by the teeth; still later, the stimulation of the right sole being continued, the animal scratches the right shoulder with the hind leg.

The impulses caused by tactile or pressure stimuli of the integument are not only referred to other skin areas, they may be referred to mucous membranes. For example, after tactile stimulation of one, the animal may suddenly rub the same or the opposite or both sides of the nose with circular movements of the radial aspect of the fist or fists. There are also sneezes and in two instances drops of milky fluid suddenly issued from a naris (nares?). Furthermore, slow, chewing motions of the jaws are very common after tactile stimulation of the skin. At times the animal seizes and chews anything available in the neighborhood: sawdust, hay, the wooden sides of the container or the netting itself. The wide opening of the jaws occasionally observed may possibly also be associated with a type of sensation referred to the buccal cavity.

In addition to these manifestations there is evidence that at least one of the special senses apparently may be involved. When an animal is tested with tactile or pressure or both types of stimuli, one may see that the animal suddenly pauses, raises its nose high in the air and samples it in various directions; or the animal abruptly sniffs interestedly in the sawdust, often spreading the sawdust by lateral sweeps of its front legs to facilitate its olfactory investigation.

It is believed that these observations may be of value in aiding the interpretation of other normal and abnormal reflex activities.

JOHN AUER

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THE KENTUCKY ACADEMY OF SCIENCE

THE Kentucky Academy of Science held its tenth annual meeting on May 12th at the University of Kentucky, Lexington. The session was called to order at 9:30 o'clock by President Beckner.

The secretary's report showed 149 members, including 65 national members, 48 local members, 23 corresponding members and 13 honorary members. Thirty-five new members were elected.

Resolutions were passed unanimously agreeing with the resolutions adopted by the council of the American Association for the Advancement of Science with reference to their position on organic evolution. The Academy voted to hold a symposium on evolution at a meeting in Louisville, the date for which is to be determined.

The officers elected were:

President, Dr. W. R. Jillson, state geologist, Frankfort.

Vice-president, Dr. Austin R. Middleton, University of Louisville, Louisville.

Secretary, Dr. A. M. Peter, Experiment Station, Lexington.

Treasurer, Prof. W. S. Anderson, Experiment Station, Lexington.

Representative in the Council of the American Association for the Advancement of Science, Dr. A. M. Peter.

The program included an address by Dr. E. N. Transeau, head of the department of botany, Ohio State University.

The following program was rendered:

Eastern Kentucky's sea shore: LUCIEN BECKNER. The ancient shore line was described as parallel, generally, with the axis of the Cincinnati anticline and to the east of it. The general thickening of the strata eastward, with increasing distance from the shore line, was pointed out and evidence was cited of the presence of estuaries of great rivers. A very peculiar and interesting feature of the geology (stratigraphy) of Eastern Kentucky was shown by a vertical cross-section of the rock formations, extending from Lee County into Pike County, constructed by plotting well records graphically. The section shows that the deeper rocks (Devonian) continue their eastward dip into Pike County, but that this is not the case with the surface formations.

Jeptha knobs of Shelby County: WALTER H. BUCHER. The geological structure of Jeptha Knob was described as that of an upthrown fault block. The formations of which the knob itself is composed were described as horizontal and of Ordovician age. On either side of the knob evidence of faulting was observed. It was inferred that only the area included by the knob was affected by the upward movement.

The Haddix-Coalburg geosyncline: W. R. JILLSON. A study of the profile of the Haddix-Coalburg geosyncline (plotted by the writer to scale) brings out clearly for the first time the following facts: (I) This geosyncline is divisible into three units: (1) Kanawha River westward to Tug Fork, low elevations between 580 and 540 feet; (2) Tug Fork southwestward to Middle Fork of Kentucky River in Perry County, low elevations between 855 and 580 feet; (3) Middle Fork of Kentucky River to Jellico region (Tennessee line), lowest elevation 855 feet and highest elevation 1,600 feet. (II) Regional coincidence of pronounced structural highs in Floyd and Clay Counties with important developed gas fields, and lack of coincidence with large and important developed oil pools in all of its course until the Cabin Creek region of southern Kanawha County, West Virginia, is entered. (III) Coincidence of synclinal structure with all lines of major drainage from the South Fork of the Kentucky River northeastward to the Kanawha River.

Land of ten thousand sinks: W. R. JILLSON. The pitted or sink-hole characteristic of the St. Louis, Ste. Genevieve and Chester divisions of the Mississippian System in Kentucky has long been recognized. The widely ramifying sub-surface drainage developed in these limestone rocks, which are frequently of high purity, is well exemplified in the karst and cave region of Edmonson

County, Kentucky, and in the natural sewage channels of the City of Bowling Green, Warren County, Kentucky. The peculiar topographic figure of the "sink" country is well shown on either side of the Louisville and Nashville Railroad, and the Dixie Highway from Munfordville in Hart County to Bowling Green. The recently completed Mammoth Cave topographic sheet exhibits 2,833 sink-holes, and is regarded as a model for students. The number of sinks on other completed quadrangles follows: Brownsville 1,150, Bowling Green 2,563, Princeton 1,429, and Monticello 1,096, giving a total of 9,071. The Brownsville topographic sheet shows the largest mapped sink-hole, just south of the Dripping Springs escarpment, between Girkin and Tuckertown postoffices. This gigantic sink has an area of 4.865 square miles or 3,114 acres. It is estimated on a basis of mapped areas that the Mississippian plateau in Kentucky contains between sixty and seventy thousand sink-holes of varying size and description.

A gigantic slate slide: W. R. JILLSON. The largest and most destructive "slate slide" in the history of mining operations in Kentucky occurred at Burdine, Letcher County, on the waters of Elkhorn Creek, adjoining the northwest flank of Pine Mountain, on February 3, 1923. About 360 cubic yards of "slate" taken from the parting of the Elkhorn coal (Pottsville) at Mine No. 201 of the Consolidation Coal Company and gobbed in Slate Hollow became supersaturated with rainwater and wash during an abnormal precipitation of 3.27 inches for the 48 hours immediately preceding the slide. The direct causes of this slide were: (1) Abnormal precipitation combined with inadequate sub-slate drainage; (2) unstable angles of rest (35°) on the breast of the fill; (3) excavation and ditching operations following the first minor slips; (4) seismological disturbances of record, and (5) unusual regional geotectonic relationships. The total length of the slide was 929 feet. The semiliquid "slate" moved out fan-shaped entirely across the bottom of Elkhorn Creek to a maximum depth of 75 feet. The movement was entirely within the "gobbed" slate and did not affect the underlying country rock or soil. Casualties were narrowly avoided.

The largest fort of the mound builders in the knobs of Kentucky: WILBUR GREELEY BURROUGHS. The fort is in Madison County, Kentucky, 3½ miles southeast of Berea, on the flat top of a mountain, 620 feet vertically above the surrounding valleys. It covers about 250 acres. Rough stone barricades guard each of 13 possible approaches and cliffs 100 to 180 feet high form the other sides. Even certain accessible joint planes four feet wide are barricaded with regularly laid rough stone walls. Piles of stone "ammunition" occur at intervals. The author made the first detailed survey and explored this fort in 1922–23 for the State Geological Survey. With voluntary assistants he has excavated in the caves and rockhouses of the fort in search of remains of the prehistoric people.

The social significance of psychological tests for college students: J. B. MINER. Three statistical pictures of the results of the Army Alpha test conducted at the University of Kentucky were presented. The first shows how closely the scores of the freshmen parallel the distribution curve of the officers in the American army. This indicates the high type of individual which the university has to train and the importance of clear recognition by the student body that it is fitting itself for positions of leadership and responsibility. The second compares the seniors with the freshmen in the College of Engineering. It furnishes a start towards the problem of defining the minimum essential of intellectual capacity necessary for completing the engineering course. The third shows tests of the twelve Kentucky candidates for the Rhodes Scholarship in the recent award. The results corroborate the opinions of the committee which made the selection after an elaborate comparison of the personal histories and the scholarship records of the candidates, supplemented by a half-hour interview with each man. It shows strikingly that high records on the psychological tests are correlated with the sort of personal characteristics sought in making this appointment.

Notes on the constitution of benzene: C. C. KIPLINGER. The author attempts to prove that Kekulé's vibration hypothesis, with a slight modification, is still as fruitful in affording explanations of the chemical behavior of benzene and related structures as the more complex hypotheses of later development. It is a fallacy to expect two ortho di-substitution products of benzene, since these could be but two special phases of the vibration cycle of a Kekulé molecule, which cycle probably occurs very rapidly. The Thiele molecule becomes a special phase of this cycle. The structures of naphthalene and anthracene are discussed briefly along the same lines. The paper is speculative and presents no new experimental evidence.

Ulcerative cloacitis in chickens: M. SCHERAGO. This is either a rare disease in Kentucky or it is not readily recognized by the poultryman. If the latter, the number of cases must be very few and the disease itself of little importance. The rather sporadic occurrence of ulcerative cloacitis in a flock and failure to transmit the disease to healthy fowls seem to indicate that it is not contagious and is not transmitted by coitus. Birds affected may be treated with a single cleansing of the anal region and cloaca and one or two applications of a 1–1000 solution of mercuric chlorid; they recover without further treatment. An attack of this disease does not seem to affect the future laying capacity of the hen.

Effect of developing fetus on production of milk of dairy cows: J. J. HOOPER. Records of 24 cows studied indicate that the growing fetus, five or six months after conception, exerts a decided influence in checking milk secretion of the mother cow. When left unbred for most of the lactation, cows maintained a higher milk yield during the last months than when bred early. The author infers that the six-months' old fetus secretes something that dries off the cow preparatory to rest and calving.

Market milk—free from B. Coli: E. J. GOTT and L. A. BROWN. The Public Service Laboratories of the Kentucky Agricultural Experiment Station have made a B. coli count as a routine procedure in the examination of milks for the past eleven years. In order to determine if market milk was absolutely free from members of the

B. coli group, 5 to 10 cc. portions of a number of samples of milk were incubated at 37½° C. for 18 to 24 hours. Out of 87 samples the authors failed to obtain B. coli in 31, or 35 per cent. Forty original pints and quarts of milk from two dairies were incubated one day at 30° C. and the next day at 37½° C. After the final incubation, thirty-one (77 per cent.) were found to be free from members of the B. coli group. It is possible for dairymen to produce milk free from B. coli. The B. coli count is of distinct advantage in the sanitary scoring of dairies and dairy products.

Association of manganese with the so-called vitamins: J. S. McHARGUE. The author presented further data which confirm his previous conclusions that manganese is an essential element for plant growth and has a function in the synthesis of chlorophyl. Data were presented which show that in the modern process of milling rice, barley, wheat and corn, the greater part of the manganese contained in the pericarp and germ is removed in the offal when these cereals are prepared as highly milled products for food. Analyses were presented which show that in the animal body manganese occurs in the largest amounts in the liver, kidney, pancreas, heart and brain. Since these organs are also richest in vitamins the author concludes that manganese is in some way responsible for the presence of the vital factors in these organs. It was also shown that egg yolk contains an appreciable amount of manganese, whereas the white of the egg contains no manganese—a fact in harmony with the observation that the yolk of eggs contains vitamins, whereas the white is deficient in vitamins. Similar parallelisms were shown in cod livers, cod liver chum and refined cod liver oil; also in tomatoes, oranges and lemons. The author concludes that manganese is closely associated with vitamins and is responsible for the origin of the vitamin factors in some way as yet undetermined, probably catalytically.

The occurrence of two fern rusts in Kentucky: FRANK T. McFARLAND. So far as the writer has been able to learn, no rusts of the Pteridophytae have ever been reported for Kentucky. While on a collecting trip to Cumberland Falls the writer found several patches of Pteridium aquilinum (L.) Kuhn bearing rust sori. On examination this rust proved to be Uredinopsis pteridis Diet. and Holw. Collected at Cumberland Falls, Kentucky, August 31, 1922. While the writer was working in the university greenhouse the first day of December, 1922, his attention was attracted by some whitish spots on the under surface of the leaves of a potted Pellaea atropurpurea (L.) Link, fern. Cross sections of these spots revealed a rust known as Hyalopsora cheilanthis (Pk.) Arth. No teliospores were found in either collection. Specimens are in the writer's herbarium and that of the University of Wisconsin.

A method of demonstrating seed infection in supposedly disease-free corn: W. D. VALLEAU. Comparative ear-to-row tests of heavily infected and so-called disease-free corn have indicated that yield will not be increased by the selection of ears which appear freest from infection. Seed from ears which appear freest from infection show, when grown in sterile sand a sufficient time, definite evidence of being infected internally with fungi. A microscopic study of serial sections of corn seeds which appeared disease-free when cultured in agar often showed extensive development of hyphae between any parts of the pericarp and seed-coat walls. In seeds which appeared to be free from infection for long periods in the sand box the hyphae were found to be extremely small and less extensive but always present in the seeds examined. It is concluded that negative evidence obtained by petri plate or test-tube cultures of corn seeds are valueless as an indication of freedom from fungi.

Late frost injury to some trees in the Bluegrass Region: A. F. HEMMENWAY. The Easter freeze of 1921 injured the woody tissue of several kinds of shade and fruit trees in this region. The writer has examined three conifers, twelve deciduous shade trees and twelve varieties of fruit trees. The Transcendent crabapple, Black Tartarean cherry, linden and hard pines were most noticeably injured. The injury is more severe in twigs less than five years old. Twigs injured by frost may render the tree much more susceptible to attacks by fungi.

The Hydnaceae of Kentucky: G. D. SMITH. The occurrence of the following species was noted and colored lantern slides representing one or more forms of each were shown and explained. Hydnum repandum, Linn.; Hydnum coralloides, Scopoli.; Hydnum imbricatum, Linn.; Hydnum albonigrum, Pk.; Hydnum adustum, Schw.; Hydnum caput-ursi, Fr.; Hydnum erinaceus, Bull.; Hydnum caput-medusæ, Bull.; Hydnum septentrionale, Fr.; Hydnum zonatum, Batsch.; Hydnum putidum, Arkinson.

The postglacial history of the vegetation of Ohio (Lantern): EDGAR N. TRANSEAU. Presenting results of studies of the influence of the Glacial period on the vegetation of Ohio, pointing out the fact that during glacial times much of Ohio was covered by an ice cap and that the distribution and character of the present ultimate or climax flora is not so much due to influences coming from geological formations, from soils or from moisture conditions, as from a migration of plants that followed up the ice as it disappeared. The vegetation now consists largely of plants derived from a few outside centers of dispersal, a southeastern, roughly represented by the Allegheny Mountain region, a western prairie center from which many plants have come in by way of the western end of the state, and a boreal center, the latter during the Glacial period being pushed southward and now furnishing a few species, remnants of those that during the Glacial period hung on the flanks of the ice and followed it up as fast as it retreated. Some of these plants are still to be found in isolated and protected spots. The lecture was highly appreciated by those present because of its bearing on the flora of Kentucky, a region which was profoundly influenced by the same conditions, though only touched by the ice sheet. The vegetation of the state, it had been noted, was derived largely after Glacial times from the centers that have furnished most of the plants of Ohio; for while its surface was not as greatly affected by the ice, its climate and such vegetation as existed must while the ice remained have been decidedly boreal in character.

ALFRED M. PETER