Walter B. Cannon, Dr. James Howard Means, Dr. S. Burt Wolbach and Dr. Katherine R. Drinker, executive secretary, has been appointed to administer this fund and to select books and monographs to be included in a series entitled "Harvard University Monographs in Medicine and Public Health."

THE American Dental Association this year appropriated $23,000 for investigation and research on dental problems. This is an increase of $6,000 over last year. Of this increase, $5,000 will go toward the establishment of a fellowship in dental research at the National Institute of Health.

THE Hooker Scientific Library, conducted as a nonprofit institution by Central College, has inaugurated a new service for chemists who lack convenient access to chemical reference works. For a nominal fee the library will send data on any question which can be answered by reference to a chemical manual, dictionary or index. Inquiries taking too much time for the low fixed rate will be answered at a proportionately higher cost, for which estimates can be rendered in advance. Full details will be sent in response to requests addressed to Hooker Scientific Library, Central College, Fayette, Mo.

SIXTY professional gardeners are registered this term in the two-year Science Course offered by the New York Botanical Garden. The first session was held on October 7 and the classes will continue through December 23. These are the largest classes in the history of this course, which was inaugurated in 1932. Dr. B. O. Dodge, plant pathologist, lectures on Plant Pests and Diseases, and Dr. F. W. Kavanagh on Soils and Fertilizers. In addition to the student gardeners at the Botanical Garden, the class includes employees of the New York City Park Department, professional gardeners who were registered last year in the practical course, and several employees of florists and nurserymen, as well as gardeners on estates in and around New York. Some of the students come more than sixty miles to the class each week. In the two-year course in practical gardening which meets every Thursday evening for a study of Cultivation of Trees and Shrubs under P. J. van Melle, of Poughkeepsie, there are about ninety students in attendance. They include a number of men and women aiming to develop their home grounds, professional gardeners desiring further instruction in their field, and teachers, lawyers, lecturers, executives and other business people.

DISCUSSION

SOME ADDITIONAL OBSERVATIONS ON SLUMPING AND GULLY FORMATION

SINCE slipping is important to the engineer, landscape architect and soil conservationist and since it may occur under somewhat different circumstances, we are recording some additional observations of this phenomenon which have occurred under different conditions than those previously recorded for the hillside in question.[1] The present observations are significant because a rain gauge located about 75 feet away from the slip makes it possible to obtain exact data relative to the rainfall conditions where slipping has occurred and because the conditions of cover have changed since slipping was last observed on the hillside.

During the night of October 6, 1936, a mass of 170 cubic feet of material slumped 3 feet down the west slope of what is known as Flag Pole Hill on the campus of Muskingum College in New Concord, Ohio. For a period of 12 hours, beginning in the afternoon of October 6, 1939, a rain gauge about one mile south of New Concord indicated that 4½ inches of rain had fallen, most of it—perhaps 3 inches—fell in the space of one hour. Considerable gullying occurred on the hillside during this period.

[1] Robert H. Mitchell, SCIENCE, 84: 2184, 420, November 6, 1936.

The slope was immediately graded and sown to grass and pine trees were planted below the slipped area up to the top of the clay upon which the slipping had occurred. Until recently no further slumping or gullying was noted.

Observation of this hill was again made on April 22, 1940, after a week of almost daily rainfall, during which time the rain gauge on top of the hill registered a total of 4.7 inches. At this time a roughly triangular-shaped area had slipped down the hill from 2 to 3 feet. The slip took place along three planes, one extending in a northwest-southeast direction for a distance of 30 feet, the southeast or uphill edge of which joined another slip plane extending for 10 feet in a north-south direction. This plane was joined at the south end by a plane extending southwest for a distance of 25 feet. From the south end of the north and south trending plane a smaller plane having a displacement of a few inches extended southward for a distance of 10 feet.

The material which had slipped down hill formed a roughly triangular terrace-like area 5 feet high and 30 feet across, tapering to the southeast and southwest for a distance of 20 feet. Several of the small pine trees, 3 or 4 feet in height, had been tilted and one had been pushed over and partly covered by the slipped material.

Several small terrace-like areas whose fronts were

4 to 5 inches high occurred on the slope above the main terrace, suggesting multiple slipping. This idea is strengthened by the fact that a number of wrinkles resembling small overturned folds occurred on the surface of the large terrace.

Extending southward from the base of the main slip for a distance of 36 feet creep had occurred, forming a terrace whose front was 2 feet high and 6 feet wide. The uphill side of this creep was scarcely discernible except for the steepened slope, since the grass was not seriously disturbed. Gullying on the slope was negligible.

The slip took place on a clay layer about 11 feet above the horizon of the Harlem coal. The material above the clay became saturated with water after a week of almost daily rain. The rain gauge 75 feet above the slip showed the following rainfall record: April 11–12, 1.2; April 15, 0.5; April 16, 0.2; April 17–18, 0.7; April 19–20, 3.3.

When the area was previously studied in 1936 the hillside had just been graded and prepared for grass. No trees had been planted on the slope. At that time 4.5 inches of rain fell in less than 12 hours. The recently observed slip occurred at the same location and on the same clay layer, but after the hillside was well covered with grass and the lower slope planted to trees up to the clay layer and after 4.7 inches of rain had fallen during a week's time. At both times the same clay layer was responsible for the slip after about the same amount of rain had fallen.

The significant difference in conditions under which slumping took place in 1936 and recently lies in the fact that the slope in the first case had no cover of any sort, while in the recent case it was well covered with grass. Another notable difference was in the nature of the rainfall; in 1936 the rainfall was concentrated into a few hours, while in the recent situation about the same amount of rain fell but it was distributed over a period of one week.

Since the quantity of rainfall in both cases was similar we might conclude that slumping may take place in certain areas underlain by clay when a condition of sufficient saturation is reached, whether the slope is covered or not. It is also significant that gullying has been checked by a good cover of grass and trees. Grass and small trees, however, were not sufficient protection against slipping when the condition of saturation was reached. It, therefore, becomes apparent that in this and similar situations the engineer, landscape architect and soil conservationist can not depend on cover alone for protection from slipping.

The fold-like wrinkles which occur on the surface of the terrace formed of slipped material in several cases had become arcuate when they occur just above a tree. The convex side of the arc is on the uphill side away from the tree. This condition indicates that the trees had a tendency to hold the slip. Since some of the trees near the toe of the slip had been moved and one had been overturned it is doubtful that trees would have entirely prevented slipping, though had they extended above the slip area, it is possible that they would have modified the slip and permitted less movement.

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MATING AND OVIPOSITION IN THE PACIFIC COAST TREE TOAD

IN connection with studies on the biology of amphibia the writer has had opportunity to make certain observations on the mating behavior of the Pacific Coast tree toad (*Hyla regilla*). Since there is apparently no previous account of this in the literature, the following may be of interest.

The beginning of the breeding season of *Hyla regilla* is marked by the congregation of large numbers of vociferous males at transient rain pools and more permanent bodies of water. The female does not enter the water until ready to deposit the eggs; the entry is ordinarily made in late afternoon or early evening, and mating and egg laying completed by the following morning. Since the females enter singly or in small groups, the superior number of males makes probable an immediate mating. By continued observation of hylas collected in the San Francisco Bay region, the details of amplexus and oviposition in this species have been learned.

A preliminary period of clasping is usual before laying begins. In the laboratory this varies from 4 to 24 hours, while in nature it is probably not longer than 4 to 9 or 10 hours. The amplectic posture is of the pectoral type with the male dorsal to the female. The forelegs of the male, placed directly behind those of the female, strongly constrict her in that region. Ordinarily there is no contact between the bodies of the pair behind a point just posterior to the pectoral girdle of the male. The hind legs of the male are folded as if in a sitting position and usually do not touch the female except when directly employed.

Insemination occurs at the moment of egg extrusion. The male brings his cloacal aperture close to that of the female, discharges a quantity of transparent semen, and with a quick, firm extension slides his feet posteriorly over the sides and hips of the female, then deftly retracts to his normal position. Simultaneous with this foot action, the female extrudes a clutch of eggs into the cloud of sperm about her cloaca. Some time before releasing an egg mass the female often