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other necessary expenses of each preparation. The editor requests suggestions concerning future volumes, and cooperation in their production.

UNIVERSITY AND EDUCATIONAL NOTES

Among appropriations announced by the General Education Board are: Northwestern University, toward \$1,000,000, \$600,000; Boston University, Boston, Mass., toward \$1,500,000, \$400,000; Illinois Wesleyan University, toward \$400,000, \$135,000; New York University, \$500,000, toward \$1,500,000; for the discharge of its outstanding obligations, \$500,000.

Dr. **FRANK L. HOFFMAN** has accepted the position of dean of what will probably be known as the "Graduate School of Applied Business Science, of the Babson Institute, at Wellesley Hills, Mass. Dr. Hoffman will continue his connection with the Prudential Life Insurance Company as consulting statistician, and will hereafter divide his time as may best meet the needs of his new work. In his new position he is expected to develop the business education for officers and managers of industrial undertakings, including insurance. The plans under way include an entire group of new buildings, and a museum of industrial products and processes. Dr. Hoffman will make his future home at Wellesley Hills.

Dr. **SCOTT BURT WOLCOTT** has been appointed Shattuck professor of pathologic anatomy in the Harvard Medical School, to fill the vacancy caused by the retirement of Dr. William T. Councilman.

LEON PAIS, Ph.D., assistant professor of physics in Yale University, has been promoted to be professor of mathematical sciences beginning with the academic year 1922-23, with assignment to the Sheffield Scientific School.

The chair of mining at Sheffield University, vacant by the death of Professor F. E. Armstrong, has been filled by the appointment of Mr. Douglas Hay.

Dr. **HENRY CLAYTON** has been appointed professor of mental diseases in the Paris Faculty

of Medicine in succession to the late Dr. Ernest Dupré.

DISCUSSION AND CORRESPONDENCE

THE VOTE ON THE EVOLUTION BILL IN THE KENTUCKY STATE LEGISLATURE

ON March 9, the lower house of the Kentucky legislature, contrary to what was expected, took the anti-evolution bill (the one carrying a heavy fine and jail sentence for a violation of its provisions) out of the hands of the committee and put it to vote. Not since the memorable election of William A. Bradley to the Senate in 1908 has there been in the legislature such intense interest in the result of a ballot. As names were called the majority for and against see-sawed with narrow margins, and there was much scurrying hither and thither by the advocates and opponents of the bill for the purpose of finding and dragging in their respective absentees for the vote. It was like a neck and neck horse race, and Kentuckians do dearly love a horse race. The final ballot resulted in 41 votes for the measure and 42 against.

An analysis of the vote above recorded shows that with the legislative district taken as a unit and computing the percentage of illiteracy on the basis of the male population, twenty-one years old and upward, in each, the advocates of the bill represented an illiteracy of 13.5 per cent., and the opponents of the bill an illiteracy of 10.7 per cent. The illiteracy of the state as a whole computed on the same basis is 11.3 per cent.

In view of the closeness of the vote on this measure and what an analysis of it reveals as to the forces which were backing its passage, the proposal that the content of teaching in the state universities shall be dictated by legislative enactment, as advocated by Mr. Bryan, is fraught with interesting possibilities.

As interesting incidents connected with the final attempt to pass this anti-evolution measure, are the following:

Two persons, not members of the assembly, were permitted to address the house on the measure, President McVey of the university against it and Rev. Noel Gaines, of Frank-

fort, in favor of it. The latter exhibited standard text-books on zoology, and grew quite excited as he quoted evolutionary statements from them.

A representative, whose vote against the bill made it a tie, called up his pastor by long distance telephone, while the balloting was yet in progress, and asked for advice as to how to cast his final vote.

The representative from Breathitt County, one of the counties of the mountain section, where anti-evolution sentiment is strong, surprised everybody by voting against the bill; indeed it was he who cast the deciding ballot. This county is known as "Bloody Breathitt," because of its distinctive lead in homicides growing out of private feuds. This member can scarcely be said to represent the sentiment on evolution in this county, which has an illiteracy of 21.6 per cent. It is doubtless more correctly represented by the editor of the *Jackson News* of that county, who recently said, "The professors at the state university may believe they are descended from apes and baboons, but let it be known that the good people of Breathitt are pure Anglo-Saxon."

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ROTERTIA

In the mind of the student the word "moment" is unalterably connected with the idea of a very short space of time. Such an expression as "moment of force" is, therefore, on the face of it, meaningless. It is useless for the teacher to point out that "moment" also means importance, and that the moment of a force is merely its importance or effectiveness in producing rotation. Calling it a "moment of force" makes "a tendency to produce rotation" a difficult physical conception for the student to grasp. This difficulty has been recognized by teachers of physics, who have at last very generally discarded the expression "moment of force," in favor of the shorter, simpler, and clearer term "torque." A torque is a twist. There you have the whole thing in

a nut-shell, and the student knows what you are talking about.

Why not keep up the good work by accepting suitable substitutes for "moment of momentum" and "moment of inertia" as well? If "moment of force" is bad, these are worse. Some text-book writers have already seen the wisdom of using "angular momentum" for "moment of momentum." This is a distinct improvement, since "angular momentum" carries its meaning on its face. But so far I have failed to find any serious attempt made to use a substitute for "moment of inertia," although, to my mind, this is the worst offender of the three. The magnitude of a moment of force is calculated by multiplying a force by a distance ($f \times r$); similarly that of a moment of momentum by multiplying a momentum by a distance ($mv \times r$); but the magnitude of a moment of inertia is *not* equivalent to the product of an inertia times a distance ($m \times r$), but times the square of a distance ($m \times r^2$). The use of the word "moment" in all three cases, therefore, misleads the student to expect an analogy which does not exist in the case of moment of inertia, thus making the term particularly inappropriate. My experience has been that the word "rotertia" immediately conveys to a student the physical conception buried in the expression "moment of inertia"; and in such a way that it is not easily forgotten. I therefore seriously urge its adoption. "Rotertia" on the face of it is equivalent to rotational inertia; and, hybrid though its stock may be, what more can we demand of a technical term than unambiguity, clarity, and force?

FREDERICK PALMER, JR.

HAVERFORD COLLEGE,
NOVEMBER 14, 1921.

THE VALUE OF TILTH IN AGRICULTURE

DR. JEROME ALEXANDER (in *SCIENCE*, February 10, 1922) criticises a statement made by the present writer (*SCIENCE*, September 2, 1921) that "the comminution of the surface of the soil, *more or less perfectly stops evaporation and thus conserves the store of soil water.*" This statement is said by Dr. Alexander to be "quite contrary to all engineering

and practical experience"—the fact being, according to him, that such breaking of the upper surface "causes or tends to cause *increased evaporation.*"

The statement made by the present writer may possibly be contrary to "engineering" experience, but that it is a truism well known to all practical farmers from the days of King Hamurabi to date, can not be gainsaid.

I quote from "Soil Fertility and Permanent Agriculture" by Dr. Cyril Hopkins, page 579—"In the semi-arid regions, fallow cultivation is practiced during one season, *the soil being stirred after each rain to prevent evaporation,* and thus store up sufficient moisture in the soil to give the crop a good start" (italics mine).

There is scarcely a more well known practice inculcated by practical farmers, in regions where droughts are feared, than the absolute necessity of keeping the surface covered with finely broken soil, for the specific purpose of conserving the soil water.

In semi-arid regions, this practice is absolutely essential to the farmers' financial life, and most "farm periodicals" harp upon this string in season and out.

L. S. FRIERSON

GAYLE, LA.

QUOTATIONS

PROPOSED LEGISLATION AGAINST THE TEACHING OF EVOLUTION

IN KENTUCKY¹

THE Kentucky House of Representatives spent five hours to-day [March 9] in discussing and hearing discussions of the "monkey bill" of Representative G. W. Ellis of Barren County, forbidding the teaching of evolution in public schools and universities. The measure was defeated by a vote of 42 to 41, after a recapitulation of the vote during which members were dragged into the chamber from other parts of the capital.

Dr. F. L. McVey, president of the state university, and the Rev. Dr. E. L. Powell, pastor of the First Christian Church, Louisville, dis-

cussed the bill by invitation. The former declared that the legislature is not within its rights in passing such a law as that proposed, and urged the members not to base the inspiration of the Bible on matters not essential, but to heed teachings of the Book. He asserted that the Bible is not an authority on science, legislation, chemistry, or any of one thousand other subjects, but on moral, spiritual and religious matters. Dr. McVey went into the subject of evolution, pointing out that many accept the teachings as not in contradiction to the Bible, and insisted that the university makes no attempt to interfere with the religion of its students. He told of the various religious activities of the university, and warned the House that it would set a dangerous precedent in the passage of the Ellis bill. He recalled fights on scientific theories in the past based on the ground that they are opposing the Bible, and reviewed briefly the manner in which various scientific subjects are taught.

Mr. Ellis brought forward Noel W. Gaines of Frankfort, formerly an army officer, who has been in the limelight several times in his career, most recently when he was involved in the "ground glass" controversy in a Southern camp, to speak for the bill. Mr. Gaines put William Jennings Bryan to shame in his denunciation of those who believe evolution, directing many of his remarks directly at Dr. Powell and Mr. McVey. He talked for nearly an hour and was frequently applauded and cheered, while spectators in the gallery and around the walls of the chamber roared with laughter. One of his "stunts" was a division of the sheep and goats, placing Dr. McVey, Dr. Powell and various zoology text books on the one side and the Bible, the Declaration of Independence and himself on the other. He had the books before him as he ran up and down behind the clerk's desk, scattering them about as he waved his arms in emphatic gestures. Finally he threw one of the text books to the floor and trampled it under foot.

"I am ashamed of this day in the Kentucky legislature," said Representative G. C. Waggoner of Scott County, a minister and veteran legislator, toward the close of the debate.

"This bill smacks of intolerance and the

¹Abridged from the *Louisville Courier-Journal*.

shadows of the Dark Ages are settling about us." Mr. Waggoner opposed the bill on the ground that in passing it the legislature would exceed its functions as a law-making body and would set a dangerous precedent. "There have been times here to-day when those on both sides of this discussion were about ready to place their opponents on the rack and torture them," continued Mr. Waggoner. "I don't know anything about evolution and from what I've heard I don't believe there are others here who do. We have set up a straw man and have been boxing industriously at him all day."

In his final appeal for the passage of his bill, Mr. Ellis said he had sent his son to the University of Kentucky and that he returned with his faith destroyed and argued religion against his father and mother. The voice of the aged representative was broken with emotion as he told of this experience.

When the roll was called the vote stood 38 to 36 for the bill, which meant its defeat, as 40 votes are required for passage. As Mr. Meyers was about to announce this the proponents demanded that the absentees be called. Then the vote was 40 to 39 for the bill. The opponents demanded a recapitulation. During that they dragged in two more members and the proponents one, making it 41 to 41. Representative Bryce Cundiff, who had declined to vote on the ground that he "was a hard shell Baptist and believed what was would be anyhow," said he would have to discard his religion and vote "No." Then the bill was declared to be defeated by a vote of 41 to 40.

IN SOUTH CAROLINA¹

The teaching of "the cult known as Darwinism" as "a creed to be followed" is prohibited in all state supported public schools and institutions of higher learning by a proviso attached as a rider to the general appropriation bill by the Senate yesterday morning. The amend-

¹ From the *Columbia State*. The amendment was eliminated from the bill by the conference committee appointed to adjust differences between the bill as passed by the House and by the Senate. It is said that another attempt will probably be made to pass the bill when the legislature meets next year.

ment, which was tagged on to the end of the section providing for the appropriation of funds for the public school system, would make it impossible for any public school or higher institution of learning teaching or permitting "Darwinism" to be taught to receive any funds from the state and would prohibit the paying of state funds to any such institution. Senator F. A. Miller of Hartsville is the author of the proviso, which was adopted by the Senate, practically without opposition.

Ultimate fate of the proviso, which took its place as one of the Senate amendments to which the House refused concurrence, will therefore have to be determined by the conference committee to which the appropriation bill was referred. None of the representatives on this committee from either house have announced their stand on the question and since the House has never explicitly expressed itself on the question the House conferees will consider the proviso without any idea as to the House's stand on the matter.

The amendment was passed in the Senate practically without debate or opposition, Senator Miller making the only address either for or against the measure. The proviso follows in full:

And provided, further, That no moneys appropriated for public education or for the maintenance and support of state supported institutions shall be used or paid to any such school or institution teaching, or permitting to be taught, as a creed to be followed, the cult known as "Darwinism."

The proviso contains no definition of "Darwinism" and is intended, Senator Miller explains, to apply only to Darwinism and therefore not to the theories of evolution of Lamarck, Bergson, Le Dantec, Baldwin, Osborn, and the many others who have since Darwin's day practically thrown "Darwinism," as it was first enunciated, into the discard. The amendment applies, Senator Miller points out, only when "Darwinism"—which is now defined as the theory of natural selection, that is, the survival of the fittest in the struggle for life, was the mechanism by which evolution was accomplished—is taught or permitted to be taught "as a creed to be followed" and not when it is

merely explained to the pupils as the pagan philosophies are explained.

SCIENTIFIC BOOKS

The Friendly Arctic. V. STEFANSSON. *The Story of Five Years in Polar Regions, with a foreword by Gilbert Grosvenor, president of the National Geographic Society, and an introduction by Sir Robert Borden, Prime Minister of Canada.* New York (Macmillan) 1921. Pp. xxxi + 784.

It is the habit of scientific men to say that there is no guide for the well-ordered conduct of the every-day business of living which approaches in validity and all-round usefulness that which is called the scientific method. But while this is strictly orthodox and extremely common preaching, the thoughtful observer of human folkways can not but be impressed with the fact that the correlation between this trite preaching and the actual practice of his friends in the conduct of their own lives, is not of as high an order as it would be expected to be if the preaching were taken at its face value. It is, therefore, an event of great human interest as well as of no mean scientific importance to have forthcoming a well-nigh complete and perfect example of what happens when scientific methods of thought are translated into action, with something approaching 100 per cent. completeness, in the end of living happily, usefully and continuously in a naturally harsh environment. Such an event is afforded in this recent book by Stefansson.

It is from this point of view that, in my opinion, the book has its greatest significance. It contains a wealth of records of achievements in the field of geography in the narrower sense of the word—discoveries and descriptions of new lands, exploration of the bottom of the polar sea by soundings, such exact mapping of coast lines, and the like—which I suppose to be of major importance in these fields of science, but being in no wise a specialist in either geography or polar exploration, I am not qualified to express any expert opinion on these matters. But I have a strong conviction, after carefully reading the book twice, that the importance which the history of science is go-

ing to attach to Stefansson's work in the polar regions will rest primarily upon quite another thing than his contributions to geography in the strict and limited sense, significant as I have no doubt these contributions are.

In temperate, sub-tropical and sub-arctic portions of the earth's surface certainly, the zone of freedom in human behavior is, from the viewpoint of evolution, rather wide. Men in such regions are, and must always have been, widely free to develop any sort of habits of life and folkways in general, so far as the eliminative action of the purely physical environment was concerned. For example, it makes no difference in terms of survival value so far as one knows, whether ladies dress in the entertaining and colorful manner of the Romanian peasant, or in the quite different if not less exciting manner of the Fifth Avenue society woman. But the case is biologically quite different in the polar regions. There the zone of freedom in respect of the mode of conducting life is extremely narrow. The environment imposes strict and narrow limitations on habits and biological folkways generally. One conforms or is eliminated. There is no wider range of choice.

Now presumably the Eskimo's knowledge of how to live happily, comfortably and reasonably long in the Arctic has been very slowly and somewhat painfully wrought into his racial and individual consciousness mainly by the operation of natural selection. Those who did not dress, house themselves, find food, etc., within the limits of the zone of freedom of individual action rigidly set by the environment are no longer either present or represented in the Eskimo population. The consequence is that the Eskimo is now, as Stefansson has demonstrated with a wealth of detail in this and his earlier book, "My Life with the Eskimo," a creature extraordinarily well adapted to his particular environment, and therefore happy in it.

Prior to Stefansson's work the whites who have adventured into the Arctic as explorers, and the list is a nobly impressive one, have uniformly depended upon what is, in its philosophical essence, one and the same scheme to