tary-Treasurer; and I. A. Updike, of Randolph-Macon College, *Assistant Secretary.* New members of the council are: C. E. Myers, of the State Board of Education; Preston Edwards, of Sweet Briar College; and Marcellus H. Stow, of Washington and Lee University.

The new officers of sections are as follows:

Astronomy, Mathematics and Physics: Chairman, Alexander Vyssotsky, of the University of Virginia; *Secretary,* F. B. Haynes, of the Virginia Polytechnic Institute.

Biology: Chairman, Bruce D. Reynolds, of the University of Virginia; *Sub-Chairman,* J. G. Harrar, of the Virginia Polytechnic Institute; *Secretary,* Lena B. Henderson, of Randolph-Macon Woman's College.

Chemistry: Chairman, W. J. Frierson, of Hampden-Sydney College; *Secretary,* William G. Guy, of the College of William and Mary.

Education: Chairman, John Alex Rorer, of the University of Virginia; *Secretary,* Paul G. Hook, of Clifton Forge.

Engineering: Chairman, Albert H. Cooper, of the Virginia Polytechnic Institute; *Secretary,* D. H. Pletta, of the Virginia Polytechnic Institute.

Geology: Chairman, E. R. Casto, of Emory and Henry College; *Vice-Chairman,* E. C. H. Lammers, Washington and Lee University; *Secretary,* William M. McGill, of the Virginia Geological Survey.

Medicine: Chairman, Carl C. Speidel, of the University of Virginia; *Secretary,* Guy W. Horsley, of Richmond.

Psychology: Chairman, Richard H. Henneman, of the College of Willian and Mary; *Secretary,* William M. Hinton, of Washington and Lee University.

The meeting next year will be at the Randolph-Macon Woman's College, Lynchburg, Virginia, and in 1941 at the Medical College of Virginia, Richmond, Virginia.

E. C. L. MILLER,
Secretary

THE KENTUCKY ACADEMY OF SCIENCE

THE twenty-sixth annual meeting of the Kentucky Academy of Science was held at Murray State Teachers College, Murray, Ky., on April 28 and 29. The principal address, on "Science and Human Mores," was given by the president, Dr. W. R. Allen.

Fifty-four papers were presented in six divisional meetings. Two divisions, the Kentucky Association of Physics Teachers and the Louisville Astronomical Society, met in joint session. A feature attraction at one of the two meetings of the Division of Biological Sciences was the color film showing "Animal Life in the Kentucky Mountains," made and given by W. A. Welter, of Morehead, Ky.

An annual cash award of $50.00 for five successive years has been placed at the disposal of the academy by Mr. and Mrs. Fain W. King, Wickliffe, Ky. This award is to go to the individual presenting the best and most original paper at the annual meeting. The recipient of the award for 1939 remains to be determined.

On Saturday, April 29, after a final general session at Murray, the academy was the guest of Mr. and Mrs. Fain King, at the "Ancient Buried City" at Wickliffe. This is an excavation of Moundbuilder ruins and burials on a bluff overlooking the Mississippi.

Newly elected officers for 1939–1940 are: *President,* A. W. Homberger, University of Louisville; *Vice-President,* Chas. Hire, Murray State Teachers College. Reelected were: *Secretary,* Alfred Brauer, University of Kentucky; *Treasurer,* Wm. J. Moore, Eastern Teachers College; *Representative* of American Association for the Advancement of Science on Council, A. R. Middleton, Louisville. *Councilor to Junior Academy,* Anna A. Schnieb, Richmond.

ALFRED BRAUER,
Secretary

SPECIAL ARTICLES

THE EFFECT OF CERTAIN CHEMICALS ON THE HATCHING OF MOSQUITO EGGS

IN a study of the factors affecting the hatching of mosquito eggs it was found that only 2 per cent. of the eggs of *Aedes vexans* Meig. and *Aedes aldrichi* Dyar and Knab would hatch when flooded with unmodified tap water or with water from the Columbia River. Since eggs of these species deposited on the soil among fallen leaves and grass of cottonwood and willow flats bordering the Columbia River hatch readily when these areas are flooded, it was thought that certain chemicals dissolved from vegetation might provide the necessary stimulus.

Experiments conducted to verify this idea showed that tap-water infusions of dry cottonwood leaves, willow leaves and grass gave consistently larger hatches than either tap or river water alone. Fallen leaves 3 to 6 months old which had dried at room temperature were used in making the infusions. The leaves were strained out with a coarse cloth before the liquid was applied to the eggs. Infusions made with green leaves also caused hatching. Eggs gathered in August and flooded with 2-hour infusions representing 2 or 3 milligrams of leaves per cubic centimeter produced the largest hatches. The egg-hatching stimulant was present in these infusions in small quantities within 10 minutes after the leaves were flooded at room temperature and reached its most effective strength in from 1 to 2 hours.

More extensive tests were made with eggs gathered

in January and flooded after they had been kept at room temperature for 10 days to bring them out of their winter dormant condition. These eggs gave maximum hatches with infusions made from 10 milligrams of dry willow leaves per cubic centimeter of water. With infusions of this strength 80 per cent. of the eggs of both species hatched. The percentages of hatch for the two species showed close correlation at all strengths tested.

Preliminary tests with the eggs of *Aedes dorsalis* Meig. showed that these eggs also require the hatching stimulant supplied by leaves and grass. In tests with *Theobaldia incidens* Thomson, *Culex pipiens* L. and *Anopheles punctipennis* Say the eggs of all three species hatched readily in unmodified tap water. The eggs of *Theobaldia, Culex* and *Anopheles* are laid directly on the water, whereas those of the three species of *Aedes* tested are laid on the soil and hatch when flooded by rising rivers, high tides, etc.

In an effort to determine the nature of the egg-hatching stimulant, a number of organic chemicals and inorganic chemical elements necessary for plant and animal growth were tested individually and in combination. These did not cause hatching. However, it was shown that the stimulant was present in oats, milk and beef liver.

Pantothenic acid,[1] a recently discovered growth stimulant which is believed to be present in all living cells, occurs abundantly in liver, milk and yeast. The addition of infinitesimal amounts of the acid produces a remarkably stimulating effect on the growth of various types of plants and single-celled animals. The effects of this acid were therefore tested on the eggs in a medium composed of several chemicals in which the acid was produced by yeast. It was found that asparagine, one of the ingredients of the medium, caused the eggs to hatch and that potassium phosphate, another ingredient, acted to increase this hatch. As pantothenic acid was not available except in solution with these two chemicals, its effect could not be definitely determined, but it appeared to have no stimulating action. Solutions containing about 1 milligram of asparagine and 0.5 milligram of potassium phosphate per cubic centimeter of tap water produced the largest hatches, 77 per cent. of the eggs of *Aedes vexans* and 42 per cent. of those of *Aedes aldrichi* eggs.

Six amino acids were found which were stimulating to the eggs. These are asparagine, glycocoll, alanine, cystine, leucine and aspartic acid. The first two were most effective. Hatches were increased with both these materials when calcium or sodium phosphate was added. Putrecine, urea and potassium acetate also caused hatching.

It seems probable that the amino acids and proteins present in vegetation may be the stimulants which cause the eggs to hatch when flooded in nature. Further research work on the composition and action of the egg-hatching stimulant, the species affected by it and its relation to mosquito egg hatching in nature are under way.

C. M. GJULLIN
W. W. YATES
H. H. STAGE

BUREAU OF ENTOMOLOGY AND
PLANT QUARANTINE,
U. S. DEPARTMENT OF AGRICULTURE

[1] These tests were made possible through the cooperation of Dr. Roger Williams, of the Chemistry Department of Oregon State College, who kindly supplied the acid and assisted with the tests.

AN OBSERVATION SUGGESTING THE PRESENCE OF A GONADOTROPIC HORMONE IN ROYAL JELLY[1]

THIS preliminary note presents evidence suggesting that extracts of royal jelly injected subcutaneously into immature female rats produce precocious development of the ovaries.

Royal jelly is an essential factor in the life of a colony of bees. It is secreted by glands in the mouth of the worker bee. It is fed to the queen while she is laying eggs and to all new-born larvae for the first three days of their lives; from then on only those larvae destined to become queens receive this special diet; queen larvae receive this food during their whole larval stage. All other female larvae, that is, those destined to become workers, are fed on nectar and pollen, after the first three days. These two types of females are strikingly different. The worker takes twenty-one days to develop from egg to adult, the queen sixteen; yet the queen bee is nearly twice as large as the worker. The worker can lay eggs only under extraordinary circumstances; the queen lays eggs steadily for as long as three or four years. The ovaries of the worker are infantile, while those of the queen are large. The worker exhibits many maternal instincts, the queen none. The fact that all these differences apparently could be produced simply by the giving or withholding of royal jelly led to the deduction that royal jelly might contain an active principle that would behave like a gonadotropic or growth hormone.

Hill and Burdett,[2] working on rats kept on a "vitamin E free diet," reported correction of this deficiency by the feeding of royal jelly. Mason and Melampy[3] later repeated this work and were unable to verify it

[1] From the Departments of Pediatrics and Surgery, Harvard Medical School, and The Children's Hospital, Boston.

[2] L. Hill and F. F. Burdett, *Nature*, 130: 540, 1932.

[3] H. K. Mason and R. M. Melampy, *Proc. Soc. Exp. Biol. and Med.*, 35: 459, 1936.