

were made under an electron microscope. Variation in the appearance of the spores, affecting the clarity with which spines could be demonstrated, was noted from one medium to the other. Since the morphology of the spore surface has been suggested as a criterion in the classification of these organisms, the authors conclude that systematic descriptions of actinomycetes would be most valuable if the media used to grow the materials for sub-microscopic observations were always specified and if synthetic media were always used.

LECLERCQ, SUZANNE. Liège University, Belgium. *Strobilar Complexity in Devonian Sphenopsids*. Scanty evidence of sphenopsids is known in Precambrian times. Recently, four new types of fructifications have been found in Devonian strata. In Belgium, a cone named *Eviostachya hoegi* Stockmans was discovered in Upper Devonian. Its chief point of interest consisted of an elaborate sporangiophore divided in nine segments supporting altogether 27 anatropous sporangia disposed in two circles. In Middle Devonian, two new species of Protoarticulatae have been studied whose main features are: *Calamophyton bicephalum* Leclercq & Andrews, sporangiophores branched in an upper and a lower segment giving off three side stalks, each bearing two anatropous sporangia, a total of twelve; *Hyenina complexa* Leclercq, the emission of pairs of sporangiophores, giving off three lateral stalks prolonged by spiniform appendages and bearing two anatropous sporangia, a total of twelve. From the Lower Devonian of West Siberia, a probable forerunner plant, *Protohyenia janovii* Ananiev has been described, consisting of aerial sterile and fertile shoots found in association. The most remarkable character was in the terminal position of pairs of erect sporangia located at the tip of each segment of the divided lateral appendage which in form and size was like the sterile leaf. These discoveries throw some light on the sphenopsids' past history.

LECLERCQ, SUZANNE, and HENRY N. ANDREWS, JR. Université de Liège and Washington University, St. Louis. *Calamophyton from the Middle Devonian of Belgium*. The *Calamophyton* specimens on which this study is based were collected by Leclercq in 1949 and 1952 from a lower Givetian horizon at Goé, a small village about 30 km. east of Liège. Although many specimens are represented in the collection, the present account is based on five which clearly display the characteristic habit of the genus. Our investigation has dealt chiefly with an elucidation of the structure of the ultimate sterile and fertile appendages. The sterile appendages (leaves) are shown to be three-dimensional structures that forked two to four times and were probably rather rigid and terete in cross-section. The fertile appendages (sporangiophores) divided into two segments or "heads," an upper and a lower one, each of which bore three short side stalks that terminated in a pair of anatropous suspended sporangia. Altogether a sporangiophore had two heads supporting twelve sporangia when none of them aborted. In view of this characteristic structure and the fact that it is appreciably more complex than the corresponding organ in other *Calamophyton*s, we have given the Belgian specimens the new name *Calamophyton bicephalum*.

LECLERCQ, SUZANNE C. M., and HARLAN P. BANKS. University of Liège, Belgium, and Cornell University, Ithaca, New York. *Pseudosporochnus Is Not a Psilophyte*. The study of 534 specimens of *Pseudosporochnus* collected in a single outcrop by Leclercq in 1949 and 1952 has given the authors the opportunity to work out: (1) the plant's habit which was that of a small tree; (2) the

mode of branching which consisted of a main stem, two orders of branches, and spirally arranged ultimate appendages (leaves); (3) the ultimate appendages (leaves) whose rachis gives off several successive pairs of opposite divisions; each of the numerous divisions then divides by several successive dichotomies; the whole appendage is arranged in three dimensions; (4) the organization of the fertile fronds, on which pairs of erect, terminal, well-developed sporangia were borne on the tips of some or all of the fine divisions of the ultimate appendages (leaves); (5) the highly differentiated vascular system of the first and secondary order branches, which consisted of a very complex stellate form with long slender arms. The conclusion to which the various characters point, and especially the anatomy, is that *Pseudosporochnus* had more in common with the Cladoxylaleae than with any other group of plants at present known, and that it must be removed from the Psilophytales.

LEDINGHAM, GEORGE F. Regina College, University of Saskatchewan. *Chromosome Numbers of Astragalus and Oxytropis (Leguminosae)*. A study made of the chromosome numbers of certain species of *Astragalus* and *Oxytropis* in relation to their geographical distribution throws some light on the origin and evolution of these genera in North America. Eurasian species of *Astragalus* and *Oxytropis* have chromosome counts based on an 8 series ($2n = 16, 32, 48, 64, 96$). Some of these Old World species have migrated, with little further evolution, into North America. They have apparently come in through the northwest during fairly recent times and very few of them have spread south of Canada. Typical North American species of *Astragalus* occur largely in the southwest United States with a few species in the southern part of Western Canada. This group has a basic chromosome number of 11 or 12 ($2n = 22, 24$, and one polyploid with 44) instead of the basic number of 8. Thus, its chromosome number and distribution are distinctly different from that of the Old World group. It seems obvious that this group should be removed from the *Astragalus-Oxytropis* complex and raised to full genus status.

LEE, MIN JAI, EUL SUK CHOE and SANG SHIN PARK. Seoul National University. *A Study of Some Physiological Characteristics of Euglena*. The comparative studies of the quantitative measurement of growth characteristics and utilization of substrates by the cells of *Euglena gracilis* var. *bacillaris* Pringsheim have been carried out in light and in darkness. The effect of respiratory inhibitors and 2,4-dichlorophenoxyacetic acid (2,4-D) on endogenous respiration and responses to the added substrates for exogenous respiration and amino acids are also investigated. Sixteen kinds of media are used in this experiment: a basal medium (Cramer, 1952) as the control, one deprived of Vitamin B₁, another of Vitamin B₁₂, 0.5 per cent ascorbate, sucrose, glucose, Na-citrate, succinate, malate, butyrate, Na-oxalate, Na-acetate, maltose, hydroquinone, lactate, and 2 per cent ethanol, added to each separate basal medium, respectively. Both in light and dark the degree of growth-rate increase of the organism is found in the following order: the basal media added 0.5 per cent lactate and 2 per cent ethanol, 0.5 per cent succinate, 0.5 per cent Na-acetate, and 0.5 per cent malate. Similar results are also found in the exogenous respiration. The endogenous respiration of the cells is strongly inhibited by 0.1 M of KCN, malonic acid, NaF, and iodoacetic acid. Twelve kinds of free amino acids are detected in this organism.