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TADPOLE LIFE IS ILLUSTRATED IN MODELS ENLARGED HUNDREDS OF TIMES

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What does a tadpole turn into? Although the "Quiz Kids" would consider this question an easy one, only a good naturalist could answer many further tadpole queries. Of all the abundant forms of higher animals, the common "polliwog" is one of the least appreciated. Even students of amphibian life often put tadpoles aside as uninteresting, and laymen are prone to think of them only as generalized blobs of flesh from which frogs and toads arise, scarcely realizing that each kind of frog or toad has its own particular kind of tadpole.

The tadpole's small size and lack of bony skeleton are largely to blame for this neglect; its soft body is hard to handle in life, to preserve for study after death, and to observe either in life or in death. Nevertheless, tadpoles are fascinating animals that differ widely in form, color, and habits. Well over a thousand different kinds exist.

From the frog's point of view the tad is one of the two remaining links in an evolutionary chain that once completely bound the frog to a life in water. The other link is the necessity of breeding in water. If frogs could only sever these two links they would emerge full-fledged land animals like their more advanced relatives, the reptiles, birds, and mammals. At least the frog has the satisfaction of looking down a long nose at the lowly fish which is still completely chained to an aquatic existence.

Let us forget the polliwog's family tree and consider its here-and-now problems. Having never developed the ability to live in salt water, polliwogs must be satisfied with fresh water. Nor are they found north of the temperate regions where perennially frozen soil makes adult amphibian life a complete impossibility.

Another restriction results from the lack of defensive ability; tadpoles are all but helpless against the attacks of certain fishes, their soft bodies making them a most toothsome prey. A few have developed poison glands which, however, have been so little studied that no one knows how helpful they may be. The poison, it would seem, at best might bring them only a Pyrrhic victory, for although they may thus kill the fish that bites them, the tadpoles themselves are also killed in the process. The poison, incidentally, is not at all dangerous to human beings who may happen to handle the tadpoles. Since fishes are universally distributed in large bodies of water, tadpoles must be content to inhabit relatively fish-free places such as small ponds, streams, and temporary pools. Shallow plant-grown edges of rivers and lakes also are favorite haunts because there fishes are rare or at least readily avoided.

Thus we see that tadpoles frequent a mere fraction of the earth's waters. In these they are, however, astonishingly abundant, and presumably it is this abundance that has forced them to make the most of their cramped quarters. A likely pool, for example, may be thought of as a polliwog city so crowded that its inhabitants have invaded every part from the muddy bottom to the very surface from which they sometimes appear to be suspended.

A new exhibit at Field Museum shows just what remarkable creatures these neglected polliwogs are and explains the ways in which they have solved the problem of existence in the face of tremendous competition from other small animals. Models enlarged hundreds of times clearly show the peculiarities scarcely noticeable in the tiny animals themselves.

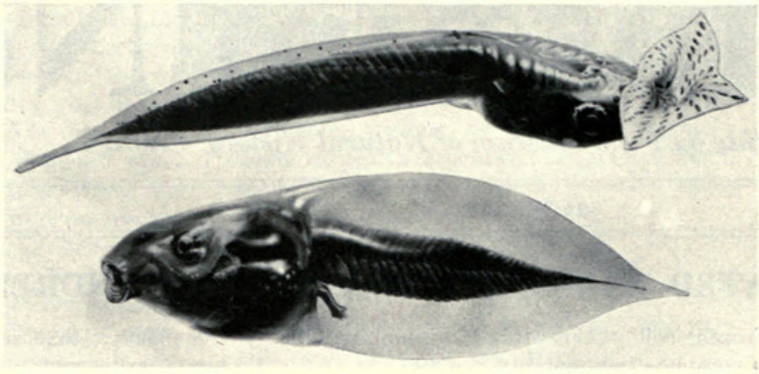
In order to understand this exhibit one must forget that tadpoles are merely immature frogs and think of them as so many species or kinds of amphibians. Each species is in turn a population of millions of individuals that have become adapted or suited to life in a particular part of the general tadpole environment referred to above. Any one of these parts selected by a species is, let us say, like a cubby-hole in an old-fashioned office desk and may be called a "habitat niche." These niches are so numerous that they have to be classified before being illustrated in a museum.

The left side of the new exhibit does just this under the heading "Major Adaptations." It is not surprising that most tadpoles have

Children Learn About Tadpoles and Frogs

Among visitors to new exhibit on day it was opened were (left to right) Gordon Johnson and Bob Hoffman of LaGrange, Illinois, and Penelope and Stephen Rich (the latter are the children of Director Daniel Catton Rich of the Art Institute of Chicago). Mr. Frank H. Letl of the Museum's staff, who supervised preparation of the exhibit, explained to the group of youngsters how tadpoles live and change into frogs.

chosen bottom niches in quiet water where food and means of protection are plentiful. These "bottom dwellers" are represented by the tadpole of the common bullfrog (*Rana catesbeiana*) with short deep body, high tail fins, and downwardly directed mouth. This species happens to be a veritable giant among polliwogs.



Two of the Tadpole Models in New Exhibit

Upper model represents an extreme oddity, the streamlined Chinese tadpole with expansible mouth somewhat resembling a lily in form. This mouth functions for surface feeding. The tadpole feeds on floating particles by expanding the lips just under the surface and drawing in a current of water. At rest the folded lips curl upward like the points of a crescent moon. The lower model, representing the tadpole of the leopard frog, illustrates gill breathing. Water taken in through the mouth washes the concealed gills and passes out the breathing pore which is on the left side. In this model the transparency of the gill covering is exaggerated in order to show clearly the gills and developing fore limb. Curator Pope says tadpoles do not breathe solely through gills, but these structures are their chief means of obtaining oxygen.

Another major adaptation is the "torrent dweller" represented by a little-known species from the mountains of western North America. The torrent species are few in number but widely distributed over the earth. They have developed a streamlined form that offers little resistance to currents, and a sucker-mouth or sucker-belly by which they cling to rocks, so that they are not swept away by rushing water.

Last but not least interesting of the major adaptations is the "surface dweller" with upwardly directed mouth and ability to float at any level. Feeding on particles caught by the surface film of quiet pond or pool is a simple matter for this uncommon type which cleverly avoids competition with the crowded bottom-loving creatures. It seems to test the saying that "there is always room at the top."

ADAPTATIONS TO SPECIAL CONDITIONS

The remainder of the new exhibit is taken up with two other aspects of tadpole life. First, on the right, a few "special adaptations" are illustrated. The tadpoles shown are species that have some unusual way of getting along in the polliwog world. For example there is the Asiatic tad sometimes called "umbrella-mouth" because of its expansible lips that help in securing minute floating food particles. Second, in the lower center, two models show various features of tadpole structure.

The new exhibit was prepared by Messrs. Frank H. Letl and Joe Krstolick of Field Museum's staff. Mr. Letl made the models by a plastic process applied for the first time in museum exhibition work. They are vastly superior to the wax products formerly in common use. A glance at the new exhibit is sufficient to convince even the most casual observer that Mr. Letl has solved the problem of making life-like replicas of the moist-skinned amphibians. The colors can actually be painted in the plastic material instead of merely on the surface. As in the Museum's celluloid models, transparency or any degree of translucency can be easily attained in the new plastic medium.

SCHOOL CHILDREN COME FROM DETROIT TO STUDY AT FIELD MUSEUM

By MIRIAM WOOD
CHIEF, JAMES NELSON AND ANNA LOUISE RAYMOND FOUNDATION

No greater tribute could be paid to the educational value of Field Museum than the fact that in the eighth grade of a public school in a city as far from Chicago as Detroit, and as large as that motor metropolis, the greater part of a year's course of study has been based upon material and facilities provided in this and certain other Chicago institutions.

The school in question is the Cadillac School, and the plan under which the course has been organized and executed indicates great enterprise on the part of both teachers and students. Educators elsewhere might find it adaptable to their uses.

Forty-three children of the eighth grade in this school, chaperoned by teachers, made a visit of several days to Chicago during their spring vacation. Participation was voluntary, and the trip was planned months in advance. Each child in the party was required to earn at least one-half of his total expenses, figured on a flat-rate all-inclusive basis of $25.25. Permission of parents, of course, was also required. In addition to visiting Field Museum, the children were taken to the Shedd Aquarium, Adler Planetarium, the Museum of Science and Industry, Northwestern University, Union Stock Yards, a candy factory, a radio studio, and Chinatown. The purpose of the whole trip was to present an introduction to various new phases of life, and to offer the children opportunity to begin trying the solution of problems "away from home."

Mr. Charles Yarbrough, leader of the group, had brought a similar group here the previous year, and at that time conceived the idea for this year's more extensive visit and studies. During the months prior to coming to Chicago, preparation was made by adjusting the course of study to co-ordinate with this plan. Leaflets on certain Field Museum exhibits, and post cards, were obtained in advance and used in classroom work. Thus familiarized, the children knew just what to seek upon their arrival in the exhibition halls.

OTHER ACTIVITIES

From Madison, Wisconsin, a group of 350 boys and girls were brought to Field Museum on May 17. This trip was sponsored by the *Madison State Journal*. Many other out-of-town groups have visited the Museum during the past month. On one single day, 1,373 school children came in organized groups.

On May 15, a meeting was held in the Museum Lecture Hall by teachers of six Chicago special schools for handicapped children, under the auspices of the Jane Neil Club. The purpose of this meeting was to enable members of the Museum staff and the teachers to consult on means for extending the services of this institution to handicapped children on a basis similar to that developed for other groups. Mr. John R. Millar, Curator of the N. W. Harris Public Extension, told of the work conducted by that Department, and the writer spoke on the activities of the Raymond Foundation and told how they could be adapted for crippled youngsters. Dr. Eldridge T. McSwain, Professor of Education at Northwestern University, made a brief address on the responsibility of teachers in using such community resources as those offered by museums.

By invitation of the manager of W9XBK, television station of Balaban and Katz, the Raymond Foundation was enabled again to place Field Museum both aurally and visually "on the air." The program featured Mr. Bryan Patterson, Assistant Curator of Paleontology, who co-operated with the Foundation in preparing a program about prehistoric animals.

Mammalogists to Meet at Museum

The American Society of Mammalogists will hold its twenty-third annual meeting at Field Museum June 9–13. This is a national society of about one thousand members from all parts of the country, including not only professional mammalogists, but wildlife managers, conservationists, sportsmen, and all others interested in mammals from any standpoint. Regular sessions will be open to the public.

The Ainu, a people inhabiting Hokkaido (Yezo), Japan, are rapidly approaching extinction. Their culture is well represented by a collection of artifacts in Hall L.