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Mr. *Robinson* was formerly national research fellow at the University of California. Dr. *Lanning S. Walls*, until recently research chemist with The Barrett Company, Frankfort, Philadelphia, Pa., has accepted an appointment as assistant professor of organic and physical chemistry, Montana State College, Bozeman, Mont. Mr. *Raymond L. Stahle* recently resigned as assistant professor of physiological chemistry in the School of Medicine of the University of Pennsylvania to become associated with the faculty of medicine of McGill University, Montreal, as assistant professor of pharmacology.

D. W. Blankenship has been granted leave of absence for the school year from his position of electrical engineer with the Jones & Laughlin Steel Co., at Pittsburgh, and is teaching in the Electrical Department of Yale University.

Mr. J. Gwynne has been appointed head of the department of agricultural chemistry at the University College of North Wales, Bangor.

Dr. Alfred C. Hamer, of Christ's College, University of Cambridge, has been appointed acting curator of the Museum of Archaeology and Ethnology.

DISCUSSION AND CORRESPONDENCE

KENTUCKY AND THE THEORY OF EVOLUTION

YOUR inquiry concerning proposed legislation against the teaching of evolution in the state university and public schools of the state has been received. In reply I will state that two such bills have been introduced in the house, and one was introduced in the senate. The senate bill was reported unfavorably by the senate committee to which it was referred. The same committee also reported unfavorably a milder substitute forbidding the teaching of anything in these public institutions "inimical to religion," but the senate by a vote of 23 to 12 turned down this latter recommendation of the committee and placed the substitute on the calendar.

The house bill which has passed the com-

mittee and been placed on the calendar is much more drastic than either of the bills introduced in the senate. It provides for a fine of "not less than fifty nor more than five thousand dollars, or confinement in the county jail not less than ten days nor more than twelve months" for any "teacher, principal, superintendent, president or other person connected directly or indirectly with such schools or institutions, who shall knowingly teach or permit to be taught Darwinism, Atheism, Agnosticism, or the Theory of Evolution in so far as it pertains to the origin of man."

This proposed legislation is the culmination of an active propaganda against evolution which has been carried on in the state for over a year by a number of the ministers of several of the Protestant denominations. The leader of these is Dr. J. W. Porter, pastor of one of the Baptist churches in Lexington, and judging from the expressions in the Baptist press, he has the backing of a large element in his denomination. He it was who received a letter of encouragement from William Jennings Bryan which he promulgated from the pulpit. From this letter we quote the following:

The movement will sweep the country and we will drive Darwinism from our schools. The enemy is already fighting. The agnostics who are undermining the faith of our students will be glad enough to teach anything the people want taught when the people speak with emphasis.

On Friday, January 20, Bryan was brought to Kentucky, where he made a number of addresses against evolution. The one at Frankfort was before a joint session of both houses of the legislature. In this he advocated legislation against the teaching of Darwinism and kindred "isms." At the close of his address in Lexington a resolution was presented by Rev. W. L. Brock, another Baptist minister of Lexington, and ruled from the platform to have been passed, in which the general assembly was petitioned to prohibit "the teaching in the state schools of evolution, destructive criticism and every form of atheism and infidelity whatsoever."

In their spoken and written attacks on evolution these advocates of suppressive measures quote largely from two publications issued by

the Bible Institute Colportage Association, Chicago, Illinois. One of these is a booklet of 144 pages by Alex. Patterson entitled "The Other Side of Evolution" and the other is a pamphlet of 24 pages by W. A. Griffith Thomas entitled "What About Evolution?" In these publications the attempt is made to refute evolution mainly by the citation of authority. With respect to well known advocates of evolution, such as Tyndall, Haeckel, Huxley, Spencer, and even Darwin himself, commendably cautious statements, particularly with reference to the *causes* of evolution, are twisted and construed into "fatal admissions" affecting their belief in the *fact* of evolution.

For expressions of positive opposition to the theory, recourse is had mainly to men of science long since dead, such as Murchison, Sedgwick, Agassiz, Dawson, Etheridge, Virchow and Dana.

Much reliance is placed upon the views of the late George Frederick Wright, who wrote a preface to the booklet in 1903. The latter, however, is cautious in his endorsement and not willing to say "that all the points in this little volume are well taken."

It is from the book by Patterson that Mr. Bryan gets his leg-from-wart, eye-from-freckle, joke which he is so fond of retailing from the Chautauqua platform.

Within the last few days Dr. Porter has issued a pamphlet of 94 pages, entitled "Evolution a Menace," in which after giving considerable prominence by liberal quotation from standard text-books to the fact that all modern authority is against him in the position he takes on evolution, he then attempts to refute it mainly by an appeal to authority as old, or older, than that cited by Mr. Patterson.

His citation from Whewell's "Inductive Sciences," written about 1854, is a case in point. Here he attempts to discredit all geology by a quotation which refers only to a lack of progress in "physical geology" comparable to the progress made in "physical astronomy" up to the time the work was written.

Dr. Porter's main reliance for material from more modern authority with which to overthrow evolution is upon Howorth's "Mammoth and the Flood," and upon the geological jug-

glings of a certain "Professor McCready Price."

The bill placed on the calendar of the house reads:

KENTUCKY GENERAL ASSEMBLY
1922

House Bill 191—Introduced January 23
By Representative George W. Ellis, Barren
County.

An act to prohibit the teaching in public schools and other public institutions of learning, Darwinism, atheism, agnosticism or evolution as it pertains to the origin of man.

Be it enacted by the General Assembly of the Commonwealth of Kentucky:

Section 1. That it shall be unlawful for a teacher, principal, superintendent, president or anyone else who is connected in any way with the public schools, high schools, training schools, normal schools, colleges, universities or any other institutions of learning in this commonwealth, where public money of this commonwealth is used in whole or in part for the purpose of maintaining, educating or training the children or young men or young women of this commonwealth; for such teacher, principal, superintendent, president or other person connected directly or indirectly with such schools or institutions of learning to teach or knowingly permit the same to be taught; Darwinism, Atheism, Agnosticism, or the Theory of Evolution in so far as it pertains to the origin of man; and anyone so offending shall on conviction be fined not less than fifty nor more than five thousand dollars or confined in the county jail not less than ten days nor more than twelve months or both fined and imprisoned in the discretion of a jury.

Section 2. If any school, college, university, normal school, training school or any other institution of learning which has been chartered by the Commonwealth of Kentucky and which is sustained in whole or in part by the public funds of said commonwealth shall knowingly or wilfully teach or permit to be taught, Darwinism, Atheism, Agnosticism, or the Theory of Evolution insofar as it pertains to the origin of man, shall forfeit its charter and on conviction shall be fined in any sum not to exceed five thousand dollars. In all proceedings of forfeiture or revocation of charter, the holder thereof shall be given thirty days notice in which to prepare for a hearing to be attended by its representative or counsel.

The commonwealth or the accused may take such oral or written proof for or against the accused as it may deem it the best to present these facts.

This act to be in full force and effect from and after its passage and approval as provided by law.

ARTHUR M. MILLER

UNIVERSITY OF KENTUCKY,
FEBRUARY 8, 1922

RELATIVITY AND STAR DIAMETERS

TO THE EDITOR OF SCIENCE: That Michelson's wonderful measurements on star diameters have a fundamental bearing on Einstein's theory and are capable of affording a more decisive proof of it than even the eclipse experiments does not seem to be yet appreciated. In my former note of March 25th, 1921, I expressed the hope that some one more competent than myself would discuss the subject; but nothing has so far appeared but a short note by Dr. Burns, and as he appears to be under some misconception of the theory, I will, with the Editor's permission, go into it a little more in detail.

Dr. Burns refers to an acceleration in the direction of propagation. But this field has nothing to do with the measurement of the diameter. What we do, virtually, is to divide the star disc *F* into halves by the diameter, shown as a dotted line, and take the centers of gravity of the two semi-circles as two sources. Obviously a considerable amount of the light will come from the edge, as at *E*, and all of it, except that coming from the diametric line, will be pulled sideways towards the diameter.

By Einstein's theory light from a source *S* to an observer *O* will be curved in the manner shown, since all world lines are warped in the neighborhood of matter. Dr. Burns's statement that there is no warping of the light from the star disc means that light originating from a prominence *E* on the star would not be warped, while light traveling past it, originating from



an outside source *S* would; which necessitates an ether between *F* and *O*; which is contrary to the theory of relativity.

The really important point, which I had hoped to bring out in the discussion, is that a purely gravitational bending, shown by the dotted line *C*, is not a mere warping, but a permanent change of path to a sort of hyperbola. If the light bending were a purely gravitational effect, all stars should show measurable diameters, if above certain dimensions. But they do not appear to do so. As the only two alternatives seem to be gravitational bending or Einstein's theory, this seems to be a definite proof of the theory.

But we need a quantitative discussion, as, as I have said, the hands of men better qualified than myself. Mere guess work is not enough. It is true that the angular effect of the world line warping changes with distance, being twice the gravitational effect, but the amount of warping by the sun is approximately $1\frac{1}{2}$ seconds, while the total angle subtended by Betelgeuse is only $1/30$ of this, and Betelgeuse is somewhere around ten million times the size of the sun. A quantitative calculation is necessary, not only for Betelgeuse but also for those stars which show no measurable disc, to explain the absence of a measurable gravitational bending, if Einstein's theory is not true.

REYNOLD A. FERRISSER

PRELIMINARY NOTE ON THE ETIOLOGY OF POTATO TIP-BURN

DURING the past two years investigations have been carried on at the Experiment Station of Pennsylvania State College to determine the etiology and specificity of the potato tip burn caused by the feeding of the potato leaf hopper, *Empoasca mali* Le B.

These experiments were in the form of a series of inoculations with aqueous and alcoholic extracts of *E. mali* Le B, and other potato feeding insects. The inoculated plants were exposed to sunlight of varied intensity by the use of glass and mesh cages to determine the role of sunlight in the development of the disease.