which would tend to increase the profitable agricultural production of the Punjab. This prize, valued at 3,000 rupees and known as the Maynard Ganga Ram Prize, may be awarded every three years if proposals of sufficient merit are received. A world-wide competition is provided, and the date for the current competition has been extended to December 31, 1929.

PRESIDENT W. W. CAMPBELL, of the University of California, has received word that the University Dental College has been awarded the gold medal of the Third Latin American Odontological Congress, held in Rio de Janeiro, Brazil, for the excellence of an educational exhibit of dental work arranged by Dean Guy S. Millberry.

AN antelope sanctuary, said to be the only antelope range in the United States, which is being established by the National Association of Audubon Societies in the Last Chance district of Nevada, is to be presented to the nation for a federal preserve, according to plans outlined in the annual report of Dr. T. Gilbert Pearson, president, at the association's twenty-fifth annual meeting in the Museum of Natural History. It is hoped to acquire 1,000 acres of land, now controlled under an option, for $20,000. Half the purchase price has been pledged by friends of the association. 30,000 acres of land surrounding the association's holdings have been withdrawn from public entry.

UNIVERSITY AND EDUCATIONAL NOTES

MEMBERS of the board of trustees of the University of Pennsylvania have contributed a sum amounting to $1,750,000 to the university. Of this amount $1,000,000 was given without restriction, and the money has been used to cover deficits of $800,000, leaving $100,000 to be used for repairs and $100,000 for current purposes. The remaining sum of $750,000 will be used for the endowment of professorships.

WITH an anonymous gift of $130,000 the University of Cincinnati College of Medicine is constructing a laboratory of applied physiology on the campus at Eden and Bethesda avenues, directly behind the anatomy department. A new field of research, according to the *Journal* of the American Medical Association, will be carried on here dealing with problems that concern the application of physiologic laws to industry, including the protection of workers in dangerous chemical and metal industries, food contamination and ventilation. An annual gift of $30,000, also anonymous, provides for the maintenance of the laboratory.

MRS. AGNES H. ANDERSON, who in 1924 erected Anderson Hall on the campus of the University of Washington in memory of her husband, the late Alfred H. Anderson, has given $50,000 to the university. The income from this gift, which is known as the Agnes Healy Anderson Trust Fund, is to be used chiefly for graduate research fellowships in forestry.

AT Columbia University appointments have been made as follows: William Robert Torgerson, associate professor of tropical medicine; Hans Smetana, assistant professor of pathology; Kenneth S. Cole, assistant professor of physiology; James L. Joughin, assistant clinical professor of neurology; Josephine B. Neal, clinical professor of neurology; Claus W. Jungeblut, associate professor of bacteriology, and Philip B. Buchy, assistant professor of mining.

DR. FREDERICK H. KRECKER, professor of zoology in Ohio State University and assistant director of the Franz Theodore Stone Lake Laboratory, has been appointed head of the department of biology in the college of liberal arts of Ohio University at Athens.

D. S. VILLARS has resigned his position as associate in chemistry at the University of Illinois to accept an assistant professorship in physical chemistry at the University of Minnesota.

DR. CALVIN N. WARFIELD, formerly of the University of Richmond, is taking up his work as the head of the physics department of the North Carolina College for Women at Greensboro.

PROFESSOR J. W. GREGORY has retired from the chair of geology at the University of Glasgow after a service of twenty-five years. *Nature* says that during the period the membership of his classes has risen from 15 to 400, and in his last session he lectured to the largest geological class in the British Isles, if not in the world.

DISCUSSION

PHARMACOLOGICAL INJECTIONS AND PHYSIOLOGICAL INFERENCES

IN a recent article in SCIENCE,[1] Cori remarks that for twenty-seven years 0.2 mg of adrenin per kilo or larger amounts have been used in hundreds of animal experiments by many investigators and that if Cannon's judgment that such doses are "huge" and "far beyond physiological limits" is well founded it would be of far-reaching importance. That many investigators have commonly used such doses of adrenin does not prove them physiological. Unfortunately the lit-

[1] C. F. Cori, SCIENCE, 70: 355, 1929.

erature of endocrinology is replete with reports of the effects of adrenin and other similar preparations used as drugs and with inferences drawn therefrom as to their physiological action. Gley has stressed the dangers of that mode of thinking.[2] It is because such reasoning may lead to error that I called attention to Cori's use of it in a recent article in *Physiological Reviews*.[3]

Cori declares that in his experiments the absorption of adrenin from subcutaneous tissue "must proceed at a rate less than 0.001 mg per k per min." He marks that Cannon regards that rate as within the physiological range of adrenin secretion. There is evidence that it is within the physiological range, but only during and immediately after a short stimulation of the adrenal glands. There is no evidence that it continues at that rate. Recent work in the Harvard Physiological Laboratory by Colwell[4] has shown that continuous intravenous injection of adrenin into the cat at the rate of 0.001 mg per k per min. produces profound pathological effects on carbohydrate metabolism. Recently in the same laboratory Dworkin has demonstrated that when the sympathico-adrenal system liberates sugar physiologically, the hyperglycemia long outlasts the discharge of adrenin. The adrenin promptly disappears from the blood and leaves sugar utilization undisturbed. The continuous prolonged absorption of adrenin studied by Cori does not represent, therefore, a physiological process, and consequently the results obtained by means of it can not be regarded as normal.

Cannon pointed out that Cori's injection in rats would be the equivalent of 14 mg of adrenin in a man of 70 k. Cori objects to this reference to man. Let us consider rabbits. Trendelenburg[5] has shown that in rabbits a continuous intravenous injection of between 0.0001 and 0.0003 mg of adrenin per k per min. produces hyperglycemia and glycosuria. If the dose given by Cori—0.2 mg per k—were absorbed at the rate which, according to Trendelenburg, is capable of producing hyperglycemia and glycosuria, from eleven to thirty-three hours would be required for the absorption. Cori reports that in his experiments "hyperglycemia and glycosuria were present after one hour and persisted for four hours after the injection." He cites his recent tests which show that 35 per cent. of the adrenin he injects disappears during the first hour and 13 per cent. during the second hour. How these results are to be reconciled with his belief that there was in his experiments "a rather constant rate of absorption" is not clear. Neither he nor anybody else knows exactly how fast the adrenin enters the blood stream. On the basis of his own figures, however, the average rate of absorption during the first hour would be not less than 0.001 mg per k per min., as he has claimed, but more than that—*i.e.*, more than ten times the amount which Trendelenburg found was adequate for producing hyperglycemia and glycosuria and actually more than the amount which in Colwell's studies caused a striking pathological disturbance.

My sole interest in calling attention to the use of what can reasonably be regarded as huge doses of powerful endocrine products in experiments is to prevent physiological literature from being encumbered with misleading inferences. The giving of doses many times the minimal effective dose, the use of such doses subcutaneously with the idea that the rate of their absorption can be accurately known and the employment of a potent agency to act continuously for a long period whereas under normal conditions it does not so act, will, no doubt, yield data. Until such data, however, have been confirmed by experiments performed under more natural conditions, they should be interpreted cautiously in physiological terms.

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[2] E. Gley, "Les Sécrétions Internes," Paris, 1920, 93.
[3] W. B. Cannon, *Physiol. Rev.*, 9: 399, 1929.
[4] A. R. Colwell. Papers to appear soon in the *Amer. Journ. Physiol.*
[5] P. Trendelenburg, *Pflüger's Arch.*, 201: 39, 1923.

A PECULIAR LIGHTNING PHENOMENON

ON Monday afternoon, August 28, my brother and I were in the vicinity of Peoria, Illinois. The afternoon had been rainy, with two thunder-storms. The second storm was still raging with sharp lightning and the rain was falling in torrents but there was no wind. Just as we were ascending a gentle slope a very brilliant lightning flash occurred; the thunder was so violent that we both felt the mechanical shock as if the car had been shaken and each felt the electrical shock especially in the shoulders.

The flash appeared to be just on our right in an open pasture crossed by what was once an osage hedge, but now only a few small trees of the hedge remained at intervals of twenty to thirty feet. About six feet from the trunk of one of these hedge trees we observed a ball of smoke about two feet above the ground. The ball appeared to be about eighteen inches in diameter and perfectly spherical. The color of this smoke, if it was smoke, was a yellowish brown quite similar to the smoke given off by burning straw. The ball began immediately to diffuse into the surrounding air just as the smoke from an exploding shell.

The storm being so forbidding, we did not care to investigate the spot at the time but we returned three days afterwards and searched very carefully and minutely for some evidence that the lightning had