times as abundant as that species, and there is no obstacle to crossing, then the great majority of *S. gloveri* will mate with the wrong species, and the females so produced will be sterile. The males will usually mate with *S. cecropia*. Thus *S. gloveri* will disappear, but the critical examination of numerous specimens should show traces of *S. gloveri* ancestry. I offer this note at the present time because it is important that all entomologists living in the Rocky Mountain region should be aware of what is going on, and should collect specimens and make observations throwing light on a case which may well become classic in the annals of biology.

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## THE RING STRUCTURE OF THYMIDINE

THE detailed structure of the nucleic acid molecule can not be formulated without knowledge of the ring structure of the constituent nucleosides, which, for nucleosides of the desoxyribose type, has not yet been established. In the case of ribose nucleosides, the furanoside ring structure has been shown by two methods, one based on methylation of the nucleosides, the other on the formation of a mono-trityl derivative. It was found that in the pure mono-trityl derivative, the trityl group is located on the primary alcoholic group of the sugar.

The latter method has now been applied to the study of the ring structure of thymine-2-desoxyriboside. A pure mono-trityl derivative was obtained and thus the conclusion is warranted that the desoxyribose nucleosides likewise have the furanose structure.

The properties of mono-trityl thymidine are as follows: m.p. 125°; $[\alpha]_D^{24} = +11.4°$ (in acetone).

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# SOCIETIES AND MEETINGS

## THE TENNESSEE ACADEMY OF SCIENCE

THE thirty-fifth meeting of the Tennessee Academy of Science was held in Nashville, Tennessee, at Vanderbilt University, on Friday and Saturday, November 30 and December 1, 1934. In cooperation with the academy, its affiliated societies, the Tennessee Ornithological Society and the Tennessee Barnard Astronomical Society, held their annual meetings and contributed papers to the program.

Classification of the papers shows: Anatomy 2, astronomy 2, bacteriology 1, biochemistry 3, biology 9, chemistry 2, forestry 2, geology 2, meteorology 1, ornithology 1, pathology 1, psychology 2, physics 2, physiology 2. The average attendance at the meetings was about fifty, but more than one hundred were present to hear the paper by William R. Amberson, of Memphis, on "Haemoglobin-Ringer, a New Substitute for Blood in Mammals," which was illustrated with motion pictures.

Dr. A. Richard Bliss, director of the Reelfoot Lake Biological Station, made a report on investigations at the station last summer. Secretary McGill made a report which showed a decrease of 10.6 per cent. in the membership of the academy since 1931 and an increase of more than 100 per cent. in the number of members that are fellows of the American Association for the Advancement of Science.

On Friday evening, Dr. Otto Struve, director of the Yerkes Observatory of the University of Chicago, Mrs. Struve and the president of the Barnard societies of Chattanooga and Knoxville were the guests at the academy dinner at 6 P. M. in the Andrew Jackson Hotel. At 8 P. M. Dr. Struve delivered the academy address in the auditorium of the War Memorial Building on the subject, "Modern Conceptions of the Universe."

The officers of the academy elected for the year 1935 are:

George M. Hall, professor of geology, University of Tennessee, Knoxville, *President;* Dr. William Litterer, Tennessee state bacteriologist, Nashville, *Vice-President;* John T. McGill, professor of organic chemistry, emeritus, Vanderbilt University, Nashville, *Secretary-Treasurer;* Jesse M. Shaver, professor of biology, George Peabody College, Nashville, *Editor of the Journal;* Miss Eleanor Eggleston, assistant librarian, Vanderbilt University, Nashville, *Librarian.*

JOHN T. MCGILL,
*Secretary*

## THE SECOND QUADRENNIAL CONGRESS OF THE MATHEMATICIANS OF THE SLAV COUNTRIES

LAST summer there took place in Europe four quadrennial regional mathematical congresses—in Leningrad (end of June), Stockholm (mid-August), Athens (early September) and the congress of the Slav countries in Prague (September 23–28). The undersigned had the opportunity of attending the first and fourth, the last as delegate of the National Academy of Sciences. The strongest impression received was regarding the seriousness of the consequences of increasing governmental interference in all domains, science not excluded. Thus, for various political reasons, a num-

ber of the closest neighbors of Czechoslovakia had hardly any representatives at Prague. The organizing committee, and particularly its prime mover, Dr. M. Valouch, did their best to counteract this tendency and in so doing they had as good success as could be expected. There were a number of foreign delegates, and the congress had a strong international tinge. There were very pleasant social activities and numerous opportunities to get together scientifically and otherwise. The congress had eight sections devoted to the principal branches of mathematics with 111 individual communications. There were also a number of more extended lectures by E. Cech ("On Duality Theorems in Topology"), V. Jarnik ("On Geometrical Number Theory"), Sierpinski (Superpositions of Functions, this address being read by Professor Cech owing to the absence of the lecturer), Menger ("Metrical Geometry") and others.

The organizers of the congress can not be praised too highly for their endeavors. It is only through such meetings that one may hope to nullify to some extent the ever-growing scientific autarchy the world over, the most serious menace to science at the present time.

S. LEFSCHETZ

PRINCETON, N. J.

# SCIENTIFIC APPARATUS AND LABORATORY METHODS

## THE CULTIVATION OF ENDAMOEBA HISTOLYTICA IN ERLENMEYER FLASKS

WHEN large numbers of *Endamoeba histolytica* are needed in culture, either for the inoculation of a series of experimental animals or for the preparation of antigen for the complement fixation test, the use of test-tube cultures is both expensive and time-consuming. A single rich culture in a test-tube is sufficient for the inoculation of only one kitten, and in testing the degree of pathogenicity of a strain of *E. histolytica* it is advisable to use at least twenty kittens. In the preparation of antigen several hundred tubes of rich cultures are required. We have found that much labor and some expense can be saved by growing the amoebae in Erlenmeyer flasks.

Probably any of the accepted media for cultivating *E. histolytica* may be employed in this way. We have used the medium recommended by Dobell and Laidlaw[1] consisting of whole egg diluted with Ringer's solution, overlaid with horse serum diluted with six parts of Ringer's solution and enriched with sterile rice flour.[2] We have used 250 cc flasks for cultivating amoebae for our animal inoculations and have found that one flask provides approximately the same number of amoebae as twenty-five to thirty test-tubes of 25 cc capacity. In the preparation of antigen we have used 500 cc flasks and have found that twenty-five to thirty flasks provide as much antigen as 350 to 400 test-tubes.

In the test-tube containing slants of coagulated egg-Ringer medium the amoebae multiply only in the rice flour and bacterial sediment at the bottom of the slant, whereas in a flask they have the whole egg-Ringer surface at the bottom to multiply upon. Approximately 15 cc of egg-Ringer mixture are required in a 250 cc flask, and 25 cc in a 500 cc flask. This covers the bottom of the flask in a thin layer. The egg-Ringer is coagulated by placing the flasks in a pan of boiling water, in an Arnold sterilizer or in the autoclave heated by live steam without pressure. The flasks must be watched to avoid overheating, which causes the formation of bubbles. A smooth base is desirable in order to provide the best surface for growth. After coagulation the flasks are autoclaved and placed in the refrigerator until needed. The serum-Ringer and rice flour are added a few days before use, and are tested for sterility by incubating for at least forty-eight hours before inoculation. Approximately 75 to 85 cc of horse-serum-Ringer are required for a 250 cc flask and 125 to 150 cc for a 500 cc flask. This provides a depth of fluid over the egg-Ringer base of about seven eighths of an inch. Approximately 0.25 cc of sterile rice flour is added to each flask. For inoculation with *E. histolytica* approximately 1 cc of a rich culture is transferred to each flask. This will usually give excellent growth in 48 to 72 hours. As with test-tube cultures a flask occasionally fails to produce good growth for some unexplained reason, but the chance of failure is less with flasks than with test-tubes.

The advantages of the flask method of cultivation are a saving in time in preparation of media and washing of glassware, a saving in glassware and a saving in media. A 250 cc flask requires only one fifth as much egg-Ringer and only three fifths as much horse serum-Ringer as twenty-five test-tubes. Furthermore, the chance of contamination in handling fewer containers is greatly reduced, owing to the reduction in the number of transplants. Again the chances for cultural variations in individual tubes is eliminated when constant conditions are desired in the inoculation of a series of animals. There is also a considerable reduction in the amount of rice flour used, which is a distinct advantage in the preparation

[1] C. Dobell and P. P. Laidlaw, *Parasitology* 18: 283–318, 1926.

[2] L. R. Cleveland and J. Collier, *Amer. Jour. Hyg.* 12: 606–613, 1930.