

PROCEEDINGS OF THE FOURTEENTH ANNUAL
MEETING OF THE ASSOCIATION OF
SOUTHEASTERN BIOLOGISTS

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The Fourteenth Annual Meeting of the Association of Southeastern Biologists was held at the University of North Carolina, Chapel Hill, North Carolina, on April 16-18, 1953. The Southeastern Section of the Botanical Society of America and the Southern Appalachian Botanical Club met with the Association.

On April 16 at 7:00 p.m., Dr. George F. Gant of the Southern Regional Education Board gave a brief outline of the organization of the Board, discussed its interests, and answered questions concerning the regional marine biology station program. At 8:15 p.m., a symposium entitled "Biology Advances in the Southeast" was held with Dr. S. L. Meyer, National Research Council, presiding. Four speakers discussed the contributions and the interests of their organizations: Dr. H. H. Plough for the Atomic Energy Commission, Mr. Ernest Allen for the National Institutes of Health, Captain C. W. Shilling for the Office of Naval Research, and Dr. Fernandus Payne for the National Science Foundation. The meeting was then opened for questions from the audience.

On April 17 and 18, 79 papers were presented by members. There were eight sections with varying numbers of papers: Biology (12), Ecology (10), Demonstration (3), Botany (13), Biology (10), Zoology (13), Genetics and Cytology (10), and Physiology (8). Thirty-five institutions were represented by the authors of the papers.

A short program was given on April 17 on biology teaching in order to inform the membership of what some organizations are doing in this field. Dr. G. W. Nace discussed the program of the Committee on Developmental Biology of the National Research Council relative to curricula and teaching of developmental biology. Dr. F. R. Hunter reviewed the discussions on biology and zoology textbooks which took place at the meeting of the Association for the Advancement of Science in December, 1952. Dr. Jonathan J. Westfall outlined the program and problems of the Committee on the Teaching of Botany of the Botanical Society of America. In the discussion which followed the members of ASB indicated they would be interested in having discussions on biology teaching and curricula at the next annual meeting of the Association.

One hundred ninety-nine people attended the annual banquet served on the evening of April 17 at the Carolina Inn. Dr. H. P. Sturdivant, Retiring President of ASB, was toastmaster. President Gordon Gray of the University of North Carolina, gave the address of welcome to which President Margaret Hess of ASB responded. Dr. Sturdivant,

chairman of the awards committee, announced the recipients of awards. Dr. Herman Silva, Knoxville, Tennessee, was awarded the Phipps and Bird Research Fellowship of \$200 for study at the Mountain Lake Biological Station during the summer of 1953. The ASB Research Prize of \$100, sponsored by the Carolina Biological Supply Company, was awarded to Drs. D. L. Billen, G. E. Stapleton and B. L. Strehler of Oak Ridge National Laboratory for their paper, "Postirradiation release of adenosine triphosphate from *Escherichia coli* B/r." Honorable mention went to Drs. H. E. Wheeler and C. H. Driver of Louisiana State University for their paper, "Genetics and cytology of a mutant, dwarf-spored *Glomerella*." Dr. John A. Fincher, chairman of the meritorious award committee, announced that Dr. Orland E. White of the University of Virginia was the recipient of the meritorious award and prize of \$100 which is sponsored by the Southern Scientific Company. The annual address was given by Dr. L. C. Dunn, Professor of Zoology and Director of the Institute for Study of Human Variation, Columbia University. His subject was "Variety and Biological Progress."

The executive committee held three meetings and took the following action: (1) voted to have an interim meeting of executive committee in Oak Ridge, Tennessee, July 24-25, 1953; (2) authorized the President to appoint a committee to study revision of constitution (E. E. Byrd, chairman, Margaret Hess, C. S. Shoup, and H. K. Wallace); (3) recommended that 1953 nominating committee obtain consent of nominees prior to placing names on ballot and that a single slate of officers be nominated and announced prior to the business meeting; (4) voted to continue membership drive; (5) recommended that Dr. B. D. Reynolds serve as Representative of ASB on Council of AAAS from January, 1953, to January, 1955; (6) approved fee of \$0.50 per registrant at the 1953 annual meeting; (7) recommended that President appoint committee to study the matter of commercial exhibits at annual meetings (H. R. Totten, chairman, H. H. Hobbs and J. A. Fincher); (8) suggested that Secretary include short biographies of deceased members in published proceedings of annual meetings; (9) voted to recommend affiliation of ASB with American Institute of Biological Sciences (Dr. T. C. Byerly, Chairman of AIBS, discussed the organization with the executive committee at its invitation); (10) received recommendations of Mr. Cecil Wright of Aloe Scientific Company and Mr. L. F. Taylor of Phipps and Bird Company relative to ways in which ASB might raise funds for fellowships and/or visiting professorships.

The annual business meeting of ASB was held on April 18. The Secretary reported that 102 persons had applied for membership to bring the total membership to 526. (A detailed Treasurer's report was mailed to the membership just prior to the annual meeting.) President Hess announced that a committee had been appointed to evaluate the meetings and to offer suggestions for improving future meetings. This committee consists of R. B. Platt, chairman, Ruffin Jones and H. H. Hobbs. A motion was made and passed that ASB join the

American Institute of Biological Sciences as an affiliate member. Membership is on a yearly basis and annual dues are \$100.

The following amendments to the constitution were adopted. Article IV, The officers of the Association shall be President, President-elect, Vice-President, Secretary and Treasurer. Article V, Section 2, The Secretary shall keep records of the meetings of the Association and of the membership of the Association. The Treasurer shall keep records of the payment of dues, disburse all funds of the Association, and present at each annual meeting a record of receipts and expenditures for the preceding year. Article VI, The Secretary and the Treasurer shall each be elected for three years and shall each be eligible for reelection. They shall not be elected in the same year.

A proposed amendment permitting election of undergraduate students to membership was rejected. The proposed amendment on emeritus membership was referred to the executive committee for further study. A preliminary report of the publications committee was accepted and referred to the executive committee. The publications committee (Clara Hamilton, chairman, George Kent, Jr., and Hiden Cox) was requested to continue their work.

The report of the resolutions committee (R. T. Brumfield, chairman, E. E. Byrd, and M. E. Gaulden) was read and approved. Sincere appreciation was expressed to the following for their contributions to the success of the 1953 meetings: (1) the University of North Carolina, (2) the Committee on Local Arrangements consisting of H. R. Totten, chairman, J. E. Adams, V. A. Greulich, R. E. Coker, M. W. Whittinghill and C. E. Jenner, (3) Miss Marian Seiler, Miss Louise Dalton and the graduate students who helped the local committee, (4) Drs. B. W. Wells, Steve Boyce, C. C. Bookout, H. Blomquist, Paul Kramer and C. F. Korstian for arranging and conducting the field trips, (5) Mrs. H. R. Totten and her committee for arranging the tours of the Chapel Hill Gardens and Mrs. J. N. Couch and her committee for arranging the tea.

The report of the auditing committee (Charles Ray, chairman, and J. C. Strickland) was read and accepted. The report of the nominating committee (H. P. Sturdivant, chairman, J. N. Couch, Ruffin Jones, Martin Young and H. C. Bold) was read. There were no nominations from the floor. The Secretary was instructed to cast a unanimous vote for the following slate of officers: President-elect, H. R. Totten, University of North Carolina; Vice-President, A. V. Beatty, Emory University; Treasurer, J. Paul Reynolds, Florida State University. Elected to serve three-year terms on the executive committee were Gordon Wolcott of United States Public Health Service and Horton H. Hobbs of University of Virginia. John A. Fincher, Howard College, was elected to serve out the unexpired term of J. Paul Reynolds on the executive committee. Bruce D. Reynolds, University of Virginia, will be President of ASB in 1954 and Mary Esther Gaulden, Oak Ridge National Laboratory, will continue as Secretary.

TITLES AND ABSTRACTS OF PAPERS PRESENTED AT THE
FOURTEENTH ANNUAL MEETING OF THE ASSOCIATION
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CAROLINA, APRIL 16-18, 1953

THE ECOLOGY OF THE SPIDERS OF MARITIME DRIFT LINES. Betty Martin Barnes and Robert D. Barnes, *Duke University*. The maritime drift lines at Beaufort, North Carolina were investigated to determine their spider populations and the relationship of those populations to environmental conditions characteristic of the habitat. The drift lines consisted of two types: *Spartina* drift lines, found between the intertidal *Spartina alterniflora* and the supratidal *Spartina patens*, and the drift lines of the sand beaches. The former were characterized by a thick debris which sharply depressed temperature, vapor pressure deficit and evaporation beneath resulting in a stable mesic microclimate. In contrast, the thin drift of the sand beach produced a distinctly xeric microclimate. The xeric and mesic nature of the two types is reflected in each supporting a characteristic but totally different spider population. Investigation of the spider activity showed a distinct nocturnal migration out of the drift at which time the adjacent sand surface and the subdrift environments most closely approximated each other.

THE FLORA OF THE SAVANNAH RIVER OPERATIONS (A.E.C.) AREA. PART I: THE MONOCOTYLEDONS. Wade T. Batson and William R. Kelley, *University of South Carolina*. The Savannah River Operations Area of the Atomic Energy Commission encompasses over 200,000 acres and is located in portions of Aiken, Allendale and Barnwell Counties and bordering the Savannah River in South Carolina. Geographically within the Coastal Plain Province, the area includes an elevation range of from 85 to 400 feet above sea level; the climate is mild, the growing season is relatively long, and the average annual precipitation is about 43 inches. A year and a half of study on the flora of the SRO area has resulted in the collection of approximately 250 species of Monocotyledons, distributed among 24 families and over 100 genera, of which *Panicum* with 37 species, *Cyperus* with 20 species, and *Carex* with 17 species are the largest. The families represented by the largest number of genera are the Gramineae and the Cyperaceae. It is hoped that this study will contribute to the knowledge of the southeastern flora.

THE EFFECTS OF X-IRRADIATION ON INTERKINETIC DEVELOPMENT IN THE MICROSPORES OF *TRADESCANTIA PALUDOSA*. Alvin V. Beatty, *Emory University*. Cuttings of the inflorescences of *Tradescantia paludosa* grown at 30°C. show five distinguishable stages of development from the tetrad stage of meiosis to the first microspore division, each stage having a duration of approximately 24 hours. Using the half-anther technique, controls and material irradiated at 50r per minute for eight minutes were studied to determine the effects of irradiation during these developmental periods. An initial cessation of development occurred in all stages.

CYTOLOGICAL STUDIES ON DURATION OF THE VARIOUS STAGES OF THE FIRST MICROSPORE DIVISION IN *TRADESCANTIA PALUDOSA*. Jeanne W. Beatty, *Emory University*. Flower buds from *Tradescantia paludosa* grown at a constant temperature of 30°C.±.5 were used for this investigation, conducted from May-August. A modified half-anther technique was used to determine the duration of the stages in microspore development from the end of meiosis through the first microspore division, studies having been made from temporary acetocarmine preparations and material fixed in Craf and stained with Heidenhain's iron hematoxylin. The duration of the nuclear cycle from the end of meiosis through the first microspore division was found to be 6½ days: five days in development of the individual microspore, one day in very early prophase of the first microspore division, and 12 hours in all other stages of that division. The duration of each stage from early prophase through

telophase was calculated on the basis of the percent of cells present in each stage in a total of 30,000 cells counted.

THE BIOLOGY OF SOME CECIDOMYID GALLS. Edwin G. Beck, *University of Georgia*. Leaf galls induced by *Phytophaga ulmi* on elms, *Dasyneura communis* on red maple, and *Mycodiplosis cerasifoli* on chokeberry were studied. All of the galls observed were formed by enlarged and otherwise modified mesophyll cells of the leaf. There was little meristematic activity involved in the formation of any of the galls. When placed on artificial media, all of the larvae were found to have microorganisms associated with them. Apparently specific organisms were associated with the larvae of each species.

THE MOSQUITOES OF THE SHIRE RIVER VALLEY, NYASALAND. Lewis Berner and Archie F. Carr, *University of Florida*. During the summer of 1952, a survey of medically important insects of the Shire River Valley, Nyasaland, was undertaken to evaluate the possible effects of certain engineering changes on them. It is planned to stabilize the level of Lake Nyasa and to institute an extensive irrigation project in the huge Elephant Marsh along the lower reaches of the river where mosquito populations are enormous. Because of the great importance of insect-borne diseases in this part of Central Africa, considerable attention was given to collecting and identifying the mosquitoes and species of *Simulium* throughout the river system. Particular emphasis was placed on observing ecological associations and estimating possible alterations that might be induced by the engineering changes. It is believed that *Anopheles funestus* is the most important malaria vector in spite of the presence of *Anopheles gambiae*. Several species of mosquitoes were recorded from Nyasaland for the first time.

POSTIRRADIATION RELEASE OF ADENOSINE TRIPHOSPHATE FROM ESCHERICHIA COLI B/r. D. Billen, B. L. Strehler, G. E. Stapleton, *Oak Ridge National Laboratory*. Studies have been initiated on the effects of X rays on adenosine triphosphate (ATP) metabolism in the bacterium *Escherichia coli* B/r because of the important role of ATP in the synthesis of new cellular materials. ATP was assayed by measurement of light emitted when this compound is incubated with the firefly luminescent system. It was found that suspensions of *E. coli* B/r exposed to 60,000 roentgens of X rays (99.95% decrease in colony forming cells) retained the ability to form ATP if incubated at 37° C. in nutrient broth containing 1% glucose. However, upon separation of the exposed cells from the incubating medium followed by ATP analysis of both the cells and the supernatant, it was found that most of the ATP synthesized by the cells was released into the surrounding fluid. Unexposed cells did not show this loss of ATP from the cells to the medium. The effects of temperature, presence or absence of metabolites, and X-ray dose on this release of ATP from irradiated cells will be discussed. From the available evidence, the release of ATP appears to be due to some cause other than lysis, since no evidence of lysis has been observed.

OBSERVATIONS ON THE DEVELOPMENT OF DIROFILARIA IMMITIS IN MOSQUITOES. Richard E. Bradley, *University of Georgia*. Results of experiments to test the susceptibility of five species of mosquitoes to infection with *D. immitis* larvae are reported. Infective stage larvae developed in the mosquitoes, *Culex pipiens* and *C. quinquefasciatus*. Three other species of mosquitoes, *Aedes aegypti*, *A. triseriatus*, and *Anopheles quadrimaculatus*, ingested microfilariae and allowed them to undergo limited development. Under the existing laboratory conditions the mortality rate in these latter three species was such that none of them survived long enough to permit full development of the heartworm larvae.

Fossil Plants from the Mine Alfred, near Duren, Germany. Clair A. Brown, *Louisiana State University*. The brown coal mine Alfred is famous for fossil plant remains which are usually considered to be middle or upper Oligocene in age. The top surface consists of a yellow clay, usually called loess; below this is a layer of mixed sands and gravels about 50 feet thick and under this an extensive layer of brown coal about 200 feet thick. The brown coal is rich in pollen and pollen analyses show repeating plant succes-

sions. In this report the emphasis is placed on the macroscopic remains in the sands above the coal. This layer has an abundance of preserved wood, usually with no definite orientation, although some stumps appear to be in place. The great quantities of wood, seeds and fruits suggest that this material was probably washed into the area and buried as the result of late fall floods. Most of the wood is *Sequoia* with an occasional piece of *Pinus*. The preserved remains include cones of 3 or 4 species of *Pinus*, *Tsuga*, *Sequoia*, *Glyptostrobus*, and fruits or seeds of *Durania*, *Pallioporia*, *Sphenotheca*, *Symplocos*, *Liquidambar*, *Hammelis*, *Magnolia* and many others. One cone, belonging to the Cupressineae, represents at least a new species and will be described at a later date. One important aspect of this fossil flora is that it contains certain plants which today grow either in Asia or North America, and are no longer native to Europe. The high alps of Central Europe were an effective barrier to the southward migration of many species and consequently Pleistocene glaciations destroyed much of the Tertiary flora of Europe.

CURVATURES INDUCED IN TIMOTHY ROOTS BY ULTRAVIOLET RADIATION. Robert T. Brumfield, *Oak Ridge National Laboratory and Longwood College*. Primary roots of timothy seedlings exposed unilaterally to Ultraviolet radiation exhibit curvatures. Exposure to 96000 ergs/cm² induced a curvature away from the source when reached a maximum about 60 minutes after irradiation. The center of the curvature was about 1 cm. behind the root apex. Dosages of 192,000 ergs/cm² induced two curvatures. A curvature toward the source occurred soon after irradiation and reached a maximum in about 40 minutes, the center of this curvature being about 1 cm behind the root apex. A second curvature away from the source occurred later reaching a maximum about 80 minutes after irradiation. The second curvature was nearer the apex than the first one, the center of the curvature being about 0.5 cm behind the root apex.

THE NUMBER OF SPOROCASTS AND CERCARIAE RESULTING FROM EXPOSURES OF PHYSID SNAILS TO SINGLE AND MULTIPLE OCHETOSOMATID FLUKE EGGS. Elon E. Byrd, *University of Georgia*. Forty-eight of the 421 snails (*Physa gyrina*) exposed to a single egg each from one of four ochetosomatid flukes ultimately shed cercariae. All infected snails were maintained in the laboratory throughout the remainder of their lives, and counts were made daily on the number of cercariae emerging. The 23 snails infected with *Ochetosoma ellipticus* shed cercariae from 6 to 161 (av. 60.8) days for a total of 26,485 cercariae, or an average of 1,152 cercariae per infection. The 9 snails "positive" for *Neorenilifer antiarum* shed a total of 9,089 larvae in 7 to 82 (av. 26.3) days, or an average of 1,010 cercariae per snail. Six snails shed cercariae of *Neorenilifer orula*. They shed 1,878 cercariae in 7 to 68 (av. 33.5) days for an average of 313 cercariae per snail. The 10 snails infected with *Dasymetra conferta* shed 2,302 cercariae within 12 to 60 (av. 39.9) days for an average of 230 cercariae per snail. The extremes in cercarial production for all of these snails were 2 and 2,816 cercariae.

In a second series of experiments snails were exposed to 1, 2, 3, 4, and 5 ochetosomatid eggs each. All of these snails were sacrificed after appropriate periods of time and the numbers of daughter sporocysts determined. The number of sporocysts were determined for each of 20 snails infected by a single egg, while only seven such determinations have thus far been made for each of the 2, 3, 4, and 5 egg-exposed snails. The 20 snails exposed to a single egg each were killed after an average cercarial shedding period of 25.7 days. They had shed a total of 10,766 cercariae and contained 1,382 daughter sporocysts. Thus each snail contained an average of 69.1 sporocysts, and each sporocyst had produced a total of 7.79 cercariae for an average of 0.30 cercariae per sporocyst per day of the cercarial shedding period. The average number of sporocysts per snail for the 2 egg exposures was 52.86, and each sporocyst had produced 0.57 cercariae per sporocyst per day of the cercarial shedding period. These averages for the 3, 4, and 5 egg exposures are as follows: 60.0 and 0.54, 53.86 and 0.48, and 80.29 and 0.42 for the mean number of sporocysts per snail and the number of cercariae per sporocyst per day of the cercarial shedding period, respectively.

THE PATTERN OF CERCARIAL LIBERATION FROM PHYSID SNAILS INFECTED

WITH A SINGLE OCHETOSOMATID FLUKE EGG. Elon E. Byrd, *University of Georgia*. In following the course of infection in physid snails (*P. gyrina*) infected with a single egg from four species of ochetosomatid flukes it was found that the cercariae emerged in a characteristic pattern. In all fluke species thus far tested there was an initial "peak" flushing of cercariae from the snail. The peak numbers continued only for a few days, and was followed by a rather sharp decline to a much lower level which persisted into the fortieth to sixtieth day of the infection. If the snail host survived beyond the initial peak period and its subsequent decline, a second peak in cercarial production was reached. The second peak failed to attain the high numbers of cercariae counted in the initial peak period, although the subsequent "slump" in cercarial numbers was much more gradual than was true for the slump following the initial peak. Furthermore, the decline in numbers of cercariae subsequent to the second peak was marked by many secondary rises and slumps, indicating the possibility of several more closely spaced peak periods—a sort of "pulsating" decline from the second peak period. Within our experience, no infected snail lost its infection during the remainder of its life in the laboratory.

THE VEGETATION OF THE FALL CREEK GULF. Donald Caplenor, *Vanderbilt University*. The Fall Creek Gulf in Van Buren County, Tennessee has been sampled by the random pairs method of Cottam and Curtis. This area is a localized virgin forest isolated in a narrow gorge in the Cumberland Plateau. The vegetation of the area shows affinity with the vegetation of the Northeastern United States and Southern Canada. There are, however, few species which are endemic to Eastern Tennessee. Dominant tree species are *Tsuga canadensis* and *Betula lutea*. Major associates are *Tilia neglecta*, *Magnolia acuminata*, *Liriodendron tulipifera*, *Acer rubrum*, *Acer pennsylvanicum*, and *Cladrastis lutea*. The most important species in the shrub layer are *Rhododendron maximum*, *Betula lutea*, *Tsuga canadensis*, *Acer pennsylvanicum*, and *Acer rubrum*. In the herb layer the most frequent species are *Viola blanda*, *Polypodium virginianum*, *Dryopteris spinulosa* var. *intermedia*, *Rhododendron maximum*, *Parthenocissus quinquefolia*, and *Impatiens biflora*.

EFFECTS OF PROLONGED TREATMENT WITH LOW-INTENSITY GAMMA RADIATION ON MITOTIC ACTIVITY IN CHORTOPHAGA NEUROBLASTS. J. Gordon Carlson, Nyra Harrington, and Mary Esther Gaulden, *Oak Ridge National Laboratory and University of Tennessee*. Prolonged treatment of *Chortophaga* neuroblasts with low-intensity gamma radiation reduces mitotic activity much less than a comparable dose given at high intensity. Treatment for 6 days at 3.4 r/hour reduced the mid-mitotic count to about 40% of normal for a period of about 7 hours following treatment. (The same dose administered in a few minutes would have reduced the count to zero for about 5 hours beginning within an hour of the end of treatment.) Continuous irradiation at 0.80 r/hour (1) failed to produce a significant mid-mitotic effect at the end of 2 days, (2) produced a significant increase in the number of mid-mitoses through the second counting period at the end of 4 days, and (3) produced a significant increase in the number of mid-mitoses through the second counting period after 6 days of treatment. The radiation-induced increase in the number of mid-mitoses immediately following 4 and 6 days of treatment is shown to result, not from a stimulating effect of the radiation on mitotic activity, but from the simultaneous progression into mid-mitosis of neuroblasts that have accumulated in late prophase as a result of the inhibiting effect of the radiation on this stage.

A NEW FORM CONNECTING ACTINOPLANES WITH STREPTOMYCES. John N. Couch, *University of North Carolina*. The genus *Actinoplanes* has a mycelium closely resembling *Streptomyces* and *Micromonospora*, but differs from either of these and from any of the higher or lower bacteria by the formation of swimming spores in sporangia. *Actinoplanes* also lacks the "spirals" so characteristic of one group of *Streptomyces*. A new form has been isolated from soil which forms sporangia with non-motile spores and also forms "spirals." Evidence is presented indicating that the sporangia are derived from the coils.

A DEMONSTRATION OF GROSS CULTURAL CHARACTERS, SPORANGIA, AND SWIMMING SPORES IN THE NEW GENUS ACTINOPLANES. John N. Couch, E.

Kathleen Goldie-Smith, and William J. Koch, *University of North Carolina*. The demonstration will show methods used in the isolation of these organisms from soil, methods of culture, and appearance of the organisms in pure culture on a variety of media. The sporangia and swimming spores will be shown under the dark field and phase microscope.

NEW TURBELLARIA FROM GEORGIA. Julian T. Darlington, *University of Florida*. During the academic year 1951-52 monthly collections were made from the semi-permanent pools of several granite outcrops near Atlanta, Georgia. Three new Turbellarians belonging to the following genera were found almost to the exclusion of other members of the class: *Phagocata* (Tricladida), *Geocentrophora* (Alloeochoela), *Mesostoma* (Rhabdochoela). The unusually large numbers of the *Mesostoma* observed in the field and the ease with which they were maintained in the laboratory favored the working out of much of the life history of this form.

AN UNUSUAL TYPE OF NUCLEAR DISINTEGRATION. Chas. H. Driver, *Louisiana State University*. A high frequency of ascus abortion was observed in a self-fertile mutant culture of *Glomerella cingulata* (S) S. & v. Schr. A cytological investigation of developing asci revealed an unusual type of nuclear disintegration which occurred most frequently during prometaphase I. In nuclei undergoing disintegration the prometaphase bivalents migrated apart, singly or in pairs, instead of assembling at the plate as in normal metaphase. Each chromosome or chromosome pair was surrounded by a distinct nuclear vacuole. At first the separated chromosomes were morphologically indistinguishable from normal metaphase bivalents except for the fact that they never became fully contracted. Later the separated chromosomes became pycnotic and eventually disintegrated. The same type of nuclear disintegration was observed less frequently in one or more of the nuclei at prometaphase of meiosis II and mitosis in the ascus. It seemed apparent that these nuclear disintegrations were responsible for the large number of partially or completely abortive asci formed by the culture.

EVOLUTION OF THE GENERA OF AGONIDAE. Harry W. Freeman, *University of South Carolina*. The Agonidae, commonly known as "sea poachers" or "alligator fishes," constitute a group of fishes of the order Scleroparei, the mailed cheek fishes. Aside from Regan's (1913) paper on the osteology and classification of the Scleroparei and Schmidt's (1936) paper on the systematics of the genus *Agonus*, there has been no study made of the evolution of this family as a group and of the inter-relationships of the genera. In this paper, the author presents the results of his study of the evolutionary trends within the family Agonidae and further postulates what may have been the origin of the family. In order to determine the inter-relationships of the genera and groups of genera, it became necessary to examine, so far as possible, representatives of all the known species. In order to work out the inter-relationships of the agonids a number of hypothetical ancestors must be postulated. It is believed that such ancestors will approximate the real ancestral forms if they are constructed from a combination of certain characters which are recognized to be common in their descendants and to be primitive in nature. When a character that is plainly not of recent origin is possessed by a large number of species throughout a group of fishes, that character may reasonably be considered to be primitive for that group.

MAGNESIUM CONCENTRATION OF BRAIN TISSUE OF GOLDFISH ACCLIMATIZED AT TWO TEMPERATURES AND ITS RELATION TO TEMPERATURE ACCLIMATIZATION. John A. Freeman, *Winthrop College*. The magnesium concentrations of brain tissue from fish acclimatized at 12 and 27°C have been determined since magnesium would appear to be a possible factor in the metabolic alterations accompanying temperature acclimatization. Significantly higher magnesium concentrations were found in brains from fish acclimatized at the lower temperature. The difference in concentration may be interpreted as resulting from the metabolic changes accompanying temperature acclimatization or as effecting such changes. Absorption of oxygen by breis of brain tissue from fish acclimatized at 27° was not changed by additions of magnesium (as the chloride) which increased its concentration to that found in fish acclimatized

at 12°. It is concluded that the change in magnesium content is not a primary factor in bringing about the metabolic changes in brain tissue associated with temperature acclimatization.

THE EFFECT OF THYROID HORMONE ON THE GROWTH OF TRANSPLANTABLE PITUITARY TUMORS. Evelyn L. Gadsden, *Oak Ridge National Laboratory*. Lack of thyroid hormone provides the major stimulus for the development of pituitary tumors in radiothyroidectomized mice and for the growth of transplants of these tumors. Earlier experiments have shown that these tumors grow readily on radiothyroidectomized but not on normal hosts. In the course of subpassages pituitary tumors dependent on the lack of thyroid hormone may gain autonomy and grow better in normal than in radiothyroidectomized hosts. The three sets of experiments now to be reported show: (I) the effect of TH on the growth of dependent tumors, (II) the effect of TH on the growth of autonomous tumors, and (III) the effect of thiouracil on the growth of dependent tumors. In Series I (nine experiments) dependent tumors were grafted on 70 radiothyroidectomized mice of which all but two developed large tumors. In a group of 57 similar mice TH prevented or retarded tumor growth. In Series II (eight experiments) TH usually promoted tumor growth in radiothyroidectomized mice. In Series III (eight experiments) thiouracil proved much less effective than radiothyroidectomy in promoting tumor growth.

ALLOXAN DIABETES IN THE RAT IN RELATION TO THE GENERAL ADAPTATION SYNDROME. Clara E. Hamilton and Francis J. Smiley, *University of Georgia*. Alloxan diabetes of varying degrees of severity was produced in male rats. The rats were studied in order to determine whether the stress of this disease produced characteristic symptoms of the general adaptation syndrome. At intervals of 0, 2, 4, and 24 hours after injection with alloxan monohydrate rats were sacrificed and blood sugar, blood electrolyte, blood white cell, adrenal ascorbic acid, adrenal lipid, adrenal histology, and organ weight studies were made. Evidences will be presented indicating that increased adrenal activity was elicited but that the characteristic alarm response to stress was incompletely produced.

SOME ADDITIONS AND CORRECTIONS FOR SMALL'S MANUAL OF THE SOUTH-EASTERN FLORA. Roland M. Harper, *Geological Survey of Alabama*. In the nearly two decades since the publication of Small's Manual many new species of plants have been discovered and described, a few native species and many weeds not previously known in the area covered have turned up, and several of the descriptions have been found to be incomplete or inaccurate. It is proposed to publish at an early date such additions and corrections as have come to the writer's notice, in the hope that other interested persons will do likewise, and thus pave the way for a new edition the present one having been out of print for some time.

SOME OBSERVATIONS ON THE SPOROPHYTES OF PALLAVICINIA. Walter R. Herndon, *Vanderbilt University*. Cells of the foot, seta and capsule of immature sporophytes of *Pallavicinia* contain numerous chloroplasts. Starch grains within these suggest that the plastids are functioning actively in photosynthesis. Sporophytes, excised from their gametophytes, continue to develop when planted in an acid, inorganic, salt solution solidified with agar. The seta of excised sporophytes elongates characteristically and the capsule matures in an apparently normal manner, forming mature spores and elaters. Spore mother cells removed from young sporophytes also continue development and form spores when placed on a solidified inorganic medium. The occurrence of chloroplasts in quantity and the continued development of sporophytes removed from gametophytes afford evidence that the sporophyte of *Pallavicinia* is autotrophic to a considerable degree, rather than "dependent" or "parasitic" on the gametophyte.

THE EPIZOOTIC ASSOCIATES OF THE CRAYFISHES OF THE NEW RIVER SYSTEM WITH PARTICULAR REFERENCE TO THE OSTRACODS. Horton H. Hobbs, Jr., *University of Virginia*. Among the animals that have found a congenial niche on the exoskeleton of the crayfishes of the New River System (in North Carolina, Virginia, and West Virginia) are certain ciliates, annelid worms of

the family Branchiobdellidae, ostracods of the family Entocytheridae, and copepods of the family Canthocamptidae. Of these, the association of the branchiobdellids and entocytherids with the crayfish appears to be an obligate one. A brief account of the entocytherids is given, and their "host" relationships are discussed.

OBSERVATIONS ON THE MORPHOLOGY OF THE PRAESOMA OF NEOECHINORHYNCHUS CYLINDRATUS (ACANTHOCEPHALA: EOACANTHOCEPHALA). Harry L. Holloway, Jr., *University of Virginia*. A detailed morphological study of the praesoma of *Neoechinorhynchus cylindratus* (VanCleave, 1913) has been made using specimens isolated from the alimentary canals of fishes of the families Centrarchidae and Percidae. All parts of the praesoma: the neck; the proboscis wall and armature; organs within the proboscis such as the apical organ, invertors of the proboscis, and central nervous ganglion; proboscis receptacle; lemnisci; sling of the receptacle; and the retractors of the neck are described and figured. Detailed measurements of the praesoma, proboscis, neck, and proboscis hooks as determined from stained whole mounts are recorded.

METHODS OF COUNTING COSTAL GROOVES IN SALAMANDERS. Thelma Howell, *Wesleyan College* and the *Highlands Biological Station*. The method of maximum count (counting one each in the axilla and groin) and the method recently proposed by Pope and Pope (*Bull. Chicago Acad. Sci.*, 9 (8): 129-152.) are considered in relation to the costal grooves of *Plethodon jordani melaventris* Pope and Hairston. The factors which have contributed to the difficulties inherent in methods proposed for counting costal grooves are discussed.

DISTRIBUTION OF ENZYMES IN ERYTHROCYTES. F. R. Hunter and Alice S. Baker, *Florida State University*. Most studies on the localization of enzymes within the cell indicate that they are on particulates. In assaying oxidases and dehydrogenases in various erythrocytes the question arose as to where the enzymes were located, particularly in a mammalian erythrocyte which lacks most of the typical cell particulates. Homogenates of washed red blood cells were prepared by alternate freezing and thawing, and the "ghosts" and other large particles were separated by centrifugation for ten minutes at 2000 g. Malic and lactic dehydrogenase, and the malic oxidase and succinoxidase systems were studied in chicken and rabbit erythrocytes. In general, all the enzymes studied were located on the ghosts and particulates of the chicken cells. In the rabbit however, the dehydrogenases, which were the only enzymes present, were all in the non-particulate supernatant.

TEPEE TECHNIQUE FOR COLLECTING CAVE FLIES. J. D. Ives, *Pinebluff, N. C.* The method as used consisted of 4 sticks about 3 ft. long with the stubs of the upper branches left an inch or more in length so as to facilitate the construction of the tepee. After the tepee framework has been located, in the deep interior of a cave, a lighted candle is placed in the ground near the center of the tepee. White cheese cloth is wrapped around the framework from the bottom to the top. With the tepee completed the collecting of specimens which alight on the cheese cloth is made directly into a 70%-80% ethylene solution into which a trace of glycerin has been added. If relative population abundance is to be ascertained, each collection should be made in the same place and the same period of time used for collecting. The time used was 1 hr. but other time-periods might serve as well.

VAN NIEL'S HYPOTHESIS AND THE EVOLUTION OF PARASITISM. Arthur W. Jones, *University of Tennessee*. Van Niel (dinner address, 1952, ASB meeting) used the fact of increasing scarcity of raw materials to justify his position regarding the late emergence of photosynthetic mechanisms. The same logic may be applied in supposing the early emergence of parasitism. Thus the parasitic habit is a "failure adaptation" (in the language of man's culture); the pre-parasite is an organism which has failed to synthesize scarce materials but which has, fortuitously and fortunately, succeeded in using materials synthesized by evolving others. The degree of a parasite's "failure" thus determines the degree of its dependence upon its host; and, conversely, the

degree of a parasite's dependence may be a measure of its antiquity or primitiveness.

NOTES ON THE TURBELLARIAN *GEOCENTROPHORA APPLANATA* (KENNEL). E. Ruffin Jones, Jr., *University of Florida*. Although *Geocentrophora applanata* resembles *G. sphyrocephala* rather closely in general appearance and structure, these two species can nevertheless be distinguished from one another. They differ in size, shape and proportions as well as in certain features of the male reproductive system, the digestive system and other details. The two species have been found in the same habitats and it has, therefore, been possible to make an accurate comparison of their morphology. *G. applanata* is quite hardy and will often survive under very adverse conditions, especially when abundant oxygen is available. It is apparently cosmopolitan in distribution.

CAUSES OF PLANT SUCCESSION: VEGETATIVE GROWTH OF GRIMMIA LAEVIGATA (BRID.) BRID. Catherine Keever, *Limestone College*. Several species of moss have been observed growing directly upon granite. Many people thought that they must have been preceded by some species of lichens or at least by some form of weathering. *Grimmia laevigata* has been grown in the laboratory on freshly cracked granite. Protonema arise from the stem of a gametophyte, spread over the rock and cause the plant to adhere to the rock. No new plants have been observed arising from such protonema, but many new plants originate from the stem of the old gametophyte. Herbarium specimens of the species collected one and two years previously showed nearly 100% viability and some plants collected 10 years before grew. Both protonema and young moss plants are very drought resistant. With this evidence, there should be no reason to doubt that this moss can initiate succession of plants on bare granite.

CYTOLOGICAL EVIDENCE CONCERNING THE EVOLUTION OF *IPOMOEA BATATAS*. August E. Kehr and Yu Chen Ting, *Louisiana State University*. From our studies it has been concluded that *Ipomoea batatas* is a hexaploid with a gametic number of X equals 45, the highest number found in the genus. During meiosis no multivalents were ever found but characteristic secondary associations involving 4-5 groups of 3 bivalents and 6-9 associations of 2 bivalents were observed. The degree of secondary association varied from intimate juxtaposition to that in which only chromatic strands connected the involved bivalents. This secondary association was interpreted to be a manifestation of chromosomes which are homologous in such minute segments that they do not form chiasmata yet have an affinity which results in their attraction to one another during Metaphase I. The authors have concluded that the sweet potato is a hexaploid of recent allopolyploid origin and arose by amphidiploidy of a tetraploid species (2N equals 60) and a diploid species (2N equals 30). However, secondary association suggests that total diploidization had not yet occurred.

THE INFLUENCE OF OXYGEN UPON X-RAY DAMAGE TO *PARAMECIUM AURELIA*. R. F. Kimball, *Biology Division, Oak Ridge National Laboratory*. Nongenetic damage (division delay and death before division) are less when paramecia are irradiated under hypoxia, provided H₂O₂ can accumulate in the medium. When it cannot, oxygen has little influence. In the first case, decreased peroxide formation is probably involved, since it has been shown previously that, under such circumstances, externally produced peroxide accounts for most of the nongenetic damage. The lack of an oxygen effect in the second case strongly suggests that peroxide produced locally within the cell is unimportant. Probably the peroxide is destroyed so rapidly by catalase that it is effective only when large amounts come in from outside the cell. However, genetic damage to the cell is decreased by hypoxia under all circumstances, making it possible that peroxide produced locally within the nucleus is effective.

DEVELOPMENTAL MORPHOLOGY OF OVULE AND SEED OF *ASIMINA TRILOBA* DUNAL. Robert K. Lampton, *Western Maryland College*. The North American Pawpaw, *Asimina triloba* possesses ovules which are anatropous, bitegumentary and have a sub-hypodermal archesporial cell which does not divide

to produce a parietal cell and a sporocyte cell. The archesporium functions directly as the megasporocyte and gives rise to a row of four megaspores. The chalazal megaspore is the functional one and by divisions forms an embryo sac which is eight nucleate and of the "Normal" or "Polygonum Type." Following fertilization there is a great development of all tissues in the ovule. The endosperm tissue fills the seed and is formed into chambers or ruminations by unfolding of the inner integument. The integuments and nucellus are joined into a "fusion zone" in the raphe and antiraphe of the seed. Growth from this fusion zone causes all tissues of the developing seeds to increase in size. A well developed hypotase is present in the ovules and seems to be connected with the inner integumentary tissues.

INTERCHROMOSOMAL INFLUENCES ON RECOMBINATION OF CHROMOSOMAL SEGMENTS IN *DROSOPHILA ROBUSTA*. Max Levitan, *Virginia Polytechnic Institute*. Wild females of the species *Drosophila robusta* collected near Blacksburg, Virginia, are frequently heterozygous for inversions in both arms of the X, in both arms of chromosome 2, or in both arms of both chromosomes. Also, one arm of chromosome 3 is commonly heterozygous for an inversion. These females permit study of interchromosomal influences on crossing-over. The data accumulated to date indicate that recombination in 2 is directly related to the degree of heterozygosity in X and 3. Heterozygosity in 2 and 3 probably has a similar effect on recombination in X, but it is not as clear or as strong. Differences in the results under similar conditions of heterozygosity indicate that other factors are also involved. The preliminary data suggest that an important part is probably played by positional differences of the various inversions.

QUANTITATIVE DETERMINATIONS OF CHLOROPHYLLS IN FLORIDA COASTAL AND ESTUARINE WATERS. Nelson Marshall, *Oceanographic Institute, Florida State University*. Measurements of the chlorophylls, particularly chlorophyll *a* which is most important in marine production, indicate a generally low basic productivity in representative coastal and estuarine waters of Florida. A noteworthy exception is the high concentration of chlorophyll in the Red Tide, a bloom of *Gymnodinium brevis*.

THE EFFECT OF ANOXIA ON THE CYTOCHROME OXIDASE SYSTEM OF THE RAT AND HAMSTER. William L. Mengebier and Samuel R. Tipton, *University of Tennessee*. The activity of cytochrome oxidase of liver, heart and brain homogenates of the albino rat and golden hamster decreased significantly after exposure of the homogenates to a nitrogen atmosphere for periods of fifteen to thirty minutes. Enzymatic activity of the liver and heart from animals sacrificed by exposure to anoxic conditions also showed a significant decrease. Survival times of rats and hamsters in a nitrogen medium were approximately the same; this is in direct contrast to results reported in the literature dealing with survival times under hypoxic conditions. Possible modes of action of anoxia on the oxidase system *per se* will be discussed.

THE INSTITUTE OF ANIMAL RESOURCES: ITS ORIGIN AND OBJECTIVES. Samuel L. Meyer, *National Research Council and American Institute of Biological Sciences*. An Institute of Animal Resources has been established by the Division of Biology and Agriculture of the National Research Council. The purposes of the Institute are: (1) to survey and put on record the existing sources of production and supply of animal material used in medical and other scientific assay and research; (2) to coordinate and organize this information in such a way that it can and will be available for distribution to individuals and institutions engaged in such assay and research; (3) to develop and establish reasonably scientific standards for the production, nutrition, hygiene, and shipment of such animals; (4) to take such steps as may be necessary to preserve the continuation of the various genetic strains, or stocks, of such material now available, or to be developed in the future; and (5) to study the needs for such material both under peace time conditions, and in the event of a possible national emergency, and to take steps to organize and have in readiness the personnel and other facilities for such extension of activity as may be necessary. The American Institute of Biological Sciences will act as the operating agency for the Institute of Animal Resources.

COOLING PROTECTS NEONATAL GUINEA PIGS FROM THE EFFECTS OF ASPHYXIA. James A. Miller Jr., Faith S. Miller and Carolyn B. Farrar, *Emory University*. Since the oxygen requirements of cells vary with temperature, the rationale for the standard practice of warming asphyxiated infants is questioned. Asphyxia was produced by exposure to 95% N₂ + 5% CO₂. Cooling was by immersion in ice water, warming by exposure to radiant heat. When tested in pairs the cooler animals recovered from exposures lethal to warmer littermates. Although cooler animals require longer to recover than warmer, they are more resistant to damage to vital organs. Rapid rewarming of cooled animals following asphyxia causes earlier reappearance of reflexes but no decrease in lethality. Cooling after the beginning of asphyxiation was found to be beneficial. The time of death of 205 animals asphyxiated at colonic temperatures between 45.2° C. and 10.9° C. gave a linear increase in survival of 50%/10° C. decrease in temperature. The shortest survival was 81 sec. at 44.2° C., the longest 617 sec. at 14° C. Narcosis with sodium pentobarbital increases resistance to asphyxia in both cooled and uncooled animals. These experiments together with many clinical reports indicate that cooling instead of warming should be employed in asphyxia neonatorum.

EFFECTS OF TEMPERATURE VARIATIONS UPON ASPHYXIAL RESISTANCE IN NEONATAL GUINEA PIGS—A KODACHROME MOVING PICTURE. James A. Miller, Jr., and Faith S. Miller, *Emory University*. Since cellular metabolism and particularly that of the brain varies with temperature, destruction of energy reserves during asphyxia should vary similarly and cooling should prolong asphyxial survival. First is illustrated an experiment in which the warmed animal survived 86 seconds, the cooled 286 seconds and their littermate control 181 seconds. Then follows a graph of time of death of over 200 asphyxiated neonatal animals showing that survival is increased approximately 50% for each 10° C. decrease in temperature within the non-lethal range. Cooled animals regularly recover from exposures which are lethal to warmer littermates. One such experiment is illustrated. Finally two experiments illustrate that narcosis with sodium pentobarbital increases asphyxial resistance in both uncooled and cooled animals. It is concluded that warming is detrimental in asphyxia and cooling beneficial. The rationale for the standard practice of warming asphyxiated infants is questioned.

DEVELOPMENTAL BIOLOGY: ITS RELATION TO BIOLOGY TEACHING. George W. Nace, *Committee on Developmental Biology, Division of Biology and Agriculture, National Research Council* (on leave from *Duke University*). Evidence indicating current trends toward reorganization of biology on the basis of biological principles and practical economic demands, rather than on the basis of the object or method of study is presented. While no aspect of biology will be excessively strengthened as a result of these trends, it is possible that some important fields may be overlooked. The Committee on Developmental Biology, Division of Biology and Agriculture, National Research Council, is described as an instrument designed to follow these trends with respect to developmental biology. Its projects are outlined with particular emphasis on those concerned with teaching. Certain improvements relative to teaching are possible and remedial action which can be taken at a national level are discussed.

NEW VIEWPOINTS IN THE STUDY OF TERRITORY AND HOME RANGE IN THE VERTEBRATES. Eugene P. Odum and Edward J. Kuenzler, *University of Georgia*. In order to determine density levels of warm-blooded vertebrates on the Savannah River Area as a part of an ecological inventory it became necessary to investigate territory and home range size of major species, since census methods are based on a knowledge of intra-population dispersion patterns. While the qualitative aspects of territory in birds are well known, no sound method of measurement of size has been developed. A new concept involving a distinction between maximum territory or home range and utilized range is proposed, and a new method of measurement has been tested. The method utilizes an "observation-area" curve (adapted from the "species-area" curve) for standardizing measurement of maximum range, and a grid overlay for determining utilized range as a percentage of the maximum range.

NEW TECHNIQUES FOR MEASURING PRIMARY PRODUCTION RATES IN AQUATIC COMMUNITIES. Howard T. Odum, *University of Florida*. Three new ways of measuring primary productivity in the large, fertile Florida spring communities show a production among the highest ever reported for land or water. One method makes use of the constant chemical quality of the water as it emerges to form a giant steady state flow system. Instantaneous production rates result from subtracting the oxygen content at night from those during the day at a station downstream from the boil. The productivity is mainly a function of the light intensity other factors being constant. Production rates vary from 27,000 lbs. glucose per acre per year on a cloudy winter day to 70,000 lbs. glucose per acre per year on a clear summer day. In a second method growth of aquatic plants typical of the community wet weighed and transplanted gave somewhat lower production figures. In a third method the production not passing into the food chain is estimated by catching the downstream drift.

NOTES ON APOGAMY IN PELLAEA. Roderick H. Outland, *Vanderbilt University*. This paper is a progress report of the author's investigation of *Pellaea atropurpurea* (L.) Link, *Pellaea glabella* Mett. and *Pellaea viridis* (Forsk.) Prantl. Gametophytes of these three species, when grown in the laboratory, develop no sex organs; however, apogamous sporophytes appear in abundance. One apogamous sporophyte appears on each gametophyte of *Pellaea atropurpurea* (L.) Link and *Pellaea viridis* (Forsk.) Prantl, but single gametophytes of *Pellaea glabella* Mett. regularly give rise to a number of such apogamous growths. Cytological investigation of sporogenesis now in progress indicates that there are two types of sporangia formed in these apogamous species. One type is that in which sixteen spore mother cells are formed, and the other type is one in which only eight spore mother cells are formed. Although it is apparent that there is a disturbance during meiosis of the spore mother cells in both types of sporangia, each spore mother cell, with rare exceptions, ultimately gives rise to a regular spore tetrad.

OBSERVATIONS ON X-RAY INDUCED DETACHMENTS OF ATTACHED-X CHROMOSOMES IN DROSOPHILA. D. R. Parker, *University of Mississippi*. Daily egg counts made for 7 days on individually mated irradiated attached-X females showed that 22 detachments occurred among the first 120 (or fewer) eggs laid by each female, while 3 occurred after 150 (or more) eggs were laid. It is concluded that most detachments occur in cells that are primary oocytes at the time of irradiation. In a second experiment, doses of 250, 500, and 1000 r yielded respectively 0.06%, 0.22%, and 1.17% of detachments in 3 days of egg laying. This "two hit" curve suggests breakage and rearrangement rather than induced crossing over. There is no evidence of clustering. 87 detachments fitting closely the Poisson distribution. Two stocks $y \ v \ f \ car$ and $y \ v \ car$ show lethals in the region of car in 100% and 85.7% of the tested chromosomes, respectively. Perhaps spontaneous lethals accumulate due to the inefficiency of selection near the centromere in attached-X's.

ABERRANT BEHAVIOR OF THE PERISTOME TEETH OF CERTAIN MOSSES. Paul M. Patterson, *Hollins College*. The hygroscopic movements of peristome teeth have been observed and described repeatedly as facilitating spore dispersal under dry conditions. That is, the movement of the teeth is such that the mouth of the capsule is more effectively closed when wet, but that the teeth loosen or open outward when dry. The reverse behavior, that is, where the single peristome or exostome is fully open or reflexed when wet, and bent inward to more fully close the mouth of the capsule when dry is here reported for all species examined in the families *Leucodontaceae* and *Cryphaeaceae* as well as certain species of *Pylaisia* and *Neckera*. While all of the observed species are corticolous, no ecological significance is indicated since many other genera of corticolous mosses show normal peristome behavior.

LAND SNAILS IN THE DUKE FOREST (MOLLUSCA: GASTROPODA). A. S. Pearce, *Duke University*. Eighty-two collecting trips were made during two years. Twenty-one species were found. A total of 1374 shells and living snails were collected, 814 (13 sp.) of these were more common at high and 560 (7 sp.) at low altitudes. Few or no snails were found in pure pine stands during preliminary collections, so collecting was limited to stands of broad-

leafed trees. A few tests showed that several snails ate such vegetables and fruits as lettuce, carrot, and apple, and also several species of fungi. One species was carnivorous.

SOME FACTORS AFFECTING THE ACTIVITY OF SPADEFOOT TOADS. Paul G. Pearson, *University of Florida*. The data presented here are a part of a continuing ecological study of *Scaphiopus h. holbrookii* (Harlan), near Gainesville, Florida. Air temperatures of mean, maximum, and minimum limits of toad activity were plotted and a test, under similar temperatures, shows no significant difference in activity rates under winter as opposed to summer months. As a measure of air moisture, vapor pressure deficit and relative humidity were plotted and a significant correlation exists between air moisture and rate of toad activity. A chi square test indicated a highly significant association between nights of toad activity and nights of reported rainfall, and a significant correlation exists between rate of activity and amount of rainfall. Using chi square, significant differences were shown between toad activity under different types of air masses. Little difference was noted between the rate of activity during the various hours between 7 P.M. and 10 P.M.

PRELIMINARY INVESTIGATIONS ON THE HIGH ALTITUDE DISTRIBUTION OF ANTS IN WESTERN NORTH CAROLINA AND VICINITY (HYMENOPTERA: FORMICIDAE). Arnold Van Pelt, *Appalachian State Teachers College*. A study of the altitudinal distribution of ants above 3500 feet in the Appalachian Mountains of North Carolina and vicinity has been undertaken. This paper is a preliminary report on the distribution above 5000 feet elevation, involving high altitudes from Haywood County, North Carolina, to Whitetop Mountain in southwestern Virginia. The plant communities of the regions under consideration are spruce-fir forests and the bald communities of the northern hardwood forest. Although the high altitude ant fauna is sparse, *Formica fusca* L. and *Tapinoma sessile* (Say) were found during the summer nesting in open areas on top of Mt. Mitchell (about 6600 feet); these species comprise part of the ant fauna of lower elevations. No ants were found in the high spruce-fir forests, although at lower altitudes in the spruce-fir, especially where these forests bordered on open areas, several species were collected. The balds above 5000 feet yielded a fauna, which, although restricted, was more varied than that of the spruce-fir forests.

STUDIES ON X-RAY INDUCED MITOTIC ABERRATIONS. Robert G. Ransom, *Army Medical Research Laboratory, Fort Knox, Kentucky*. From the extensive experimentation on cytological material with small chromosome numbers—*Trillium* (Sparrow and Moses), *Tradescantia* (Sax), *Allium* (Sax), and *Chortophaga* (Carlson)—stemmed the desire to subject even more complex tissue to investigations in radiation cytology. The basal epithelium of the cornea, studied in its mitotic response to X-rays by Friedenwald, was chosen for studying morphological changes in the mitotic figure after X-irradiation. Two effects were observed—an early "physiological" effect and a later "structural" effect. Concentrated investigations on the "structural" effects revealed their occurrence in Wistar and Sprague-Dawley rats, in young and adult animals, whether exposed to local or total body irradiation or to hard or soft X-rays. Mikaelson reported glutathione to be effective in reducing irradiation induced chromosome aberrations in *Tradescantia*. In the present study cysteine instillation reduced the frequency of "structural" effects but BAL instillation proved ineffective. Dose-effect investigations are progressing and will be reported subsequently.

THE ACTION OF STREPTOMYCYLAMINE DERIVATIVES ON THE STREPTOCIN SENSITIVE, RESISTANT AND DEPENDENT STRAINS OF MYCOBACTERIUM TUBERCULOSIS. W. B. Redmond and M. M. Cummings, *Veterans Administration Hospital, Atlanta, Ga.* Modification of the streptomycin molecule has generally resulted in reduction or loss of antibacterial potency and these compounds composed of amines coupled with the drug are no exception. Comparative studies of 29 derivatives on the resistant strain have revealed that few of them have any inhibitory effect. Similar studies show that only 8 of them support growth of the strain that requires streptomycin, while 14 of the compounds inhibit growth of this strain in the presence of streptomycin. This inhibition has

been termed the "antistreptomycin effect." The antistreptomycin effect has been demonstrated on the sensitive strain by obtaining growth in 1.5 ug/ml of streptomycin. This concentration of streptomycin alone completely inhibits growth.

THE EFFECTS OF OXYGEN ON THE PRODUCTION OF CHROMOSOME ABERRATIONS DURING THE FIRST MICROSPORE DIVISION OF *TRADESCANTIA*. Walter A. Rees, *Emory University*. Inflorescences of *Tradescantia paludosa* were subjected to positive pressures of 1, 2, 3, 4, 5 and 6.6 atmospheres of oxygen and 2, 4 and 5 atmospheres of helium, the periods of exposure ranging from 1-48 hours. Temporary acetocarmine preparations were made for study of the metaphase stage of the first microspore division. Material exposed to pure oxygen under 1, 2, 3, 4 and 6.6 atmospheres above normal pressure for 24, 18, 18, 12 and 6 hours, respectively, was found to be normal, while buds subjected to oxygen under pressures of 1, 2, 3, 4 and 5 atmospheres above normal for 48, 24, 24, 16 and 12 hours were killed. Inflorescences developed normally in pure helium at 2, 4 and 5 atmospheres above normal and also when subjected to vacuum for one hour. No chromosomal aberrations identical to those produced by x-radiation were produced by pure oxygen in *T. paludosa* at normal atmospheric pressure or at 1, 2, 3, 4, 5 and 6.6 atmospheres above normal.

THE DISTRIBUTION OF FISHES ON THE GULF COAST OF FLORIDA. George K. Reid, Jr., *College of William and Mary*. The ichthyofauna of the Florida keys and the southern region of the peninsula is predominantly West Indian and tropical in character, while that of the northern gulf coast is similar to the fauna of the South Atlantic coast of North America. One of the problems which has interested students of fish distribution in this region is whether the transition in the character of the fauna from one type to the other along the west coast of Florida is an abrupt or gradual one. In the vicinity of Cedar Key, Florida, collections of fishes were made for over a year (1950-1951). The collections contained representatives of many of the families characteristic of the more temperate regions and several of the groups of tropical affinities. Comparison of species densities and of relative abundance of individuals in the Cedar Key fauna with available reports of other areas indicates a gradual transition toward the tropical character of the southern fauna.

REDUCING ACTIVITY IN NODAL SECTIONS OF *ACER* SPP. Lorin W. Roberts, *Agnes Scott College*. Experiments were conducted on first year twigs of *Acer* spp. with various redox indicators (monotetrazolium salts, ditetrazolium salts, potassium tellurite, and resazurin). The following regions of the stem were sites of reducing activity: branch and leaf traces, vascular cambium, phloem, xylem ray cells, medullary sheath, and cortex. Reducing activity varied on a seasonal basis and was correlated with the presence of terminal and lateral buds. Preliminary experiments suggest that reduced sulfhydryl groups may play a role in the reduction of these indicators. The redox indicators were reduced *in vitro* by: glutathione + cyanide, cystine + cyanide, cysteine, and BAL (2, 3-dimercaptopropanol-1). Nodal sections showed greater reduction with all the redox indicators when treated with cyanide. The staining pattern of 1-(4-chloro-mercuriphenylazo)-naphthol-2, a specific sulfhydryl reagent, is identical with that of the reduction pattern obtained with the redox indicators.

A MODIFIED PHOTOMULTIPLIER SCINTILLATION DETECTOR FOR ALPHA-PARTICLE DOSIMETRY IN SINGLE CELL BIOLOGICAL IRRADIATION. R. W. Rogers, *Florida State University*. The phosphor in this detector consists of a single silver-activated zinc sulfide crystal twenty-five microns in diameter. A modified microscope setup feeds the scintillations into a photomultiplier and scaler, with the alpha-particle source replacing the substage condenser and the phosphor optically aligned on the microscope stage. Calibration of the fine-focus knob permits detection of alpha-particles traversing the phosphor at ranges from one millimeter to several centimeters. Special applications to various dosimetric problems in biological irradiation studies are discussed, with particular reference to living-culture hanging drop preparations of grasshopper embryos.

LETHAL AND MUTAGENIC EFFECTS OF RADIATION ON A PROTOZOAN, *ASTASIA LONGA*. J. Henry W. Schoenborn, *University of Georgia*. A number of single

individuals were isolated into complete medium after being ultraviolet irradiated and then kept in darkness or exposed to visible light. Flagellates that were viable after irradiation divided repeatedly to form macroscopically visible clones, and in this way survival data were obtained following various dosages of ultraviolet radiation. The results produced a sigmoid type of survival curve, and photoreactivation was observed but was less marked than has been reported for certain other microorganisms. Clones resulting from the above work were tested for biochemical mutations by attempting to grow them in the inorganic medium that suffices for the parent strain. Clones were observed that grew slowly or were incapable of growth in the inorganic medium, and tables will be presented showing the mutation rates following various doses of ultraviolet light. The results obtained following ultraviolet irradiation will be compared with results previously obtained with X radiation.

GENERIC CORRELATIONS IN THE FLORAS OF MEXICO AND EASTERN ASIA. Aaron J. Sharp, *University of Tennessee*. Much has been written about the relationship between the floras of eastern Asia and eastern United States. Some of the genera listed as common to the two areas also occur in Mexico and are represented sometimes by the same species. Included here are: *Aescyrum*, *Carya*, *Gelsemium*, *Hamamelis*, *Illicium*, *Magnolia*, *Mitchella*, *Nyssa*, *Parthenocissus* and *Tovara*. Other disjunct genera common to Mexico and eastern Asia but not represented in eastern United States are: *Acacia*, *Buettneria*, *Cedrela*, *Combretum*, *Engelhardtia*, *Oreodaphne*, *Sterculia*, *Terminalia*, *Turpinia*, *Zizyphus* and others. Some examples of other genera common to Mexico and eastern Asia but widely distributed in North America are: *Alnus*, *Aralia*, *Cornus*, *Populus*, *Potentilla*, *Quercus*, *Salix* and *Viburnum*. Of particular interest is *Distylium* (endemic to Mexico and Guatemala and eastern Asia), and the species *Mitrastemon Matudai* Yam. of the Rafflesiaceae known only from Mexico, Guatemala, Dutch Sumatra, Formosa and Japan.

THE FLORA OF MAMMOTH CAVE, KENTUCKY. Herman Silva. Mammoth Cave is the well-known limestone cavern in the west-central section of Kentucky. Electric lights have been installed in portions of the cave for a number of years, and patches of green plants have developed around them. The green alga, *Protococcus viridis* Ag. was the dominant plant in the patches, and two other algae as well as moss protonema were identified there. Well developed moss was found at one site, and unusual development of a fungus observed in several places.

THE SEPARATION OF FREE NEUROBLASTS AND OTHER EMBRYONIC CELLS FROM GRASSHOPPER EMBRYOS. Georgia S. St. Amand, *Biology Division, Oak Ridge National Laboratory* and Samuel R. Tipton, *Biology Division, Oak Ridge National Laboratory and University of Tennessee*. A method for obtaining suspensions of single cells from embryos of *Chortophaga viridifasciata* has been developed. Neuroblasts as well as other types of cells from these suspensions undergo normal mitosis and maintain active respiration for several hours after separation. The procedure, carried out under aseptic conditions, consists of (1) digestion of 150 embryos in 5 ml. trypsin-hyaluronidase solution (7.5 mg. each per 10 ml. calcium-free medium) at 38°C. for one hour, (2) addition of 0.5 ml. 1% albumin in calcium-free medium, (3) separation of clumps of cells by gently forcing them into and out of a small pipette, (4) addition of 5 ml. medium containing calcium, (5) centrifugation, and (6) resuspension of the residue. A suspension made as described contains approximately 2,000,000 cells which respire at the rate of 1.2 mm.³ O₂ per million cells per hour.

PARASITISM OF THE GRASSHOPPER CHORTOPHAGA VIRIDIFASCIATA (DEGEER 1773) (ORTHOPTERA: ACRIDIDAE) BY TACHINID FLIES (DIPTERA: TACHINIDAE)—A PRELIMINARY REPORT. W. St. Amand and Will J. Cloyd, *University of Tennessee*. Field collections of the grasshopper *Chortophaga viridifasciata* are rather heavily parasitized by the larvae of Tachinid flies. Collections from both Knox and Anderson counties in Tennessee show infections. This indicates that the condition is not restricted to a localized population. At least three genera are involved but specific determinations are yet to be made. Compound as well as multiple infections occur. One grasshopper may contain as many as six parasites. The early larval instars are free in the haemocoel of the host

but later instars are attached. The most usual points of attachment are the thoracic or the first abdominal spiracles. Attempts to infect grasshoppers under laboratory conditions have been unsuccessful and the precise method of infection is as yet unknown. It is hoped that studies now under way will reveal the life cycles of all parasites involved.

A NEW LUNGWORM PARASITE FROM THE BOBCAT, *LYNX RUFUS RUFUS*. B. Dolores Stough, Virginia Polytechnic Institute. In the spring of 1952 bobcats were collected for a food habit study. During this study, it was observed that 25% of the bobcats collected from North Carolina and Virginia were infected with lungworms. A search through the literature revealed that there is no record of lungworm parasites recovered from *Lynx rufus rufus*. Further investigation proved the parasite to be a new genus and species of the metastrongylids. The new genus differs from other genera of the superfamily Metastrongyloidea in the bursal pattern and morphology of the spicules of the male and in the position of the vulva of the female. The name proposed for this lungworm is *Lynxrufus wilsoni*.

THE EFFECT OF TEMPERATURE AND DAY-LENGTH ON THE EGG-LAYING DATE OF JUNCOS IN THE GREAT SMOKY MOUNTAINS. James T. Tanner, University of Tennessee. Juncos (*Junco hyemalis*) nest progressively later from low to high elevations in the Great Smoky Mountains. Day-length increases during the nesting season, and is the same at all elevations. Average temperature increases during the nesting season, but at any one time decreases with altitude. This makes it possible to measure the relative effectiveness of the two factors in determining the date of egg-laying. This study indicates that the most important stimulus for egg-laying is temperature.

RELATIONSHIPS AMONG LEAF INSERTION PATTERNS IN MOSSES. Kenneth A. Wagner, Florida State University. Historically, little attention has been paid to the pattern of leaf insertion in mosses other than to note the common systems of 1/3, 2/5 and 3/8. An investigation of a large number of species shows that one pattern may dominate in several of the large groups. This consistency is believed to have evolutionary significance. The Brotherus concept of the origin of these basic patterns by torsion of the internodes is amplified and an explanation offered to account for certain derived patterns such as those found in *Fissidens* and the Homalioideae. A comparison of the mathematical coincidental relationships among the several leaf insertion patterns may enable us to predict additional patterns not yet found in the mosses.

THE MYGALOMORPH SPIDERS OF FLORIDA. H. K. Wallace, University of Florida. The five species known to the author (*Cyclocosmia truncata* (Hentz), *Myrmekiaphila torreyi* Gertsch and Wallace, *Pachylomerides audouinii* (Lucas), *Atypus abboti* (Walckenaer), *Atypus bicolor* (Lucas) to occur in Florida are described and their habits compared; Kodachromes of nests and individuals of four of the species are used to illustrate the talk.

A NEW GENUS AND SPECIES OF NEOECHINORHYNCHIDAE (ACANTHOCEPHALA). Helen L. Ward, University of Tennessee. While making a survey of parasites of marine fish caught in the vicinity of Miami, Florida, a number of acanthocephalans belonging to the family Neoechinorhynchidae were found in the intestine of the mullet, *Mugil cephalus*. Since these parasites differ fundamentally from other genera of the family, a new genus, *Floridosentis*, is proposed, with *F. elongatus* as the genotype. The new genus is distinguished chiefly by the number and arrangement of proboscis hooks which occur in eight diagonally longitudinal rows of about seven hooks each. Most members of this family possess three circular rows of six or more hooks each, although a few genera are characterized by the presence of more than three circular rows. A detailed description of the new genus and species is being published elsewhere. Stained whole mounts of adult male and female specimens will be demonstrated.

PRELIMINARY OBSERVATIONS ON THE EFFECTS OF P³² ON THE DEVELOPMENT OF COTYLOPHORON COTYLOPHORUM (DIGENEA: PARAMPHISTOMIDAE). T. B. Weber, Louisiana State University. Eggs were placed in Standard Reference Water containing P³² with activities ranging from 0.625 to 50.0 uc/ml. Eggs in 1.25 uc/ml and lower developed slightly more rapidly than the control; those

in 2.5 uc/ml developed at a rate comparable to that of the control, while those in succeeding activities up to 25 uc/ml developed progressively slower. Eggs in 50 uc/ml failed to develop. Hatching was greater in the lower concentrations than in the control with inhibition becoming evident at 2.5 uc/ml. Hatching declined rapidly in the progressively higher concentrations. Numerous instances of abnormal development in all activities were noted. The longevity of the miracidia hatching in the various activities was determined.

THE BLADEN LAKES (N. C.): ADVANCING OR RETREATING BOG MARGINS? B. W. Wells and Steve G. Boyce, *N. C. State College*. M. F. Buell (1939) states: "There is a mass advance of the vegetation into the lake from the margin. Cypresses are established which become nuclei for islands of shrubs and trees." D. G. Frey (1948) writes: "The reduction in area and volume of the lakes has occurred primarily through the gradual encroachment of the vegetation along the shores." Exactly the opposite is true. Waves and currents are eroding the peat at every point of contact. Evidence: marginal shrubs are mature multiple stemmed (fire response) like those back from margin; denuded roots are in all stages of necrosis; offshore gum and cypress show all stages of large roots exposed by peat erosion. The lakes are in Carolina Bays (meteorite origin?) most of which are peat filled. Initial smaller water bodies were made possible by fire. All present surfaces have burned repeatedly making pollen profile studies of no significance.

PLANTS OF THE PALISADOES (JAMAICA). Erdman West and Lillian E. Arnold, *University of Florida*. The Palisadoes, a long spit of land bordering Kingston Harbor, exhibits an interesting strand and dune flora composed of natives and ruderals. Some species are the same as those appearing in similar habitats in Florida.

GENETICS AND CYTOLOGY OF A MUTANT, DWARF-SPORED GLOMERELLA. H. E. Wheeler and C. H. Driver, *Louisiana State University*. A variant of *Glomerella cingulata* (Stonem.) S. & v. S. was obtained which produced ascospores approximately one-third normal size and which lacked the curvature characteristic of the ascospores of this species. A genetic and cytological study indicated that the dwarf-spored character was controlled by a mutant gene designated dw^1 (dwarf). In single cultures, this gene also controlled the position of the fusion nucleus in the ascus, the occurrence of nuclear disintegrations during meiosis, and partial or complete ascus abortion resulting from these disintegrations. In crosses, the nondwarf allele dw^+ was completely dominant in heterozygous cells but only partially dominant in heterokaryotic cells. Some asci from crosses between dwarf- and nondwarf-spored cultures contained four nondwarf spores, two dwarf spores and two spores intermediate in size. Evidence derived from studies of spore arrangements and a maternal effect exerted in crosses suggested that a diffusible product of the dominant allele dw^+ was responsible for the occurrence of intermediate spore pairs. A brief discussion of the taxonomic and genetic implications of these findings was presented.

EFFECTS OF INDOLEACETIC ACID ON GROWTH IN CODIUM. Louis G. Williams, *Furman University*. A report will be made of the effect of an exogenous supply of indoleacetic acid on the growth of both apical and intercalary segments of *Codium decorticaum* (Woodward) Howe.

INVERTEBRATE FAUNA OF SOLID SUBSTRATA IN NORTH CAROLINA. Louis G. Williams, *Furman University*. An ecological comparison of the invertebrate fauna is made of inshore jetties, outcropping of coquina at Fort Fisher, and offshore submerged reefs of North Carolina. An effort is made to relate distribution in North Carolina based on influences of 1) silt and mud, 2) sand, 3) configuration of substrata, 4) salinity, 5) depth, 6) temperature changes, 7) desiccation, 8) turbidity, 9) fouling substances, and 10) natural enemies.

CHANGES IN MONOHYBRID SEGREGATION RATIOS IN DROSOPHILA ACCOMPANYING SPERMATOGONIAL CROSSOVERS INDUCED BY X-RAYS. Maurice Whittinghill and Robert M. Johns, *University of North Carolina*. Previous experiments have demonstrated that induced crossing over in *Drosophila melanogaster* is correlated with a slight increase in wild type noncrossovers, when the irradiated parent was heterozygous for a recessive lethal. Recent testcrosses of $I(2)gl^3$

Cy cn^{\pm} sp^{\pm} / isogenic wild males treated as young adults with 3000 r of X-rays have revealed up to 2% increases in the proportion of wild type among the late offspring within an entire experiment involving over 14,000 flies. One male chosen for breeding beyond his 25th day of life transmitted wild type alleles to $62.9 \pm 2.1\%$ of the last third of his family. Conversely, although the original lethals went to 50% of the early brood, they were received by only 37% of his later brood. Furthermore, numerical equality of certain classes indicated clearly that crossing over and the formation of homozygous sectors of the testis were accomplished in a spermatogonial cell or cells.

SPERMATOGENESIS OF THE GRASSHOPPER AS SEEN IN LIVING CELLS. A. M. Winchester, *Stetson University*. Using specially designed phase contrast lenses, the author photographed details of spermatogenesis in living cells from the testes of the Florida lubber grasshopper, *Romalea dictyophorus*. The photographs are shown in the form of lantern slides. They show details of the chromosomes more clearly than is possible with photographs of stained preparations. The chiasmata formation of the paired chromosomes of the first meiotic division and the coiling system of the chromosomes are brought out particularly well. Some stages of spermatogonial divisions and all stages of both first and second spermatocytic divisions are shown.

PROXIMATE CAUSES OF CERTAIN PLANT DISEASES. F. A. Wolf, *Duke University*.

NEWS OF TENNESSEE SCIENCE

(Continued from page 171)

The University of Tennessee College of Medicine has received a grant of \$24,000 from the American Cyanamid Company, Lederle Laboratories Division, to finance a study of the health of the aged; also a \$55,104 grant from the United States Public Health Service for use by several departments for research programs.

Dr. James D. Hardy, assistant professor of surgery at the University of Tennessee College of Medicine, has received a research grant of \$6,966 from the American Cancer Society. The grant is for further studies in the field of nutrition in relation to the ability of the patient to withstand surgery.

Dr. Roger E. Koeppel, instructor in chemistry at the University of Tennessee Medical Units, has been awarded an \$8000 grant by the National Science Foundation to finance a study of "precursors of the carbon of glutamic acid."

Dr. R. R. Overman, associate professor of physiology at the University of Tennessee Medical Units, has been awarded a grant by the National Science Foundation to attend the meeting of the fifth International Congress on Tropical Diseases and Malaria in Istanbul, Turkey, August 28 to September 4, 1953. He will speak on the relation of the adrenal gland to malaria and to post-malarial debility.

Dr. Joseph B. Parker, Jr., associate professor of psychiatry at the University of Tennessee Medical Units, has resigned, effective March 31, to accept a similar position on the staff of the Duke University Medical School, Durham, N. C.

Dr. D. A. Shirley, of the University of Tennessee Department of Chemistry, recently received a grant from the Eli Lilly Company to aid in his studies on anti-tubercular agents.

Dr. James A. Taylor, M. D. Vanderbilt University, senior psychiatrist at Kennedy Veteran's Hospital since 1952, will be assistant professor of psychiatry and neurology at the University of Tennessee College of Medicine, beginning March 1, 1953.

Dr. Donald B. Zilversmit, associate professor of physiology at the University of Tennessee Medical Units, has been awarded a \$10,584 research grant by the Life Insurance Medical Research Fund. He will investigate the role of phospholipides in the deposition and mobilization of arterial lipides.

Dr. Charles E. Cheston, professor of forestry at Sewanee, has found an interesting cache of Indian pottery, arrowheads and animal bones in a shallow

cave on the university domain. It is estimated that these remains are more than 160 years old. They are being carefully cataloged as excavation continues.

An annual lectureship has been established at Vanderbilt University in memory of Dr. Barney Brooks, late professor of surgery. The first lecture was given by Dr. Ewarts A. Graham, Emeritus Professor of Surgery, Washington University School of Medicine, St. Louis, on "The Relation of Cigarettes to Bronchiogenic Carcinoma," on January 21, 1953.

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- Carlson, J. Gordon (ORNL). 1952. Microdissection studies of the dividing neuroblast of the grasshopper, *Chortophuga viridifasciata* (De Geer). *Chromosoma*, 5:199-220.
- Clark, Sam L. (Vanderbilt University). 1953. Oral folic acid tolerance test in normal human subjects and patients with pernicious anemia. *Proc. Soc. Exper. Biol. & Med.*, 82:25-28.
- Coniglio, John G., W. J. Darby, M. C. Wilkerson, Richard Stewart, Anne Stockell, and G. W. Hudson (Vanderbilt Univ.). 1953. Effect of X-irradiation on fat balance and on lipid and vitamin A content of the liver. *Amer. Jour. Physiol.*, 178:86.
- Collins, Clair J., L. S. Ciereszko, and J. G. Burr, Jr. (ORNL). 1953. Studies in the Wagner rearrangement. V. Further evidence for a steric effect. *Jour. Amer. Chem. Soc.*, 75:405.
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- Felton, Jean S., and Mary D. Owen (ORNL). 1953. Forecasting the number of employee visits to an industrial health service. *Indus. Med. & Surg.*, 22:1-7.

(Continued on page 195)

THE ROYALFERN, THE CINNAMONFERN, AND THE INTERRUPTED-FERN IN TENNESSEE

JESSE M. SHAVER

George Peabody College for Teachers, Nashville, Tennessee

INTERRUPTED-FERN *Osmunda Claytoniana* L.

(Continued from the October, 1952, number)

Grier (1927) found the number of fertile leaflets (in 609 leaves) to range from ½ a pair to 7½ pairs with 3 pairs being commonest (occurring in 24 percent of the leaves observed). Also, Robinson (1875, p. 52) mentions specimens