This characteristic, which constantly surprises the English visitor, accustomed to the free expression of individual opinion on every topic under the sun, has its explanation, if not its justification, in the exceptional conditions under which the American democracy has developed its national life. With a people recruited from every quarter of the globe, living under conditions which stimulate individual initiative, there was grave danger that the unity of the national life might be lost unless the variant elements could be held in check by a powerful public opinion. In Great Britain, centuries of tradition have fixed habits of action in certain definite grooves, and one can safely allow himself the luxury of freedom in his thinking.

In the United States, where tradition is at a discount, and each man does what the need of the moment seems to require, there must be some steadying and conservative influence, and this, apart from the written constitution, is supplied by a powerful and often tyrannous public opinion. What is going on in religion in the so-called Fundamentalist movement has its parallels in economics and in politics. Feeling is often substituted for reason, and the nonconformist is punished by social disapproval, if not ostracism.

To understand the theological antecedents of Fundamentalism one must go back a generation to the Briggs case, the celebrated heresy trial of the last decade of the last century, which in so many ways paralleled the Robertson Smith case in Scotland. There, as here, the issue was the inerrancy of the Scripture; there, as here, the first result was the condemnation of the accused; but, at this point, the parallel ceases. In Scotland, the result was a revival of Biblical study carried into the homes of the people by a generation of ministers who were teachers as well as preachers—a revival which familiarised the rank and file of the people with the issues involved, robbed criticism of its terrors, and prepared the way for the saner and more scientific theology of to-day. In the United States, this result followed with certain individuals and in certain sections of the country, but for the most part the effect was different. The Briggs case shook the faith of many a minister in the old theology without giving him a firm grasp on the new. He therefore ceased preaching theology altogether and turned to social service or some other practical interest as a substitute. The result is that the present issue comes upon a people unprepared to meet it, and easily swept away by the plausible rhetoric of an orator like Mr. Bryan, who has learned by long practice to make words do duty for ideas.

It must be further recognised that when their real interest is separated from the fantastic opinions with which they have associated it, the Fundamentalists are contending for something with which men of a very different mental outlook may feel sympathy, namely, a positive and constructive Gospel. In the general loosening of old ties which has been the aftermath of the War not a few self-styled liberals have been ready to break completely with the past, and lightly to surrender values painfully won by the labour and sacrifices of many generations. The spectacle of this light-hearted radicalism has seriously alarmed many who would have been ready to respond to a saner presentation of the newer views, and, yielding all too readily to the psychology of the crowd, they have allowed themselves to lend their support to positions which, under less trying conditions, they would be the

first to repudiate. It is not the first time in the history of religion that a good cause has been discredited by the agents of which it has made use.

One further point requires brief notice. In spite of the factors I have mentioned, the controversy would not have reached its present acute stage if there had not been on the Fundamentalist side a systematic popular campaign, amply financed, which has carried the cry of the Gospel in danger into every section of the country. Only recently have the advocates of a reasonable Christianity realised the danger which confronted them, and organised for a similar campaign of education on the other side. That realisation has, however, come at last and that organisation been effected, and unless the American people have been permanently bereft of the good sense which has hitherto characterised them in critical hours, we may confidently expect that the forces of reaction will be checked, and a reasonable liberty of thought be safeguarded.

Sir RAY LANKESTER, K.C.B., F.R.S.

Formerly Director of the Natural History Departments of the British Museum.

In the article about to be published in NATURE which you have sent to me for comment, I do not find any definite information as to the law or laws said to be operative in certain States of the American Union by which the teaching of the doctrine of evolution is forbidden, nor do I find any precise statement of the power said to be exercised by certain States of withholding pecuniary support or, on the other hand, of giving it to colleges or schools which teach or do not teach subjects approved or disapproved by the State legislature. One must suppose that such *direct* control of the educational programme of colleges and schools supported by grants from the public purse is approved by the citizens who elect the legislative body. If the wishes of the constituency are carried out, lookers on may regret or disagree with the programme enacted, but must admit that the action is in accordance with the fundamental principles of self-government. If the action is not in accordance with the wishes of a majority of the constituency, that majority can elect new representatives pledged to the policy it prefers.

Another very important question is raised in your article about which I have no information. You say that the Federal Court has the power "to decide as to the right of a State to prohibit the teaching of fundamental philosophical principles." One would wish to hear more about this power of the Federal Court, and also as to the interpretation of the term "fundamental philosophical principles." In the absence of information on these matters it would be rash to pursue the

subject further. Clearly enough (in my opinion) the integrity of the law must be upheld. The "law" can be altered by a regular constitutional method, but there seems to be no justification for disobeying it instead of repealing it.

The normal and healthy result of the exclusion from State colleges of "studies" which many citizens desire to be made accessible for themselves and their young people, must be to bring about a "boycot" of the State institutions in question, and the endowment of free "nonconformist" colleges to take their place. In many respects educational enterprise flourishes best when free from State interference, State prejudice, State ignorance, and State jobbery. The great universities of the United States are independent corporations, and so are Oxford and Cambridge and their colleges, and so too are the other great universities of Britain. The State government does not at the present day presume to control their programme of studies, but rather protects them from fanatical influences and secures them in the possession of property which enables them to pursue the making and the diffusion of knowledge with independence and self-respect. The present freedom of student and professor and the self-governing status of "Universities" in Great Britain is the outcome of long and historical struggle. That status is not theoretically complete even now, but is in a reasonable state of adjustment to the demands of healthy progress. The university is expected in Great Britain to be (and *is*) tolerant of divergent opinions. It unites learned men of various philosophical outlook in a common effort to increase knowledge and to promote its diffusion through all classes of the community.

It must be incredible to British teachers that a judge charges a grand jury by reading out the first chapter of Genesis and declaring that that is the account of creation which Tennessee teachers must adopt. As a matter of *fact* that is *not* what the judge said. What he said was that, according to the law of the State of Tennessee, a teacher could not legally be paid his salary unless he taught the first chapter of Genesis as true. A Tennessee high school science teacher refused to give that teaching, and so has gained an enormous journalistic advertisement.

The whole affair is being worked by journalistic enterprise in the States on a misleading basis. There is no "trial" of the advertised teacher. He is no martyr. He is simply a case of the very ordinary failure of an employee who will not carry out the terms of his engagement and is dismissed accordingly. He is under no compulsion. He can teach according to contract or he can go elsewhere. He prefers to go. The interesting questions which remain for solution are: (1) Do the

free and independent citizens of the State of Tennessee approve of the action of their legislature in regard to the first chapter of Genesis? (2) Will the Federal Court over-ride the interference of the State legislature in this special instance? It will take time to educate the citizens of Tennessee so as to enable them to judge whether their legislature is wise or foolish in endeavouring to exclude the teaching of the doctrine of evolution from State-supported colleges. We must wait and see. But in the meanwhile the great colleges of Harvard, Yale, and Princeton and the scientific academies and museums of the United States are not affected by this storm in a tea-cup.

P.S.—I should like to place on record the fact that at Oxford in 1873 I gave, as deputy of the Linacre professor of anatomy and physiology, a course of public lectures on "The Genealogy of the Animal Kingdom," in which I fully accepted and taught Darwin's doctrine of descent. Neither at Oxford nor afterwards when I gave a similar course of lectures at the Royal Institution in London was there the smallest protest or objection raised to the straightforward teaching of the doctrine of evolution and Darwinian zoology. On the contrary, I received warm encouragement alike from professors and undergraduate students.

Prof. E. W. MACBRIDE, D.Sc., F.R.S.,
Professor of Zoology, Imperial College of Science
and Technology, South Kensington.

THE remarkable movement in America aiming at the suppression of the teaching of evolution in schools and universities is too widespread and has far too much momentum behind it to be accounted for as a mere outbreak of intellectual obscurantism. The general public there, as elsewhere, is profoundly uninterested in scientific speculation, unless this is discovered to have a practical bearing on life. It is because, in the opinion of the average American, the doctrine of evolution as taught in American schools and colleges is liable to defeat the purpose for which those institutions were established that he has risen in revolt against it.

The Fundamentalist argument is as follows:—These schools and colleges from which we desire to exclude evolutionary teaching were established by men brought up in the Puritan tradition, which has largely moulded and developed the American national character, of which we are all proud. The object for which these homes of learning were founded was not the imparting of abstract truth but the training of men to be good citizens. Evolutionary teaching in America has led to a purely materialistic and mechanistic view of life: it teaches that individual men are mere ephemeral bubbles on the surface of things: that their moral ideas are only tribal taboos of no particular validity: that "conscience and

free-will," to quote a leading exponent of "behaviourism," "are mistakes of the older psychology," that "God" and "Heaven," according to another evolutionary philosopher, "are defence-mechanisms different in degree but not in kind from the illusions of the paranoiac," and the widespread acceptance of such ideas would undermine the American character.

The most practical objection to the Fundamentalist position is its entire futility. Nothing could do more to stimulate widespread interest in evolutionary views than the attempt to prohibit them. The American youth in particular resents being forbidden any of the fruits of the tree of knowledge, and the attempt to do so will only whet his appetite for them. Just as hundreds of boys and maidens now indulge in whisky drinking who in pre-prohibition days never dreamt of such a thing, so it is to be anticipated that hundreds of youth who previously were entirely satisfied with cinemas and baseball will become evolutionists.

The only way effectively to combat the mechanistic view is to build up a thorough and convincing idealistic criticism of it. This is the path which has been followed in England; indeed few if any of the great Victorian scientists were blind to the enormous intellectual difficulties involved in a thoroughgoing materialism: for this reason Huxley, amongst others, wisely adopted the position which he termed "agnosticism"—freely acknowledging that problems of the relation of mind to body were entirely beyond the competence of science to solve. Since Huxley's day, idealistic criticism has grown in strength, and so it has come about in Great Britain that all sorts and conditions of men, including reverend bishops of the Church and nonconformist divines, accept evolution, whilst still refusing to accept a mechanistic view of life and the universe. We commend the consideration of these facts to Fundamentalists in America.

SIR ARTHUR SHIPLEY, G.B.E., F.R.S.,
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THE average American of the Middle and Southern States is a very naïve mammal. As a "prominent citizen" tells us in the current number of *The National Review*, the United States is a nation of adult children, and certainly some of the things they do seem to older and more mature countries decidedly childish. The farmers and the Methodist and Baptist pastors of States like Tennessee, Kentucky, Oklahoma, are really convinced that they can make a people moral and religious by enacting laws. But the laws in America are so seldom enforced. Before the War some eight or nine States passed a law by which all lunatics and criminals were to be sterilised, but I

believe the law has only been observed in one or two cases. Seven years ago I was sitting next to a very vinegary lady at Des Moines in Iowa. She was jubilant over the Volstead Amendment, and said they would now tackle tobacco, and as soon as they had got that noxious weed out of the way, they would have a world campaign against the drinking of tea or coffee, both of which she understood contained poisons. She closely cross-examined me as to whether the students at Cambridge were allowed to smoke, and when I told her that they were, and that I hoped they did, because we believed in the freedom of the individual, she became almost abusive. But finally I silenced her by saying that she seemed so devoted to liberty that she wanted to take it away from everybody else in order to add to her own store.

Now, in several States there is an attempt to control free thought. In the Churches, America has scarcely passed beyond the region of the Presbyterian prosecution of Robertson Smith nearly fifty years ago. They have heresy-hunts, again an attack on free thought. The Ku Klux Klan movement is largely directed against certain forms of religious faith. They are

"Fightin' like devils for conciliation,
An' hatin' each other for the love of God."

But all the laws they pass can be and are evaded, and one has no doubt that in those States that have forbidden the teaching of evolution, evolution will still be taught. Unfortunately, as a whole the people of these "sections" are not a reading people, and seldom soar above a light illustrated magazine, or they would read what they may not be taught. The new text-book with which the Tennessee text-book commission has replaced the one used by Mr. J. T. Scopes states, "In reference to all animals resembling man, none of them are to be thought of as a source of origin of the human species." But, after all, thought is free, in spite of Mr. William Jennings Bryan, if one likes to think that man descended from animals resembling man, it will be very difficult to stop it.

Of course, there is a great deal of money in these proceedings. It will be the making of Dayton, where nothing has ever happened before and there is doubtless an expensive publicity agent with an itching palm. The average European who has not seen it has no idea of the "lobbying" carried on by the more pushing publishers in the United States to get their books adopted. Text-books are remunerative, and whoever has got the contract for these new biology books will probably make a very good thing out of it. In the days of Henry Newell Martin, if he wrote a "Physiology" which was to be adopted as a school book by any State, he had to append a chapter on the

dangers of alcohol, otherwise it had no chance of being accepted. As Kipling says of the American :

Enslaved, illogical, elate,
He greets th' embarrassed Gods, nor fears
To shake the iron hand of fate
Or match with Destiny for Beers.

Of course, now it does not pay to make beer in America, you must substitute synthetic gin for the last word of the couplet, but unfortunately synthetic gin does not scan.

The Right Rev. E. W. BARNES, D.D., Sc.D., F.R.S.,
Lord Bishop of Birmingham.

THE ignorant fanaticism which has led to the proscription of evolution in certain Western States of America is deplorable. As one who values intellectual freedom I am shocked that Anglo-Saxon communities should seek by legislation and prosecution to prevent the spread of knowledge. As a Christian I am dismayed by a movement which opposes a reasonable formulation of the Christian Faith. Cumulative and well-tested evidence has convinced every reputable biological expert throughout the civilised world that man has evolved from an ape-like stock. The normal educated Christian in Great Britain regards the process of evolution as the machinery by which God has created man. Every divine of any eminence among us accepts this point of view. Such acceptance strengthens the Christian position, for it makes the spiritual interpretation of the universe which we derive from Christ more convincingly reasonable.

No part of the teaching of Jesus, as set out in the New Testament, can by the most ingenious sophistry be held to imply belief in the literal truth of the Genesis account of creation. The "Fundamentalists" forget that the Bible is a spiritual treasure-house, not a scientific manual. They ignore the Christian doctrine that the Holy Spirit is still at work among men, leading them to an ever fuller understanding of truth ; with a fear that is really anti-Christian, they assume that a fuller knowledge of truth will weaken rather than establish the Christian revelation. The inevitable result of their attempt to repudiate sound science in the name of religion will be that tens of thousands of college boys and girls in America will repudiate Christianity in the mistaken belief that it is bound up with pitiable ignorance.

In England the battle was fought out more than a generation ago. From the blind religious prejudice of men like Pusey, Samuel Wilberforce, and Gladstone (why do political leaders damage their fame by theological obscurantism ?) we were mainly saved by the enlightened boldness of the Victorian liberal divines ; of Archbishop Temple ; of Frederick Denison Maurice,

who was never tired of quoting the spirit of Darwin's investigations as a lesson and a model for churchmen ; of his friend Kingsley ; of Bradley, the Dean who buried Darwin in Westminster Abbey ; of Farrar, who preached his funeral sermon ; of Canon Wilson, who still survives in honourable old age. But without such men the truth would have prevailed. It will prevail in the long run in the United States. Of what avail was it that the Roman church placed heliocentric treatises on the Index of Prohibited Books ? The earth moves : and the mind of man moves also to embrace an evergrowing understanding of the mystery of creation.

Prof. W. J. SOLLAS, Sc.D., F.R.S.,
Professor of Geology, University of Oxford.

THE action of the State of Tennessee raises a number of questions which it would be interesting to discuss were it not that they are all subsidiary to the one which agitates the minds of all freedom-loving peoples, *i.e.* the right of the State to suppress the teaching of scientific truths. On the subject of evolution there is, I believe, among competent thinkers but one opinion. To put it in a form that will be readily understood by our Puritan friends, all zoologists and botanists are agreed that the creation of species, including man, proceeds or has proceeded by way of evolution. This a theory which might almost be regarded as a fact ; it is so widely and surely based that it might be ranked as of equal certainty as the revolution of the earth around the sun, a subject which supplies an interesting parallel with the present one if only we substitute Papists for Puritans.

But all endeavours to suppress a truth are as futile as they are false. If natural history is to be taught at all in the schools, then in the end the truth will out. The structure, functions, habits, and distribution of animals and plants are, it is true, subjects of such absorbing interest that lessons upon them, from which all theory is carefully filtered off, are sufficiently attractive in themselves to arrest the attention and engage the studies of a class, but the interrelation of the facts they disclose must inevitably suggest many searching inquiries, and curiosity once aroused will not rest satisfied until it has received an answer. Then, if we are really back in the days of the Inquisition, the next step which will devolve upon the State will be the institution of an Index Expurgatorius. Short of this the truth will no longer rest concealed.

We reach, then, a stage when the community will arrive at a knowledge of the facts of evolution. Then comes the question—What about its explanation ? There we are on very different grounds. It is no secret that Darwin's explanation no longer occupies

undisputed possession of the field, and there are without doubt many distinguished investigators who freely admit that a satisfactory explanation has yet to be found. For myself, I confess that I regard the Darwinian explanation as only a half truth, and I think that the discussion of this question requires wider knowledge and greater maturity of judgment than the schools are likely to provide. It should be left to the universities, and even then the implications of all evolutionary theories should be carefully borne in mind, for the effects of some of them, if rashly introduced into ethics, personal, social, or political, might prove to be disastrous in the extreme.

Sir ARTHUR KEITH, M.D., F.R.S.,
Hunterian Professor and Conservator of Museum,
Royal College of Surgeons of England.

It is in no spirit of levity that I, a life-long student of the human body, would quote here, for the benefit of Fundamentalists, both at home and abroad, a saying of that Master whose teaching they claim to follow: "Father, forgive them, for they know not what they do." For if their desires are fulfilled, the teaching of anatomy will become a colossal system of organised hypocrisy. In every sentence of his lecture, a professional anatomist, who is compelled to base his teaching on the first chapter of Genesis, must sin against the truth which is in him. If the teaching of evolution is proscribed, then the study of the development of the human body must be forbidden by law, for in its development the human body proclaims that evolution is true. Dissection will have to be forbidden; for every one, be he teacher or student, who dissects man's body and compares it with that of apes and of monkeys, has the same truth forced on his perception.

Only penal servitude for life will keep men from searching the records of the rocks and discovering that the earth itself has kept a detailed history of plant, beast, and man, and all of these records shout aloud that evolution is true. All the fossil remains of primitive man, of beings who are almost as much ape as man, will have to be destroyed and all written description of them obliterated if Darwinism is to be undone. The stone implements of ancient man, which have been gathered with such meticulous care from recent pages of the earth's history, will have to be gathered together and solemnly carried to the deepest sea and there sunk. For these silent witnesses carry the history of man and the history of woman tens of thousands of years beyond the days of Adam.

Archæologists must be forbidden to enter Egypt and Mesopotamia, for they are carrying history further back than the Bible allows. Astrology must replace astronomy; alchemy, chemistry; children must be taught

that the sun and moon revolve round the earth, if the Bible is to be standard text-book of the modern teacher of science.

Men who propose to bring about such a change "know not what they do." They do not know the world they live in. For what they have set out to do is to turn the hand of the clock of progress back to a point it reached four thousand years ago—to a point when teachers of anatomy assured their students that woman was made out of Adam's twelfth rib. If Fundamentalists push their proposal to the point of practice, they will certainly smash the "rock of ages" but they will leave unharmed the "record of the rocks."

Prof. G. ELLIOT SMITH, M.D., F.R.S.,
Professor of Anatomy, University College, London.

THE proscription of the teaching of evolution in any university cannot fail to destroy the influence and in fact the very existence of such an institution. For the purposes of a university are to advance and diffuse knowledge and to inculcate the discipline of the search for truth. To deny it the freedom to cultivate these objects is to eliminate its right to exist.

Such action can do no harm to the theory of evolution: nor can it stifle the spirit of truth. But it does reveal the depth of ignorance and stupidity of those who assume that it is possible in the twentieth century to suppress intellectual freedom and to eliminate the spirit of honest inquiry from any community. Moreover, the ignorance is not merely of science but even more of the lessons of history. This campaign for fettering intellectual pursuits has been pursued with a variety of excuses for more than three centuries. In spite of ephemeral triumphs it has invariably ended in disastrous defeats, injuring the misguided fanatics themselves far more than the cause of truth they are trying to stifle. For it is clear the Tennessee comedy is not concerned primarily with evolution: it is essentially the three-century-old attempt to destroy intellectual freedom. The denial of evolution now occupies the place that even so recently as fifty years ago certain theologians assigned to the claim that the earth was flat and fixed in space.

But the reality of evolution is as certain as the fact that the earth revolves around the sun. The former is as essential a part of all modern biological thinking as the latter is of astronomy. Hence the change of the issue does not help those who are stupid enough to imagine that the fact of evolution can be suppressed.

In 1615 Galileo was summoned before the Inquisition, which unanimously declared his proposition that "the sun is the centre and does not revolve about the earth" to be "foolish, absurd, false in theology, and heretical, because expressly contrary to Holy

Scripture." In spite of repeated humiliations, certain theologians (and especially those in the Southern States of America) only finally abandoned these claims that did infinite harm to their own cause less than fifty years ago. The substitution of the biological for the astronomical issue can only result in adding vitality to the ridicule that is certain to overwhelm these misguided people, who know not what they do.

Prof. W. C. McINTOSH, D.Sc., F.R.S.,
Emeritus Professor of Natural History,
University of St. Andrews.

TRAINED from early days in biology on the shores of the rich Bay of St. Andrews under William Macdonald, George E. Day, and Miss Otté, the translator of De Quatrefages' "Rambles of a Naturalist," and later under George James Allman and John Goodsir in Edinburgh, before the appearance of the "Origin of Species," it has been my fate to witness all the vicissitudes of support and opposition (often with personal knowledge of the men) to which this epoch-making work gave rise. Close occupation in zoology and a disinclination to theorise have prevented personal work in a field so fascinating and so fruitful to many, yet such could not check an impartial judgment of the facts. In Great Britain about fifty years ago, it is true that the leanings for and against evolution were each in turn keenly opposed in elections for certain university chairs. It is long, however, since such straitened views have disappeared, and men of every grade of opinion on the subject have been dispassionately chosen on their real merits, and perfect freedom of opinion afforded to university and other teachers. This experience has not resulted in the lowering of the esteem for what is good, nor has it altered the value of the Bible or of religion, nor has it undermined the moral principles and character of the nation—upon which so much depends.

The breadth of view and the great impetus the evolutionary theory has given to the study of the natural sciences cannot be denied. Its value, for example, is of the greatest importance in grasping the relationships of fossil and recent types of every class, from the simple Palæozoic forms to those of the Pleistocene period. Knowledge is a universal goal, and scientific knowledge especially cannot be hampered by restrictions, however well intended. It seeks truth only and labours long to find it. The teaching of evolution in schools and colleges of the United States was perhaps unknown to many in Great Britain, but the veto of some of the American States authorities against such teaching seems to carry us back to the Middle Ages, when free thought and conviction on

certain subjects were fraught with violent opposition and danger. I do not hesitate, therefore, in joining my scientific colleagues in protesting against this infringement of freedom of thought—affecting responsible officials of high character in universities and schools of the United States.

Rev. HILDERIC FRIEND,
Wesleyan Minister.

MY biological researches commenced close on half a century ago, when the Churches were almost all strongly opposed to Darwinism. My bias, therefore, was, from the outset, against the theory of evolution. Yet every step taken in the study alike of botany and zoology, of anthropology and religion, tended to show me that the secret of life was to be found, if anywhere, along the lines of evolution; and there was no other theory in the field which could meet all the difficulties involved in the mystery of life. Genesis states a fact, evolution attempts an explanation.

As a student of divinity, long familiar alike with the idea that science and religion were in conflict, and that the doctrine of evolution intensified the supposed antagonism, I have found in that doctrine the most satisfactory solution of my problems as a teacher. I owe much also to the fact that, in my plastic years, I resided in the East, and became familiar with Oriental imagery and modes of thought.

I find the doctrine of evolution in fullest harmony with all that I have been able to discover by practical study of Nature and comparative religion, as well as by personal experience. While I have the highest respect for law and order, I cannot but wonder that the making of laws relating to the education of the race should be in the hands of men so reactionary and ill-informed; men who have failed to learn anything from the past. All history teaches us the unwisdom of opposing new modes of thought. Christ had to insist on a revision of the Mosaic law, as being out of harmony with the thought of the age, and time has in fullest measure justified his action. The Church in vain attempted to suppress the teaching of Galileo. If this thing is of men (as a wise man once remarked) it will come to nought; but if the doctrine be true it cannot be overthrown. The truth will prevail. Nothing can be gained, and much will inevitably be lost, by any attempt to enforce legislation against the teaching of evolution.

It must, however, be conceded that much present prejudice and misunderstanding is due to the want of thought and tact often displayed by propagandists. For the future, in order to obviate these things, the teaching of science as well as that of religion must be entrusted to our wisest, best, and most carefully

trained educators. Whatever of error there may then be in their teaching will eliminate itself, and the doctrine of evolution may safely be left in their hands to establish itself if it be true, to develop and unfold if it be imperfect, or to perish if it be false.

F. A. BATHER, D.Sc., F.R.S.,
Keeper of the Department of Geology, British Museum
(Natural History).

THIS mediæval gesture is curiously half-hearted. Complacently to accept the material benefits of research and to reject the intellectual results, to prefer the electric light to the light of reason, the loud-speaker to the still small voice of the spirit: this is worse than a frank return to the Dark Ages. But the attackers of evolution have apparently never considered what is meant by it. Possibly some of its defenders also have not considered. The attack at any rate is confined to organic evolution (atoms and automobiles may evolve as they please), and the spear-point of it is directed against the statement that man is descended from the anthropoid apes. Few would accept so crude a statement nowadays, but any statement that zoologists could substitute for it would, no doubt, be equally objectionable.

Education, however, is the field of battle, and a teacher may perhaps grant something to the other side. Evolution is a theory of creation. There are other theories, and some of them, held by thousands of well-meaning people, may not be taught in the State schools of certain countries. Perhaps it is just as well not to teach any theories. A teacher who is not himself an investigator is liable to be too dogmatic and to bring forward a theory as a ready-made explanation of matters which he is really (like the rest of us) unable to explain. The right of free thought and free speech is one thing; the guidance of the young is another.

As a palæontologist I should be quite prepared to teach facts, leaving their philosophical interpretation for later years. The intelligent among my pupils would probably come to the same broad conclusion as all palæontologists have come to, and they would have had a better intellectual training than if the theory had been forced into them.

Are not the Americans a little too ready to substitute theory for fact in their educational courses? Perhaps this attack is the inevitable reaction, and it may prove not unwholesome. It would do us all good to drop "that blessed word Evolution" for fifty years.

The controversy will be entertaining and a boon to the newspapers; but is it seriously supposed that all the eminent biologists in the world could convert Mr. Bryan and his friends? As easily would President Osborn convert Mr. Bateson to his particular belief.

D. H. SCOTT, D.Sc., F.R.S.,
Lately Honorary Keeper of the Jodrell Laboratory,
Royal Botanic Gardens, Kew.

THE resuscitation, in certain of the United States, of the old "Science *v.* Religion" conflict is a curious and interesting phenomenon, which need not seriously disquiet the scientific world. The Fundamentalists are quite right in holding that a belief in evolution is fatal to their own stereotyped form of religion. If religion is to be wholly unprogressive, then science also must be kept stationary; otherwise a collision is inevitable, and science is bound to get the best of it in the future, as she has constantly done in the past.

The surprising point about the American conflict is that it has come so late. Sixty years ago, when Darwinism was young, we were quite accustomed to this kind of antagonism in England, though it does not appear that we ever went so far as to prohibit the teaching of the new doctrines.

It may be doubted whether, among scientific men, there are any now living who reject the theory of descent. From a biological point of view this is, in fact, the only theory in the field, for the old doctrine of special creation was no more than a confession of ignorance. To account for the origin of species by asserting that species were created by the Deity is as if we were to attribute the origin of the Himalayas to the act of God, instead of trying to find out how and by what forces their elevation was accomplished.

It is probable that those who dislike evolution may have been misled and unduly encouraged by the recent frank statements of some eminent biologists, who have acknowledged how little we know of the methods of evolution. The difficulties are no doubt more fully realised now than they were a quarter of a century ago. But Mendelism and its implications no more cast doubt on the reality of evolution than the theory of relativity invalidates the discoveries of Copernicus.

Of late years I have often had occasion to direct attention to the difficulties in tracing the course of evolution in the plant world. The problem is extremely involved, and many questions must be left open. None the less, the general conclusion that the past history of plants, like that of animals, is nothing but the record of an evolutionary process, remains firmly established.

Rev. FRANK BALLARD, D.D.,
Christian Evidence Lecturer for the Wesleyan
Conference.

IT is difficult to write with judicial calmness concerning the state of affairs exhibited by the approaching "trial" of Mr. J. T. Scopes for teaching evolution in

the Tennessee High School. The assumptions of Fundamentalism are so preposterous, alike in theory and in practice. I am not altogether surprised, when I call to mind my experiences in America a quarter of a century ago. It was pitifully manifest then, that both in science and theology, many of those who posed as authorities were half a century behind the times. But one did hope that the intervening years would have opened their eyes. The notion of a Judge's charge to a grand jury beginning with the reading of the first chapter of Genesis—"as the account of creation which Tennessee teachers *must* adopt"—of course in the Fundamentalist sense—savours of the sixteenth century rather than the twentieth.

In view of the whole case, there are two questions which loudly call for unequivocal answer. (1) The first is whether universities are to be free to teach what is true, in the light of advancing knowledge, or are to be for ever throttled by the grip of theological obscurantism. Unless this latter alternative be met with an overwhelming negative, humanity must simply drift back to the miserable darkness of the Middle Ages. (2) The other question is whether the view of creation, with all its consequences, which is dogmatically insisted on by Fundamentalists, is so true that nothing more remains to be learned.

It is not too much to say that, in these days, every child in a respectable school knows that it is not. Whatever room and need there may be for the correction of Darwinism, and the re-statement of evolution in the light of our latest knowledge, this certainty emerges, as plainly as the light of dawn after the dark, that the "creationism" which pivots itself in the opening chapters of Genesis is wrong; and its inferences are as false as they are dangerous, as mischievous as they are dogmatic. Neither God nor man is such as the Fundamentalist shibboleth declares. To say nothing of palæontology, biology, and embryology—save that they cannot now be extinguished by ecclesiastical anathemas—every Fundamentalist bears about in his own body a hundredfold proof that his main contention is untrue. That ought to suffice, not only for all the twenty thousand who are to fill the stadium for the "trial" of July 10, but also for every sane and sincere man or woman on earth.

W. BATESON, D.Sc., F.R.S.,

Director of the John Innes Horticultural Institution,
Merton, Surrey.

I AM glad to add a few words to what I wrote in *NATURE* of September 1, 1923, p. 313. The Tennessee trial is something more than a curiosity in the history of civilisation. Wherever science and learning are valued, sympathy with the unfortunate victims of this new persecution will be unanimous and deep. They suffer in the cause of truth, if ever men did. To them personally we trust that at least some restitution may be made.

None of us can, however, be indifferent to the issues now being raised on a great scale for the first time in the modern world. The opinions of Tennessee and similar communities respecting the evolution of animals and plants would not seem to be a matter of general concern, but the symptom is really one of grave

trouble, and the tremor now perceptible is an indication of a strain in the social fabric which sooner or later may end in catastrophe. To the nineteenth century, the dissemination and inculcation of scientific truth wholesale was an object almost as desirable as actual discovery. The fundamental and permanent heterogeneity of the population was not appreciated as a fact of any consequence. With education it was expected to disappear. Nothing of the kind has happened. If the true convictions of our own people could be ascertained, I do not suppose they would be found to be very different from those of Tennessee. We are fortunate in having a somewhat larger proportion of the rarer elements as an ingredient in our population—men whose minds are as Plato might have said, "released"; but they are a mere fraction in any community, and it is a miracle that they are able to impose a precarious authority sufficient to protect themselves from molestation.

Upon the still larger considerations which lie behind, we, as scientific men, are not required to pronounce. Whether a State stands to gain or to lose by the encouragement of intellectual freedom in comparison with others which control or suppress truth is a problem on which political philosophers have exhausted the arts both of eloquence and sophistry. No universal solution, independent of time and place, can be expected. But one thing is certain: that to us our liberty is vital; and to suppose that movements of this magnitude in the United States have no significance for ourselves is to cherish a very dangerous illusion.

Sir SIDNEY HARMER, K.B.E., D.Sc., F.R.S.,
Director of the Natural History Departments,
British Museum.

IT is difficult for those of us in Great Britain who have recently taken part in the centenary celebrations held in honour of Huxley, the champion of intellectual liberty, to realise the consequences of a successful attempt to control scientific thought, or to believe that a result of that kind is possible in a great country like the United States, which has always prided itself on being the home of freedom. The danger is, however, a very real one on the other side of the Atlantic, and our scientific colleagues there who are fighting the battle can count on the unanimous support of workers on this side.

Considerable harm has been done in America by the failure to realise that a want of agreement as to the causes of organic evolution does not imply any difference of opinion with regard to evolution itself. The evidences for the origin of animals and plants as we now see them, as the result of evolutionary processes, seem to us, as to our distinguished co-workers who stand for intellectual liberty in America, too plain to be doubted. Even if, like Malvolio, we did not approve the opinion of Pythagoras, we should think too nobly of the soul to wish to convert an honest conclusion on the subject into a legal offence.

Among those who are qualified to speak in Great Britain there can be only one opinion: that the attempt to limit the advance of scientific thought is intolerable. History is full of examples which show that progress cannot be stayed, even if it can be

temporarily arrested. It may be anticipated that the principle which is so much feared by a section of opinion in the Southern States will ultimately triumph over its opponents, by the inexorable evolution of a more rational attitude of mind. In the meantime, much harm may be done, and it may earnestly be hoped that the supporters of a policy of intellectual slavery will be defeated.

ERNEST BARKER, D.Litt.,
Principal of King's College, London.

How far can the public opinion of a State, expressed through its legislature, claim to control the curriculum or the teaching of universities or schools? It would seem to me that any State may demand that this or that subject should be taught in any place of instruction which is supported from public funds, but that no State is entitled to prescribe what should actually be taught about any subject. The reason is simple. The aim of all teaching is to awaken and train intelligence. No teacher can awaken or train the intelligence of his pupils unless he is using his own intelligence freely. If a teacher teaches what he is told to teach, he teaches by rote a lesson which his pupils learn by rote. Without freedom, he is also without self-respect; without self-respect, he cannot earn the respect of his pupils; and failing to earn the respect of his pupils, he fails to produce any effect upon their minds. All education depends on the free contact of a teacher, teaching spontaneously, with pupils who are attracted by the suggestion of his teaching and drawn thereby into study on their own account. No man can draw others to himself unless he is speaking from himself.

The very genius of liberty which inspires representative bodies, and is the breath of their own existence, must prevent them from killing the genius of liberty which inspires places of education and is the breath of *their* existence. A legislature cannot be told what it is to legislate; a university cannot be told what it is to teach. Public opinion is a great thing; but there can be no healthy public opinion without discussion, and no genuine discussion without a genuine and free education. If a legislature tries to kill liberty of teaching, it stultifies itself—based as it is itself on freedom of speech. If public opinion seeks to stifle freedom of thought and expression, it commits suicide; for public opinion can only be formed by freedom of thought and expression. A democratic State cannot kill liberty or stifle freedom of thought without killing itself and stifling the breath of its own life.

Prof. D'ARCY WENTWORTH THOMPSON, C.B., F.R.S.,
Professor of Natural History, University of
St. Andrews.

WHEN the wisecracks of the backward States, with their true herd-instinct, take to quarrelling over whether evolution should be taught or no, it is some consolation to think that worse mischief might perhaps be found for such idle hands as theirs to do. If they did no more than forbid the teaching of evolution in their elementary schools, I should even be inclined to agree with them; for I feel myself none the worse that no

schoolmaster ever dreamed of teaching Darwinism to me, nor has it ever been among the lessons which my own children learn. Few schoolmasters are really fit to teach it, and children have other fish to fry.

That these good people should insist on setting the Book of Genesis against the "Origin of Species," and should hate the one as they love (or profess to love) the other, is a sadder thing. The lessons of the last sixty years, the philosophy of evolution itself, should help us all to appreciate them both, and to see in the Mosaic cosmogony as noble a poem as ever was in all the world, and a living monument of profound wisdom and very ancient science. The longer I live the more beautiful it seems to me,—the more beautiful and the more vitally and essentially true. The child cannot understand it all; who is there that can? But if it be withheld from him, he is robbed of part of his heritage.

When democratic licence lets these foolish and fanatical men impose their folly on the universities and play havoc with the public libraries, then our American friends and we ourselves may well be dismayed. Dr. H. F. Osborn and his colleagues are smarting under insult and injury, but the protest they have drawn up is moderate in tone and faultless in expression. I admire the restraint they display under the gross provocation they have received. What they want (but they are too courteous to say so) is "a bridle for the ass, and a rod for the fool's back."

Rev. ERIC S. WATERHOUSE, D.D., M.A.,
Wesleyan College, Richmond, Surrey.

THE action of certain American states, which have set a ban upon the teaching of Darwinism, is evidence of a curious but frequently-noted fact that, in theological matters, the newer countries are more reactionary than the old. The great majority of clergy and ministers in Great Britain accept the theory of the evolution of species. It has appeared within recent years that some of Darwin's positions are not likely to be sustained; especially as regards the importance he attached to the accumulation of small variations, and to natural selection. But the main position of the evolution of species, as against the doctrine of the special creation of "natural kinds," is well-nigh impregnable based.

Modern Christianity understands that the cause of truth demands absolute freedom of research and statement. The basis of all scholarship is the belief that truth can be attained. Religion must hold that what is true cannot possibly conflict with it. Unfettered search for truth will involve that mistakes are made and errors are accepted as true. But the same process will in time provide also the remedy. Those who hold that Christianity is true should also hold that no scientific or philosophical truth can be detrimental to it, even though such truth may upset ancient dogmas. Conversely, it follows that anything set forth in the name of science or philosophy which is incompatible with those broad truths to which man's religious experience bears witness is to be suspected. Surely ultimate truth must be such as satisfies all our values, intellectual, moral, æsthetic, and religious.

Prof. J. GRAHAM KERR, F.R.S.,
Regius Professor of Zoology.

THE fact of evolution is one which is now verifiable by the student of even elementary embryology, who can observe for himself the successive stages by which any one of the higher animals evolves out of the simple unicellular zygote. In the case of man himself it can be seen that he is for a time provided with gill-openings in the sides of his neck and that he has other temporary peculiarities which would justify his being classed with fishes were only his embryonic structure known. That the process of evolution was characteristic of the past history of the race, as it still is of the individual, is shown by many paragraphs of geological history—the most beautiful of them all being that provided by the rocks of the American continent chronicling the evolution of the skeletal peculiarities of the modern horse. The only persons who can at the present day have honest doubts regarding the broad facts of evolution are (1) those who are ignorant of such facts as I have indicated and (2) those whose conception of God permits them to regard His records, as inscribed in the rocks and in the embryonic body, as a whimsical series of deceptions. If the legislators of Oklahoma and Tennessee belong to the first of these categories, their opinions may be expected to change with inquiry—and I would indeed recommend such inquiry into the facts of Nature as a charming and delightful relaxation from their legislative labours—but if they belong to the second there is, I fear, little hope of modification of their strange, and as they appear to me, somewhat pagan doctrines.

No doubt it might be argued that the main point at issue is not whether evolution is a fact but rather whether thought is to be subject to the control of authority. We have seen of recent years manifestoes exemplifying such control—emanating it may be from Berlin, or from Moscow, or from Peking, or it may be promulgated by the governing council of some social or industrial organisation. The effects in the way of hatred and war that are liable to result from such policy have been so amply demonstrated in the past, and are so clearly apprehended for the future, that I find it difficult to believe that its open adoption will find any considerable body of support in the United States.

Prof. R. C. PUNNETT, F.R.S.,
Arthur Balfour Professor of Genetics, University of
Cambridge.

To one who has never set foot on the American continent, it is difficult to suggest the real meaning of the curious outburst against freedom of thought which has made its appearance in the Southern States. That it is anything more than a sporadic phenomenon is hard to believe. The firm outer crust of civilisation which has gradually set through the long centuries may at times show local disruption, especially in lands with little tradition of disciplined thinking. Where the will to ignorance exists, the forces of obscurantism may from time to time break out with sudden violence, but that they will ever engulf the

globe seems a possibility as remote as the return of the solar system into the nebular phase. After all, it is in his powers of reasoning that man differs most from other animals, and without them he could neither feed nor clothe himself.

This inherent capacity for rational thinking, without which daily life would be impossible, is surely a sufficient guarantee that obscurantism in the long run will never prevail. If we admit so much, it is all to the good that the greatest possible publicity should be given to the trial of Mr. Scopes. It will lead to some interest in these matters on the part of millions to whom, at present, evolution is nothing but a longish word that sometimes appears in a cross-word puzzle. It will bring them into contact with facts, which are at once the best stimulant to curiosity, and the best antidote to obscurantism. Let us therefore hope that the combined enterprise of the newspapers, railways, and cinemas will lead to the erection of an even larger stadium than that proposed. Though the lawgivers of Tennessee may make the angels weep, they hold out a promise of infinite entertainment to a world that is often rather bored with life.

F. A. DIXEY, D.M., F.R.S.,
Subwarden, Bursar, and Lecturer of Wadham
College, Oxford.

THE growing agitation against the teaching of evolution in several of the states of the American Union is nothing less than astonishing. If there is anything whatever that is well established in the conclusions of natural science, it is the general doctrine of organic evolution. The details of the evolutionary process are still matters of legitimate discussion, but as to the main fact that the present aspect of organic nature is the result of evolution, there is absolutely no question among those who are competent to form an opinion on the subject. But even if the doctrine rested upon a less assured foundation of observation and research than is actually the fact, it is no less deplorable that in a civilised country like the United States an organised attempt should be made to check the process of inquiry into the truths of Nature. Whatever excuse there may have been in former ages for limiting the scope of free investigation, and for visiting with penalties those men who ventured to bring their powers of reasoning and observation to bear upon the conclusions sanctioned by authority, no such excuse or palliation exists at the present day.

The futility of all efforts to impede the progress of scientific discovery has been amply demonstrated, and it might have been supposed that this would have been brought home to the consciousness of all but a few fanatics. That the reality is far otherwise has unfortunately been made fully apparent by the activities of the Fundamentalists in the Southern States of America; and it must be recognised that the forces of obscurantism have increased in certain parts of the North American continent to a pitch which actually constitutes a public danger. The fullest sympathy is due to those men of science in the United States who are striving to rescue their country from the reproach of hostility to the cause of truth and knowledge.

Prof. J. COSSAR EWART, M.D., F.R.S.,
Regius Professor of Natural History in the
University of Edinburgh.

THE coming trial of Mr. J. T. Scopes reminds one of the case of Prof. Robertson Smith, whose articles on Biblical subjects half a century ago greatly distressed and alarmed the authorities of the Free Church of Scotland. Professors in the Free Church Colleges were required before induction to sign the Confession of Faith, which implied, amongst other things, that they would be guided in their teaching by the first chapter of Genesis. After full consideration, Robertson Smith's articles were adversely reported on by a committee of the General Assembly of the Free Church, with the result that he was removed from his chair in the Aberdeen Free Church College. According to Sir Arthur Shipley, the fight made by Robertson Smith for intellectual freedom made him the "most popular if not the most powerful man in Scotland."

There is no evidence that during Darwin's lifetime any professor in the Scottish universities lectured on the doctrine of evolution; but since 1882 the evidence in support of the origin of species by natural selection has been frequently dealt with by teachers in Scotland. It is doubtless true that for some time in Scotland Darwinism was regarded by some as an "unpleasant apparition." This may be partly accounted for by the fact that in 1882 the president of the Royal Society of Edinburgh was a Scottish judge who had no interest in biology, and partly by the presence of several clergymen on the Council. Fortunately, largely by means of courses of lectures in the University of Edinburgh, on the philosophy of natural history, by the late G. J. Romanes, the alarm which for a time prevailed all but subsided; that any opposition that existed has almost entirely died away was made evident by the popularity of Sir Arthur Keith's recent lectures in Edinburgh on the "Story of Man's Evolution as told by his Fossil Remains."

E. N. FALLAIZE,

Hon. Secretary, Royal Anthropological Institute.

THE attempts to discourage the study of evolution which have been made in certain legislatures of the United States, as well as the impending trial in the State of Tennessee, have naturally aroused considerable interest among anthropologists in Great Britain. A ban on evolution would virtually affect the progress of anthropological science not only in so far as it affects the origin and descent of man, but also as rendering meaningless the conception which serves to give unity and direction to the study of human culture as a whole. The importance of these studies in relation to the general advancement of knowledge needs no emphasis, while any system of higher education which omits to take into account the systematic study of man and his culture is deprived of one of its most important elements as an educational discipline. A generation growing up under a scheme of education thus mutilated would find itself cut off from the general stream of intellectual progress and isolated from the culture of the remainder of the educated world.

On the general question of the relation of the State to scientific inquiry, it is impossible not to deplore a movement which seeks to fetter individual freedom of thought and investigation, and at the same time attempts to justify such interference by submission of the questions at issue, not to a scientific tribunal, but to a court composed of laymen without scientific training, and governed by rules of evidence which have no validity in scientific investigation. Should the obscurantist influences which have promoted this action in the State in question prove strong enough to carry the day by force of numbers, the result will appear derisory to the rest of the civilised world; but unfortunately it will deal a disastrous blow to science in the United States, and indirectly to scientific investigation as a whole throughout the world.

Prof. SYDNEY J. HICKSON, D.Sc., F.R.S.

Professor of Zoology, University of Manchester.

A LITTLE while ago a student in my class took the opportunity which an examination afforded to dissent from, and to criticise severely, a view which I had expressed in my lectures.

I took the line of action which I think all my colleagues in this country would have taken of giving him a mark for his answer irrespective of the views he expressed, suppressing an inclination I felt to mark him a little higher for the courage he showed in dissenting from the views held by his examiner.

In a university where the teachers are free to teach, the students must be free also to accept or reject the theories they are taught. Suppression of free teaching must lead to suppression of free learning. The students will leave their high school or university trained in the belief that the theories and conceptions of the universe they have learned are true and that anything else is false. This can only lead to a form of mental stagnation in the generation which it is our duty not only to instruct but also to stimulate to search for truth in the wide fields of science.

In the correspondence which has been published about the Tennessee State law on the teaching of evolution, a great deal has been written about the importance of the liberty of the teacher. With all that we must cordially agree. But let us also plead for the liberty of the taught. Let us insist that in a free country the young men and women should be trained to think, encouraged to discuss, and free to form an opinion. The dogmatic teacher produces dogmatic pupils, and a State that insists upon dogmatic teaching produces a race of citizens deprived of that liberty of thought which is essential for its progressive development.

Prof. J. STANLEY GARDINER, F.R.S.,

Professor of Zoology and Comparative Anatomy,
University of Cambridge.

IN all ages and in all climes men have striven for truth, and in the march of progress men have attained no step after more persistence and suffering than the right to a free utterance of the truth that in them lies. Real religion and science have in common this passion for truth, eternal and indestructible. In its search for truth, science begins with the demonstrable

facts, and from these humbly and gratefully draws conclusions. These are not in the nature of permanent dogma, and, as more evidence is attained, further conclusions are drawn.

Let legislators, who ban the teaching of evolution, think what they are doing, and, above all, whether they will not defeat their own ends. The technique of all teaching prepares the ground for theories of evolution. The biologist teaches facts, but the road for the student has already been paved, and the latter naturally strings these facts together in an evolutionary form. I know no professor of biology who requires to teach the broad theory of evolution, for, with a little knowledge of facts, his students, universally and of their own initiative, deduce it for themselves. What the professor does is to discuss how evolution may have come about, its extent and its limitations, endeavouring thereby to teach his students to think logically, that is, sanely. Applied to life his students find that they have learned the principles, not of militant atheism and communism, but of sane and orderly progress, on the due understanding of which depends the prosperity of States. Let those in authority think well of the advice of Gamaliel: "If this counsel or this work be of men, it will come to nought: but if it be of God, ye cannot overthrow it; lest haply ye be found even to fight against God."

EDWARD CLODD.

THE savants of America need no assurance from their brethren on this side of the Atlantic that they are as one with them in their struggle to maintain the liberty of thought and its expression which are the instruments of progress, the legal suppression of which is the aim of the so-called Fundamentalists. That the theory of evolution is based on a bedrock of facts unshakable has no weight where passion, prejudice and ignorance impel undisciplined emotion. Hence, to this type of mentality, reason appeals in vain. Against this are cited the contents of a miscellaneous collection of ancient writings of uncertain authorship, age and meaning, the interpretation of which has riven Christendom into hundreds of "warring sects." We may envy the Greeks of old, of whom, in his brilliant "History of Freedom of Thought," Prof. Bury says, they "fortunately, had no Bible, and this fact was both an expression and an important condition of their freedom."

The attitude of these obscurantist heresy hunters is clear enough. They hold that belief in evolution imperils the souls of men; hence the fanaticism which would prohibit its teaching. To these malignants no quarter can be given: their fictions and fallacies "debase the moral currency." It cannot, as W. K. Clifford says, "be true of my race and yours that to keep ourselves from becoming scoundrels we must needs believe a lie."

Prof. ARTHUR SMITHELLS, C.M.G., F.R.S.,
Emeritus Professor of Chemistry, University of Leeds.

THE control of education by political or sectarian authority must always involve potential danger to intellectual freedom, but it costs an effort to believe that, at this stage of human history and in the New World, we are in the presence of a serious threat on the part of popularly elected State authorities to use

political law for suppressing knowledge of the laws of Nature.

It is to be hoped that the intellectual world of the United States will rise to the occasion, and that its members will undergo any kind of martyrdom rather than tolerate so great a scandal. They may be assured of the sympathy and support of multitudes in every civilised country in resisting this extraordinary recrudescence of a type of persecution which was thought to have passed away for ever with the Dark Ages.

The universities, above all, will be called upon to fight on the side of freedom, and it seems inconceivable that they can show any timidity or any willingness to traffic in compromise. The first rights of a teacher, the cause of science, the dissemination of truth, are assailed once more by bigotry and fanaticism in the seats of authority. It seems superfluous to insist upon the importance of the issue or on the need of an unqualified victory over the powers of darkness.

In recent times voices have been heard proclaiming the doom of our modern civilisation. Let learning go into captivity, and surely enough these prophets of evil will be justified!

Rev. J. SCOTT LIDGETT, D.D.,

Warden of the Bermondsey Settlement, London.

THE agitation about the teaching of evolution in the United States raises most important political, scientific and theological questions. In regard to them all the controversy appears to me to be disastrous. For a State legislature to attempt to decide questions of scientific evidence is fatal to the interests both of truth and freedom. It extends the authority of the State to realms quite beyond its legitimate province, and carries us back to the Middle Ages. From the scientific point of view, the contention that the doctrine of evolution is a "mere guess" is to show complete ignorance of the immense body of facts that have been ascertained, and of reasoning that is securely based upon these facts. What is most injurious of all, however, is the supposition that the truth of Christian Theism depends upon any particular hypothesis as to the method of divine action in creating, or constituting, and in sustaining the universe. The philosophy of Theism is much profounder than this. To many Theists, the attempt to treat God as so external to the universe that His action can only be explained as that of Omnipotence acting upon it from without by mere acts of will, is to run counter alike to the deeper teaching of Scripture as to the organic relation of God to His World, to the deliverances of religious experience properly interpreted, and to any satisfactory philosophy of Theism. It represents the doctrine of Deism, and not of Christianity.

Rev. A. F. DAY, S.J.,

Church of the Immaculate Conception, Farm Street,
London.

ALTHOUGH my opinion on evolution lays no claim to being that of an expert, I feel favourably disposed towards the theory and do not regard it, in any moderate form, as necessarily conflicting with the revealed account of Creation. Even if this were otherwise, the

policy of the Southern and Eastern States could never commend itself to those who have learnt lessons from the past. Indeed, one might well defend Urban VIII. *in re Galileo*—as Huxley did—and condemn Tennessee, Oklahoma and Co. in the present issue. Of course, the teaching of advanced evolutionism lends itself fairly readily to being made the vehicle for communicating an anti-religious bias. To endeavour to inoculate unformed minds with such a prejudice would evidently be taking an unfair advantage. Indeed, such conduct is opposed to science as well as to morality. It is out of place, therefore, even with mature pupils; both science and religion should confine themselves to their respective provinces.

If any one wishes to combat any doctrine which he regards as erroneous, he should equip himself for the task from the armoury of sound knowledge. It is not for the legislature to enter the lists. Nor should the State run the risk of even appearing to repress honest inquiry.

Prof. G. H. F. NUTTALL, Sc.D., M.D., F.R.S.,
Quick Professor of Biology in the University
of Cambridge.

THE leaders of thought throughout the world have for centuries been unhesitating supporters of the principle that intellectual freedom should prevail in university teaching. Therefore, the opposition to the principle which we are witnessing in the United States to-day, in the form of legislation against the teaching of evolution, is of a character which must fill us with apprehension for the future of "the land of the free and the home of the brave," and of the ability of that land to continue thus to describe itself. Involuntarily we ask ourselves, "What next? Where will this end? . . . if the ignorant majority can thus impede human progress towards truth." The resolution adopted by the Council of the American Association for the Advancement of Science will assuredly be approved by all competent men of science.

Sir OLIVER LODGE, D.Sc., F.R.S.,
Formerly Principal of the University of Birmingham.

THE outcry against the teaching of evolution in some of the United States seems so preposterous in Great Britain that the only use we can make of it is to

bethink ourselves whether we are not doing, or wishing to do, or have not done, something of the same sort in connexion with a less established region of scientific inquiry. Actual prohibition may be difficult of accomplishment, but a refined system of boycotting, such as has begun in the United States in connexion with the doctrine and facts of evolution, can be applied with greater ease, and has already been effective in restraining recruits and silencing the utterances of some who might otherwise have been willing to testify to what they know of truth in other subjects. Had Sir William Crookes been a university professor it would have gone still harder with him than it did. *Lehrfreiheit* is only granted with limitations; it is tolerated so long as it does not outrage preconceived opinion and introduce discord into a pre-established harmony.

Rev. S. M. BERRY, D.D.,
Secretary, Congregational Union of England
and Wales.

ALL those who have enjoyed an education steeped in the spirit of freedom will hope that the threat to that freedom in the schools of the United States may be averted. The idea that teachers should be prohibited from teaching the doctrine of evolution because it is opposed to a certain interpretation of the Biblical account of the Creation, seems to progressive minds on this side of the Atlantic both ludicrous and preposterous. To the minds of all progressive churchmen, any such prohibition would be regarded as a set-back to religious progress and a denial of that liberty of opinion in matters of religion which it has taken centuries to win. That such a threat should come from the United States is history's latest irony.

Rev. H. B. WORKMAN, D.Litt., D.D.,
Senator of London University, Principal of Westminster
Training College.

ANY attempt to interfere with freedom in the teaching of evolution is wholly reactionary, and is bound in the long run to be prejudicial to religion. Dogmatism, whether by scientists or theologians, should give place to a greater consciousness of the vast regions of the unknown.

Truth and Doctrine in Science and Religion.

THE vagaries of those near to us in kin are proverbially harder to understand than those of strangers, and it is equally true that it is less easy to appreciate the shibboleths of the generations immediately preceding our own than those of a remoter date. It is undoubtedly a fact that the common element in British culture and that of the United States has often served to obscure certain fundamental differences of which the occasional manifestation sometimes amazes and more often bewilders us. The tendency shown by certain State legislatures in America in their attitude towards the doctrine of evolution, which has culminated in the prosecution of a teacher in the State of Tennessee for the use of a text-book in which a reference to that doctrine was included, is indicative of a public opinion of a force and character which it is difficult for us in Great Britain and in these days to appreciate.

Scientific workers on this side of the water are

accustomed to meet their American colleagues on an equal footing. They expect to find among them a readiness equal to their own to accept the facts which scientific investigation may bring to light and an equal openness of mind in the discussion of the bearing of such facts upon accepted theory. It has, therefore, come with something of a shock to them to find that a movement upon which they may have looked with some feeling of amusement, and as such may not have regarded more seriously than as a passing phase, is likely to prove an obstinate barrier to intellectual progress and freedom of discussion. Those who have followed the trend of thought among the intellectual section of the general public in the United States for any length of time may not be equally surprised. They have been aware that sooner or later some such question as this was bound to arise. It is not so long ago that a well-known American novelist put before his