

THE OBSCURE SALAMANDER DESERVES A PLACE IN THE SUN

By CLIFFORD H. POPE

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ONCE ASKED AN acquaintance what he did for a living. He answered that he did not like to say because his reply was too apt to bring a laugh. It turned out that he was a manufacturer of hot tamales and had a small but flourishing business. I sympathized with him because my interest in snakes has often brought a laugh, or at least a facetious remark.

Since taking up a study of salamanders I may be met with a blank expression rather than a laugh. This is even more trying because I know that a long explanation will be called for. Such an explanation often leaves the recipient's mind confused. He may even become defiant or skeptical.

Recently I tried to explain to my barber that he uses salamanders, not lizards, as bait in fishing for bass, but he chose to remain skeptical. After all, the little animals in question look like lizards to him and lizards they are and always will be. I changed the subject because I consider it highly imprudent to push an argument when in the barber's chair. It might be remarked here that this constant confusion of the salamander with the lizard is due basically to a similarity in shape. However, if the former were well known and the latter were not, the layman would insist on calling a lizard a kind of salamander.

UNFAMILIARITY BREEDS CONTEMPT!

My barber did not realize that he was putting salamanders to what is just about their only practical use, thus demonstrating in a way why salamanders must forever be more or less obscurely linked or confused in the lay mind with lizards, which most emphatically they are not. If my barber's friends insisted on confusing him with a gorilla, he no doubt would take offense, whereas his relationship to a gorilla is vastly closer than is the relationship of the lizard to the salamander.

The cause of the relative obscurity of salamanders is, I believe, their lack of usefulness. The other important vertebrates or backboneed animals, mammals, birds, reptiles (including snakes, lizards, turtles, and crocodilians), and frogs are familiar to every man, woman, and child. It is true that one small group of amphibians, the caecilians, is virtually unknown, but the explanation of its obscurity is patent: caecilians are secretive burrowing creatures of the tropics so

rare that many professional herpetologists live and die without ever laying eyes on a living one. Moreover, a caecilian looks rather like a snake and would mislead anyone.

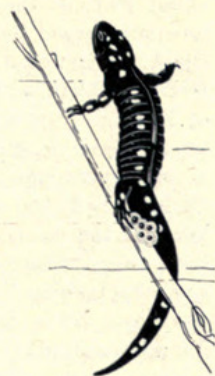
As we think of the well-known groups of vertebrates it becomes apparent that they have certain qualities in common: all are abundant, all are widely distributed, and all have considerable economic value. The snakes and the lizards do not rank with some of the others in economic value, but the snakes make up for this deficiency in their peculiar emotional appeal to man, the lizards in sheer abundance and conspicuousness. The sun-loving habits of most lizards keep them in the open where they are quickly seen. In abundance and extent of distribution the salamanders hold their own well enough, although in number of species they are far surpassed by all the other important groups except the crocodilians (alligators and crocodiles) and the turtles.

NO CLAIMS EVEN TO NOTORIETY

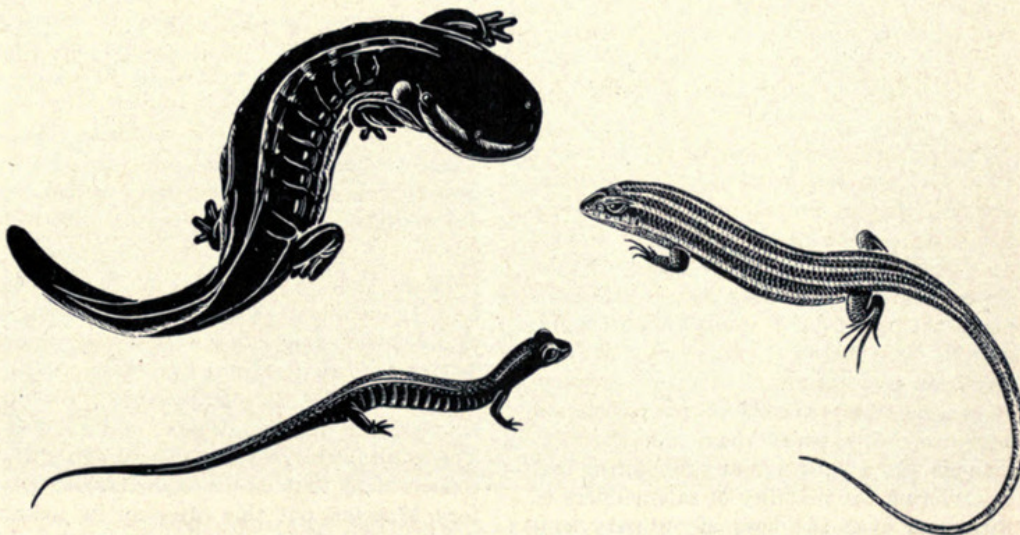
The salamanders alone can boast of no real economic importance because, with few exceptions, they are too small to be eaten and their skins would not be large or thick enough to serve as leather. Nor do their feeding habits make them useful as de-

negative. When we trace our ancestry back toward the lower forms from which we arose we can by-pass even such highly popular groups as the birds, which are merely specialized reptiles, but we must go very near to the salamanders. These creatures lie close to the line of descent that links us to the fishes. It was an amphibian not unlike a modern salamander that first escaped the bondage of water and came out on land to live. Many of the salamanders of today reflect this stage of vertebrate evolution in their double life, part of which is spent on land and part in water. Every student of biology comes in contact with a salamander in the laboratory when studying the anatomy and evolution of vertebrates. Salamanders are not only sold by the thousands to schools and colleges for student dissection but are used extensively in biological laboratories as objects of experimentation. To the zoologist, then, the unknown salamander is at least as important as any other vertebrate, always, of course, excepting the mammals.

From the point of view of the naturalist the salamanders are extremely interesting because of their unusual habits and complex life-histories. The common newt, for example, has a three-stage development that begins in water (larval form), continues on



SPOTTED
SALAMANDER
LAYING EGGS



Drawings by Margaret G. Bradbury

HOW TO TELL A SALAMANDER FROM A LIZARD

The heavy-bodied scaleless salamander known as the hellbender is shown above at left. Below it is a "typical salamander." A lizard, distinguished by its scales, is seen on the right.

stroyers of the enemies of man. Even if they were highly dangerous like the crocodiles, some of the larger mammals, and the venomous snakes, they would at least be notorious. But a poisonous skin harmful only to the digestive tract of man is too much of a negative characteristic to make the salamander notorious.

Do salamanders deserve this unimportance? Are they devoid of any significance or interest that would make them worthy of attention? The reply is an emphatic

land (red-elf stage), and is concluded in water (mature or reproductive stage). In some kinds of newts the males develop gaudy crests during the breeding season, a fact that European aquarium and terrarium lovers have taken advantage of to develop the hobby of rearing newts, which is like the tropical-fish hobby of this country. No such interest has ever been developed in the United States, although we have a vastly richer salamander fauna than does Europe. Perhaps the explanation lies in our lack of

really spectacular kinds that would stimulate such a hobby. Some Japanese newts are sold in our stores and do eventually find their way into home aquariums or terrariums.

The courtship of many salamanders is interesting to watch and the method of fertilization unique among the backboneed animals. The eggs of the primitive kinds are laid in water, those of the more advanced on land. They are often guarded by the mother, a fact proving that the lowly salamander is not entirely devoid of concern for the coming generation. The process of reproduction is in general intermediate between that of the fishes and that of the vertebrates higher than the salamanders.

LINKED WITH RAIN AND FIRE

Although, as already pointed out, salamanders are relatively few in total number of species, they not only are widely distributed but also are found throughout the northern hemisphere where advanced human cultures have long been interested in studying life scientifically. Few salamanders are found in Africa and South America and none occurs in Australia. In the Old World the significance of these animals varies from place to place. In China salamanders are associated with rain and even believed to control it. This is not so surprising in view of the fact that these amphibians are moisture-loving. While working in China I was advised to refrain from catching salamanders during dry spells, and I learned that they are often kept in temples and carefully protected there.

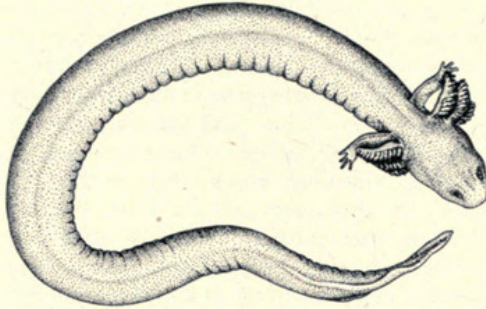
In Europe the salamander is associated with fire, and the belief that salamanders actually live in fire is reflected in many languages. Incinerators, portable stoves, and other articles used in connection with fire are known as "salamanders." An example of this is a type of utensil for browning pastry. The theory of Paracelsus, the Swiss physician and alchemist of the 16th century, gives some idea of the age of this association with fire. This savant held that the salamander was a being actually inhabiting fire. Considering the inability of salamanders to withstand even the heat of ordinary sunlight, this is a remarkable myth. Perhaps the frequent appearance of salamanders on hearths gave rise to it—individual salamanders brought in with firewood would crawl out on feeling the drying effect of the heat and seem to have emerged from the ashes.

Finally, salamanders are varied enough in size and shape to attract attention. The giant salamanders of Japan and China reach a length of from three to five feet and have grotesque flat bodies. In the United States the hellbenders, though considerably smaller than their Asiatic cousins, the giant salamanders, are formidable in appearance. Once while I was hunting in North Carolina a fisherman friend of mine caught a hellbender and ran a mile with it to ask what it

could be. He seemed to be convinced that he had discovered the devil itself. This and the name "hellbender" give ample evidence of grotesqueness.

SIREN IN CHICAGO AREA

The "Congo eels" and sirens of the southeastern lowlands are shaped like eels and reach a length of three feet. One kind of siren actually occurs in the Chicago area where it is so rare that few persons ever see



A VOICELESS SIREN

This salamander's only link with mythological sirens, for which it is named, is its aquatic habitat. It breathes by means of gills, which grow just in front of its tiny legs. The hind legs of the species have been lost in the course of evolution. This kind of siren is occasionally found in the Chicago area.

it. The smallest species of salamanders are barely three inches long and not nearly so thick as a lead pencil. These large and small extremes are the exceptions proving the rule that the typical salamander is a lizard-shaped vertebrate about five inches long. It should be remembered that the smooth, moist skin of the salamander is in sharp contrast to the dry, scaly skin of the lizard, and consequently the two can be distinguished at once even by the untrained eye.

In the year 1943 the salamanders of this country attained the stature of having a complete 555-page book of a semitechnical nature devoted to them: *Handbook of Salamanders* by the late Sherman C. Bishop, who was our leading student of the group. The addition of Dr. Bishop's superb study collection to that of Chicago Natural History Museum put this Museum in possession of the finest research collection of salamanders to be found anywhere.

2,200 INSECTS IN AMBER ACQUIRED BY MUSEUM

Important collections of insects in amber are rare, and most of those on record have found their way into European museums where they have been held for years and, for the most part, probably will remain. So far as known by staff members of the Department of Zoology at Chicago Natural History Museum, the only two important collections in the United States are one obtained in the 1930's by the Museum of Comparative Zoology at Harvard University

and a collection of 2,200 specimens recently acquired by this Museum. The world's finest collection, consisting of more than 100,000 specimens owned by the Königsberg Museum in Germany, was destroyed during World War II.

The collection just obtained for our Museum consists of insects that were trapped in the flowing pitch of conifers that grew about 30 to 35 million years ago in an area now submerged by the Baltic Sea. This is the A. F. Kohlman collection, obtained from F. E. Trinklein, a high-school science teacher of Racine, Wisconsin, who purchased it at an auction following Mr. Kohlman's death several years ago. In the millions of years during which the resin-enclosed insects lay beneath the sea they fossilized. They thus have been preserved accidentally in much the same fashion that modern specimens are purposely preserved in balsam-resin slides for microscopic study. In fact, of this collection about 1,450 of the specimens have been prepared for research with a microscope. The collection was assembled in the period from 1900 to 1915. They are specimens "naturally embedded in plastic." The state of preservation is unique. Most of them can be studied in such minute detail that it is possible to compare carefully and relate them to modern forms, says Rupert L. Wenzel, Curator of Insects.

"Study of the rich Baltic amber fauna has probably enabled workers to learn more about the insects of the area and time than is true of any other group of animals for any geologic horizon," Curator Wenzel adds. "The material is of particular importance because it gives the first clear picture of an ancient insect fauna since Carboniferous and Permian times. The intervening Mesozoic period, marked in the evolutionary picture by the rise and fall of dinosaurs and the beginning of the mammals, has yielded relatively few fossil insects. Baltic amber has been a valuable article of commerce for more than 2,000 years both as a semiprecious mineral and as a source of amber varnish. The sources of Baltic amber were much depleted by mining and dredging operations before World War II, and those that remain are now in Russian hands."

Scandinavian Paleontologist Studies Here

Dr. Tor Orvig, a paleontologist from the Swedish Natural History Museum in Stockholm, spent two weeks in Chicago recently, during which he studied the collection of fossil fishes at this Museum. He was particularly interested in those of Silurian and Devonian age.

He who sees things grow from the beginning will have the best view of them.

—Aristotle



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