meryx, Blastomeryx, Mylogaulus, Sciurus, Paomys, Aelurodon, Pseudaelurus, Machaerodus, together with a few bird, reptile and anuran bones.

A preliminary study of this urodele material shows that the specimens, numbering over a hundred individuals, belong to one species and must be placed in the family Ambystomidae and probably in the genus Ambystoma. The size of the skeleton would be about that of some of the larger members of the genus Ambystoma living to-day, averaging about 225 mm in length. A study of the material is now being carried on and a complete description and diagnosis will be available in the near future. In so far as the writers are aware, these are the first urodeles to be described from the Lower Pliocene.

L. A. ADAMS
H. T. MARTIN

UNIVERSITY OF ILLINOIS
UNIVERSITY OF KANSAS

THE ALBINO RAT

THE use of the term *Rattus norvegicus albinus* to designate the domesticated strain of albino rat, used so extensively in experimental laboratories, has been condemned by systematists on the grounds that albinos occur in practically all species and are only variants. That is a point for systematists to settle, but it seems evident that so far as the Wistar strain of white rats is concerned there is something more to be said. Recent work on the gametic composition of a colony of rats resulting from interbreeding the Wistar strain with the wild gray rat, *R. norvegicus* Erxl., a partial report of which appeared in the December 16, 1927, issue of SCIENCE, indicates the possibility of a greater difference between the parents than is ordinarily found in strains of one species.

The chromosomes of ninety rats have been examined, some of them being the ordinary albinos. No differences could be detected between the gametic composition of these and the other members of the group. A comparison of the albinos of the colony, however, and the Wistar strain of albinos, shows marked differences in gametic composition both in chromosome counts and in the chromosome number in the offspring resulting from matings made between them and other members of the colony. So far as our knowledge of the specificity of chromosome number and behavior goes at the present time, this would not be an expected result if the ordinary albinos of the colony and the Wistar strain were merely variants of one species. Examination of four wild gray rats, *Rattus norvegicus*, shows that these rats had a diploid count of forty-two chromosomes and both twenty-one and thirty-one chromosomes in the secondary spermatocytes, the dimorphism in the haploid number being the common characteristic of the members of our colony. According to Donaldson[1] the pure strain of albinos came from *R. norvegicus* and "is far removed from its wild ancestor and moderately inbred." How far this removal must be carried before species-differences arise is a matter of speculation, but the fundamental differences in gametic composition are suggestive in this connection. Since the ordinary albinos of the colony show the gametic composition of other members of the colony, it is probable that this change has occurred since the original strain of pure albinos was segregated from its wild ancestor.

This change is not confined to members of our own colony of mixed rats. The testes of two rats received from the laboratory of Professor R. A. Dutcher, Pennsylvania State College, gave chromosome counts of forty-two and sixty-two respectively, each showing both twenty-one and thirty-one chromosomes in the secondary spermatocytes. Members of a third colony came from Professor H. Steenbock, University of Wisconsin, in which the same conditions are found.

It seems possible that the primitive or basic number of chromosomes in *R. norvegicus* is forty-two, and that the dimorphism in the haploid number is a late acquisition, and that we have here a new species in the making which will ultimately come to have only 62–31 chromosomes.

OLIVE SWEZY

ANATOMICAL LABORATORY,
UNIVERSITY OF CALIFORNIA

THE HIDING PLACES OF TREE-FROGS

A NOTE in SCIENCE (Mar. 9, 1928) on "Tree-Frogs in Pitcher-Plants," by Dr. E. A. Andrews, of Johns Hopkins University, in which he calls attention to an association between pitcher-plants (*Sarracenia flava*) and the tree-frog (*Hyla cinerea*) observed near Beaufort, N. C., in June and July of 1888, brings to mind a similar observation made by us on June 21, 1924, in a region of the same type. While collecting near Washington, N. C., at the head of Pamlico Sound some sixty miles north of Beaufort, we came upon an extensive sphagnum swamp, at the time very dry and firm enough to walk about on, and found it filled with orchids and pitcher-plants, *Sarracenia flava* most abundant. The swamp is surrounded by thin pine-woods interspersed with scrub-oaks, these occurring also on the dry knolls in the sphagnum. While opening the pitcher-plants in order to collect the insects hidden in the deep greenish yellow funnels we were surprised to find a long, thin, green tree-frog.

[1] Donaldson, H. H., 1924, Wistar Institute, Philadelphia.

In the course of a half-hour's collecting we saw others but were unable to capture any of them. The funnels of these pitcher-plants were moist and cool in contrast to the surrounding dry and dusty woods and undoubtedly offered the most congenial conditions for these frogs.

In 1910 while collecting in Florida we found tree-frogs numerous in the moist troughs formed at the bases of the leaves of the common cabbage palmetto, especially where the surroundings were dry, as was the case near the sand-dunes on Anastasia island off Saint Augustine. The bases of the leaves of the common yucca (*Yucca aloifolia*) also harbor a population of insects and tree-frogs. In extreme southern Florida as well as on the tropical islands of the Caribbean sea it is usually possible to find tree-frogs in the moist centers of the numerous aroids growing on the trees and rocks. In Cuba, during the dry season, tree-frogs inhabit the moist and narrow space under the leaf-sheaths of the royal palms, even along dry and dusty highways.

Near the Harvard Biological Station at Soledad we surprised a small boa hunting out and eating the tree-frogs hidden in a roadside palm; in fact, it was the shrieks of a half-swallowed frog which disclosed the marauding boa. Along the streams near the Harvard Botanical Garden (Soledad) we collected tree-frogs in the same moist hiding-places as well as in the leaf-sheaths of the bananas. The cool damp places under the palm-sheaths, at the base of yucca leaves and palmetto leaves and inside the aroids harbor a great variety of insects, especially beetles, and sometimes earthworms and it has been while searching for insects that we have found the tree-frogs.

BEIRNE B. BRUES

FOREST HILLS,
BOSTON

CENTERS OF RESEARCH

THE paucity and mediocrity of the research produced by some of the graduate schools of our large universities have been the subjects of a great deal of adverse censure. Out of this amazing amount of vituperation has come little or no constructive criticism.

That certain laboratories are making great contributions to science can not be disputed. Why, then, this great disparity between research laboratories? Leaving, for the time being, a discussion of personnel out of account, the author would venture the remark that a large part of the trouble is due to the matter of organization.

There seem to be two lines of development in this country. Either the department of research is under one outstanding leader or else the research students are divided between several members of the departmental staff.

European centers of research have, in general, adhered to the first method and their success has been attested by the number of American students who have flocked to work under certain great scholars. In this country we seem to have lost sight of this fact and as a result find too often the second plan of organization. If one sets down a list of research centers, classifying them under the two modes of organization just mentioned, I believe it will be a surprise to see how they align themselves.

It seems perfectly obvious that, in a department of research where students are working for a Ph.D. degree, the best results are to be obtained when they are all directed and supervised by one individual who has the *flair* for research.

A real *esprit de corps* can hardly be built up in a divided research group. It is the unity of the group which makes for success. The divided directorate of research suggests too much the chaos which has existed the past few years in China's government.

If an educational institution intends to set up a school of research in any department it will call one man as director of research for that department. The other teachers on the staff will be called to give certain courses and not to direct research. This would not mean that they should not do any research work. On the contrary, they would be encouraged to do it. If of sufficient ability such teachers should have assigned to them an assistant of Ph.D. caliber to help in their research work. So far as actual research work goes, a teacher with a good research assistant can get more done than he can directing six inexperienced Ph.D. candidates. It would be a great stimulus to the students in the department to see this sort of research work going on.

This plea for a centralized control of research is not calling for superhuman directors. It goes without saying that the best men available will be called to such an important position, but many laboratories would be turning out a much better product to-day if their research work were centralized in each department under one individual, even though the director were not a Nobel prize winner.

Our research laboratories would hum if each department could be directed by one leader of thought and action who had the enthusiasm for his subject which is contagious and to whom has been imparted that subtle gift of passing on to others the urge for creative scholarship.

S. R. WILLIAMS

FAYERWEATHER LABORATORY OF PHYSICS,
AMHERST COLLEGE