these plants and of the mosquitoes breeding among them have, as yet, been devised. The detailed descriptions of the sanitary methods used for the control of malaria in the Zone will be of particular interest to students of malaria. Chief reliance has been placed on screening and on reducing mosquitoes by larvicides, by drainage and by filling. The situation among the troops stationed on the Canal Zone is noteworthy. Although malaria has declined among them since 1911, when they were first stationed on the Zone, the morbidity rates are higher than among the civilian employees of the Canal or among U. S. troops stationed elsewhere. Inasmuch as the barracks are located in well-sanitated areas, the authors believe the higher rate to be due to infection at night during official and unofficial visits in the Republic of Panama, in unsanitated areas of the Zone and, even to a certain extent, in sanitated areas of the Zone.

The entire book is written from the standpoint of the most up-to-date conception of malarial control and leaves little room for criticism. One disappointing feature is the untrustworthy nature of the older records—which is obviously no fault of the authors. The book, besides supplying a much needed source book on Panama, is another demonstration of the difficulty of controlling malaria in the tropics at a reasonable cost and the imperative need of further research. It is to be hoped that the various agencies carrying on research in the Republic of Panama and the Canal Zone will continue their excellent work.

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UNIVERSITY OF CHICAGO

SOCIETIES AND MEETINGS

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE thirty-eighth annual meeting of the North Carolina Academy of Science was held at Wake Forest College, N. C., on May 5 and 6. About 250 members and visitors attended the meeting. Seventy-three papers and several exhibits made up the program.

The general section met the first day with the president, John W. Lasley, Jr., presiding. This meeting consisted mostly of the reading of papers of general interest and continued, except for the luncheon hour, till 4:30 P.M., when the annual business meeting was held.

At the business meeting reports of the various committees were called for. The executive committee reported the election of 33 new members and the reinstatement of 6 former members. The losses in membership were reported as follows: from non-payment of dues, 12 members; from resignation, 2 members; from death, 1 member. The committee announced the acceptance of the invitation from Davidson College to hold the thirty-ninth annual meeting at Davidson, N. C., in 1940. The committee also recommended that H. B. Arbuckle, department of chemistry, Davidson College, and W. C. Coker, department of botany, the University of North Carolina, be made life members.

The committee on high-school science reported that in the essay contest sponsored by the academy, first prize for 1939 had been awarded to Alfred Gallant, of the Central High School, Charlotte, N. C., for his essay entitled "Quartz Crystals for Radio Transmitters." The committee also reported the nomination of Ralph Kiser, Central High School, Charlotte, and Miss Eugenia Cox, Old Town High School, Winston-Salem, for junior membership in the American Association for the Advancement of Science.

In the report of the conservation committee resolutions were presented as follows: (1) that the Conservation Committee of the North Carolina Academy cooperate with the Virginia Academy "to arrange and carry out such cooperation as may be of mutual benefit to the two academies in the proposed study of the Dismal Swamp Area"; (2) that the two areas which make up the "Primeval Forest" at Highlands, N. C., be preserved and that, therefore, the U. S. Forest Service and the National Forest Reservation Commission be urged to acquire this tract immediately and add it to the Nantahala National Forest.

The committee of the American Association for the Advancement of Science research grant reported that the grant for 1939 had been awarded to F. H. McCutcheon, department of zoology, North Carolina State College, for use in his "investigation of possible experimentally induced seasonal variations in the oxygen affinity of hemoglobin in mammals."

The committee on the academy medal reported that the 1939 medal had been awarded to F. H. McCutcheon, department of zoology, North Carolina State College, for his paper entitled "The Respiratory Mechanism of the Grasshopper."

The following officers of the academy were elected for 1940: *President,* H. L. Blomquist, Duke University; *Vice-president,* John N. Couch, the University of North Carolina; *Secretary-Treasurer* (three years), Bert Cunningham, Duke University; *Member of the Executive Committee,* Earl H. Hall, Woman's College of the University of North Carolina; *Representative to the Academy Conference and the Council of the A. A. A S.,* Bert Cunningham, Duke University.

After the reading of a memorial report honoring

the late Henry van Peters Wilson, the business meeting adjourned.

At 8:30 P.M. the evening meeting was held with the vice-president, Donald B. Anderson, presiding. After a brief address of welcome by Dean Bryan, of Wake Forest College, President John W. Lasley, Jr., gave his retiring address entitled "The Relation between Mathematics and the Sciences."

On Saturday afternoon the academy met in the following sections: General, Botany, Mathematics, Physics, Zoology, The North Carolina Section of the American Chemical Society and the High School Science Teachers.

The following officers were elected by the various sections:

ZOOLOGY SECTION

Chairman: J. P. Givler, Woman's College, University of North Carolina.
Secretary: Z. P. Metcalf, North Carolina State College.

MATHEMATICS SECTION

Chairman: T. F. Hickerson, University of North Carolina.
Secretary: J. A. Greenwood, Duke University.

PHYSICS SECTION

Chairman: H. E. Fulcher, Davidson College.
Secretary: F. W. Lancaster, North Carolina State College.

NORTH CAROLINA SECTION OF THE AMERICAN CHEMICAL SOCIETY

Chairman: E. C. Markham, University of North Carolina.
Vice-Chairman: W. E. Jordan, North Carolina State College.
Secretary-Treasurer: Ivan D. Jones, North Carolina State College.

HIGH SCHOOL SCIENCE TEACHERS

Chairman: Clifford Beck, Salisbury, N. C.
Secretary: Harry MacDonald, New Bern, N. C.

H. L. BLOMQUIST,
Secretary

SPECIAL ARTICLES

CHEMICAL COMPOSITION OF THE TUMOR-PRODUCING FRACTION OF CHICKEN TUMOR I

THE agent transmitting chicken tumor I can be separated from tumor extracts quantitatively, and partially purified, by a method of centrifugation at high speed.[1] The material prepared in this manner is found to be composed of small granules, visible in the dark-field microscope, approximately 70 mμ in diameter,[2] with a corresponding particle weight of about 2.3×10^{-16} grams and a molecular weight of *ca.* 140 millions.[3] The tumor-producing power of ordinary tumor extracts varies a great deal, and only preparations exhibiting high activity were retained for this study. Tests were made by injecting the freshly prepared material intracutaneously in adult hens. Tumors were usually present after 8 days and the final results were recorded not later than 18 days after injection. In these experiments, the smallest dose to produce actively growing tumors was about 4×10^{-13} grams, in terms of dry weight, of the purified substance. The relation between this weight and the weight of the individual particles indicates that the minimal active dose contained approximately 2,000 of the elementary granules.

The purified tumor fraction contains 8.5 to 9.0 per cent. nitrogen, a confirmation of previous analysis, and 1.5 per cent. phosphorus. Tests for proteins are positive. A typical Feulgen reaction, characteristic of thymonucleic acid, is absent. However, an intense reaction is obtained with the Schiff reagent, which suggests the presence of aldehyde groups in the material. Tests for pentoses are strongly positive.

Previous work has shown that the purified tumor fraction could be decomposed into two chief components, namely, a lipoid fraction and a protein fraction.[4] The chemical and physical properties of these fractions have been investigated further, and the results of this study is the matter of the present note.

The lipoid material associated with the tumor-producing fraction of chicken tumor I, and extracted by ether, had been found to represent about 24 to 26 per cent. of the whole substance.[4] The results of a somewhat more vigorous extraction by treating the dry substance with ether-alcohol and chloroform, at room temperature, indicates that at least 35 per cent. of the total dry weight of the purified material is lipoid in nature. This complex lipoid material contains about 2.4 per cent. phosphorus and 1.6 per cent. nitrogen.

Two main fractions can be separated from it. (*a*) One fraction is soluble in cold acetone. At room temperature it is a soft, yellow-colored mass which crystallizes in narrow plates arranged in rosettes. This fraction contains about 1.8 per cent. phosphorus and 0.9 per cent. nitrogen, figures which suggest that about half of the material may be in the form of phospholipids. The test with the Schiff reagent is negative or weakly positive. (*b*) The second fraction, which is the most abundant, has the general composition and

[1] J. C. G. Ledingham and W. E. Gye, *Lancet*, 1: 376, 1935; C. R. Amies, *Jour. Path. Bact.*, 44: 141, 1937; A. Claude, *Jour. Exp. Med.*, 66: 59, 1937, *Am. Jour. Cancer*, 30: 742, 1937, and SCIENCE, 87: 467, 1938.

[2] W. J. Elford and C. H. Andrewes, *Brit. Jour. Exp. Path.*, 17: 422, 1936.

[3] A. Claude, *Jour. Exp. Med.*, 66: 59, 1937; K. G. Stern and F. Duran-Reynals, SCIENCE, 89: 609, 1939.

[4] A. Claude, *Jour. Exp. Med.*, 61: 41, 1935; SCIENCE, 87: 467, 1938.