dicotyls themselves. Among various dicotyls, which have a Lower Cretaceous record and numerous present representatives, are not only the Magnoliaceæ and Trochodendraceæ, but Berberidaceæ, Myricaceæ, Salicaceæ, Fagaceæ, Moraceæ (figs), Lauraceæ, Myrtaceæ (*Eucalyptus*). The list might be greatly extended. As a clue to the nature of the real early characters of dicotyls attention may be turned to the sassafras, poplars, elms, oaks and magnolias, all typical in the Comanchian. All these must show recognizable archaic characteristics in the seedlings; and in making comparisons with gymnosperms, *Araucaria* and the cycads afford just as critical data as the cycadeoids.

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SPECIAL ARTICLES

THE REGULATION OF BLOOD VOLUME AFTER INFUSIONS OF SOLUTIONS OF VARIOUS SALTS. PRELIMINARY NOTE

IN the recent work of Rous and Wilson[1] it was demonstrated that the disastrous effects of hemorrhage are not the result of the withdrawal of hemoglobin from the circulation. They bled an animal until the hemoglobin was reduced from 80 per cent. to 20 per cent., *i. e.*, three fourths of the original hemoglobin of the animal was removed without consequent serious effects. A reduction of four fifths, however, resulted in a somnolent, torpid condition, followed by death. Under the conditions of severe, sudden hemorrhage observed in man, the hemoglobin content is never reduced as much as these authors report.

Bayliss[2] has shown that the factor which makes the results of sudden hemorrhage severe is the lowered blood pressure consequent to the reduction of volume of fluid in the circulatory system. Bayliss and Rous and Wilson state that saline infusion is almost useless in sustaining blood volume; and Bogert, Mendel and Underhill[3] have shown in what a surprisingly short time infused saline solution leaves the circulation. Bayliss reports satisfactory results in sustaining blood volume when colloidal solutions of approximately the same viscosity as blood are used as infusion fluids. He used 6 per cent. gelatin or 7 per cent. acacia in Ringer's solution. Rous and Wilson have used the same solutions with the same satisfactory results. They also have used human plasma and horse serum. Human plasma has given them their best results. They dispute Bayliss's contention that the infusion fluid must have the same viscosity as blood. Hurwitz[4] has used Locke solution containing 5 per cent. acacia for infusion in human patients and reports satisfactory results.

In the course of some experiments of a somewhat different nature, the writer has had occasion to measure the rate of disappearance from the circulation of various isotonic solutions, each containing the same cation but a different anion. In view of the timeliness of this question of maintenance of blood volume, it seemed worth while to offer at this time what information was available which had a bearing on this problem.

The solutions examined were isotonic with rabbit's blood. The bromide, nitrate, acetate, chloride, sulfate and thiocyanate of sodium were the salts used. These solutions were injected into the jugular vein of rabbits which had been anesthetized with ether. Blood samples were taken from the carotid and the dilution of the blood after injection was followed by the hemoglobin percentage, using the Haldane technic. Fifty cubic centimeters per kilo body weight, or the approximate blood volume, was injected in two minutes. The average time for the blood volume to return to normal after the injection was less than an hour for every salt used except one. This exception was the sulfate. When this salt was used the blood volume did not return completely to normal during the entire experiment. The amount of infused fluid which remained in the circulation was about 9 per cent. of the amount put in.

[1] Rous and Wilson, *Jour. American Medical Association*, 70, 219.

[2] Bayliss, *Proc. Royal Society*, 89, 380.

[3] Bogert, Underhill and Mendel, *Am. Jour. Physiology*, 41, 189.

[4] Hurwitz, *Jour. American Medical Association*, 68, 699.

We can, then, confirm the results of Bayliss, Hurwitz and Rous and Wilson with chloride infusion; our experience supplements these in showing that, in so far as the bromide, nitrate and thiocyanate of sodium are concerned, the use of them in infusions after severe hemorrhage would probably be of little permanent value in maintaining normal blood volume. Furthermore, it is probable that employment of sodium sulfate, even in combination with colloidal substances, will prove little more efficacious than Ringer's solution.

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THE IOWA ACADEMY OF SCIENCE

THE Iowa Academy of Science held its thirty-second annual session at the Iowa State College at Ames, beginning at 1:30 P.M. on Friday, April 26. After the general program in the Assembly Room sectional meetings were held for the reading of papers of special interest and these were resumed on Saturday morning. The general business meeting was held on Saturday morning at 11 o'clock. Dean E. A. Birge, of the University of Wisconsin, gave the annual address at 8 P.M. Friday, on "The warming of an inland lake." The Iowa Section of the Mathematical Association of America and the Ames and Iowa Sections of the American Chemical Society held their meetings in connection with the sessions of the Academy. President Ross delivered his presidential address on "The history of the teaching of science" at the general meeting on Friday afternoon.

At the business meeting on Saturday morning the following officers were chosen for the coming year:

President—S. W. Beyer, State College, Ames.

First Vice-president—T. C. Stephens, Morningside College, Sioux City.

Second Vice-president—R. Monroe McKenzie, Parsons College, Fairfield.

Secretary—James H. Lees, Iowa Geological Survey.

Treasurer—A. O. Thomas, State University, Iowa City.

Resolutions were passed endorsing the national administration, also calling for the selection of scientifically trained men to the position of fish and game warden and on the Board of Conservation.

TITLES OF PAPERS

Physics and Psychology

Temperature-time relations in canned foods during sterilization: GEORGE E. THOMPSON. Certain well-known mathematical formulæ are applied to heat penetration into foods packed in cylindrical cans. It is found that if the diffusivity of the food be known the temperature-time curves may be constructed with a fair degree of accuracy for cans of any size and for any practical temperature range. A number of experimental and theoretical curves are shown for squash and corn.

(a) Some structural features of selenium deposited by condensation from the vapor state above the melting point. (b) The sublimation curve for selenium crystals of the hexagonal system: L. E. DODD.

Stroboscopic velocities in the tonoscope: H. R. FOSSLER AND L. E. DODD.

The eclipse expedition to Matheson, Colorado, June 8, 1918: D. W. MOREHOUSE.

The X-ray spectrum of tungsten: O. B. OVERN.

A new principle in the design of rheostats of large capacity: H. L. DODGE.

On the coefficient of absorption of photoelectrons in silver and platinum: OTTO STUHLMANN, JR.

On the production of opaque and the color of transparent and semitransparent metallic films: OTTO STUHLMANN, JR.

Hall effects in thin silver films: G. R. WAIT.

The effect of pressure upon the conductivity of selenium: E. O. DIETERICH.

The measurement of basic capacities in motor ability: CARL E. SEASHORE. The speaker reported having devised and standardized a series of seven tests for the measurement of the basic forms of motor capacity. These are (1) motor ability, (2) timed action, (3) a simple response to a simple signal, (4) a simple response to a complex signal, (5) a complex response to a complex signal, (6) precision in action—direction, time, distance and force, and (7) strength and endurance.

He also reported having devised simplified forms of instruments for these measurements. The time measurements are all made by means of small attachments, used on a phonograph. The complex reaction to a complex stimulus (chain reaction) is made by means of a carrier contact to a typewriter; and the strength and endurance test is made by means of a new form of ergograph, taxing the muscles of the forearm.