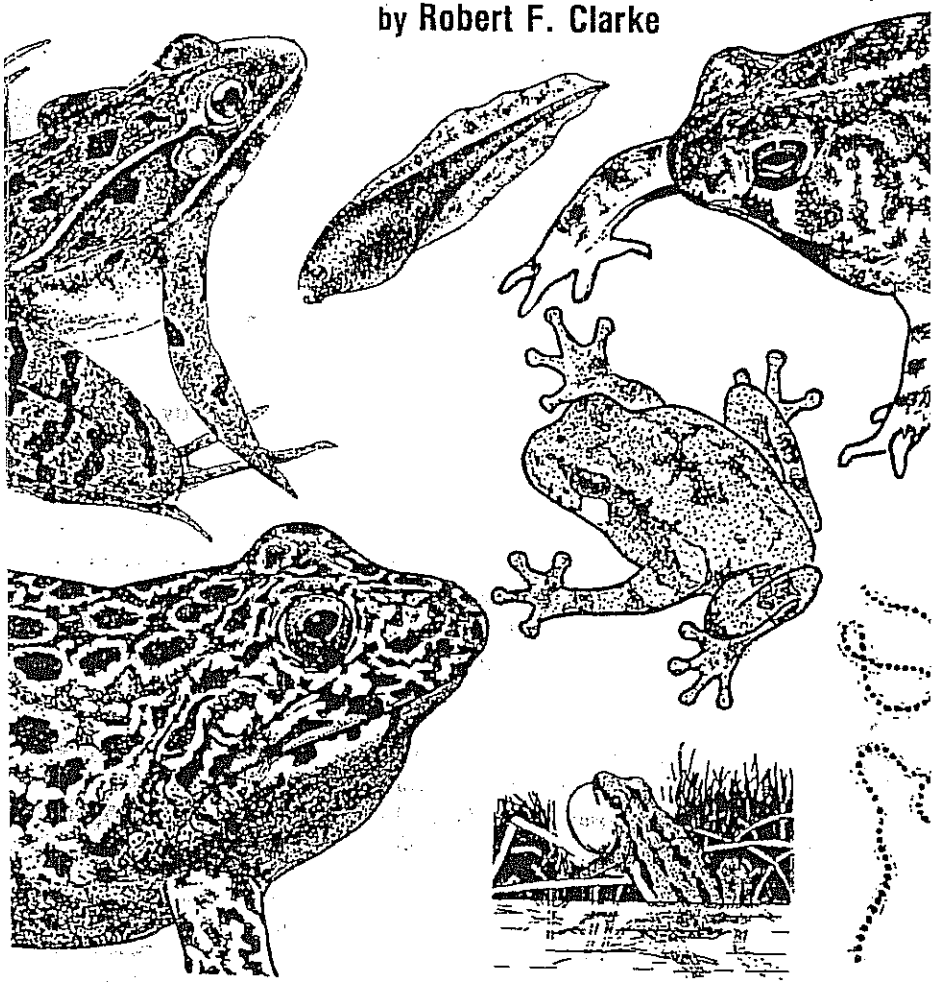
FROGS AND TOADS IN KANSAS

by Robert F. Clarke



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I don't suppose that there is anyone who reads this issue of the *Naturalist* who doesn't know what a frog or a toad looks like, but popular literature, childrens' books, cartoons, and other characterizations depict "frogs" as fitting the general description of members of the genus **Rana**, and "toads" the genus, **Bufo.** But there are many other frogs and toads in the world having physical appearances which are at variance with both of these general types — and none of the frogs turn into princes and none of the toads "give warts." The objective of this issue of the **Naturalist** is to give a hasty overview of the Kansas frogss and toads, their habits, habitats, and distribution; and to describe the 20 forms that occur in the state in such a way that, hopefully, most can be identified. For those seeking more information or better guides, a short list of pertinent publications is given at the end of this issue.

Frogs and toads are members of the classification of vertebrate animals — **Amphibia** — which also includes salamanders and a tropical, legless group of burrowing forms known as Caecillians. All of these animals share common characteristics which differ them from other groups, such as bony fishes or reptiles. Among these characteristics are the type of egg that must be laid in water or in a moist location, a glandular skin that lacks scales, toes (when present) without claws, three-chambered heart, skull and skeletal bones that are unique, a peculiar voice mechanism, and a number of other morphological, physiological, and behavioral differences.

The names "frog" and "toad" are used throughout this issue in order to use popular names for two generalized groups, but other than the **Rana/Bufo** stereotypes mentioned above, the names do not apply well, and in some cases are not only misleading, but also both names may be applied to the same species. So, "What is the difference between a frog and a toad?" is not a good question, and we must resort to other names that have more meaning. Each "kind" has been given a "scientific name" — which is made up of a genus name and a species name. Thus, **Rana blairi,** indicates that the individual belongs to a group that does not freely interbreed with other closely-related groups, the species (**blairi**), and that, in addition, it belongs to a larger, more inclusive group, the genus (**Rana**). The genus includes several to many species, and several genera (plural for genus) are

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grouped together into a family. Therefore, it would be most correct to use the scientific name when speaking or writing of an individual animal. However, somehow we like to attach a common names to "kinds" of animals, although these common names may change from one locality to another. In this booklet, the "accepted" common name is given for each form, as well as the scientific name. Family names are supplied to show relationship at a higher level.

LIFE HISTORY

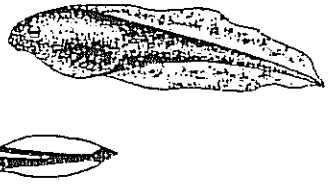
A generalized, "typical" life cycle can be described for all of the Kansas frogs and toads, for all conform to the same pattern, with only minor variations. Adults are terrestrial, and most spend their lives in close proximity to open water or in an extremely moist habitat, the thick-skinned toads being an exception. Each species has seasonal or precipitational preferences for mating, from early March through most of the summer. When the proper time arrives, males travel to selected sites where water is present and begin to vocalize. These calls apparently are species-specific and attract other males to the vicinity, where they begin to call. Females are attracted to the association of males of their species by the clamor, where the pairs are formed that deposit eggs in the water. Each egg eventually hatches into a tiny larval stage that has external gills and is confined within the egg membrane. Very quickly, changes take place that modify the appearance of the larva: skin of the head grows back, covering the gills, and a spiracle tube is formed to transport water from the now-internal gills to the outside; a jawless mouth opening with "scrapers" forms, and a finned tail appears. The larva leaves the egg, as a tadpole larva, swimming freely. After the appointed amount of time for each species, hind legs appear and later the front legs. Major changes, described later, fit the tadpole for existence on land, and it leaves the water with strong legs, a tail that has been mostly resorbed, breathing air, and feeding on animal prey rather than its past plant diet.

EGGS

All Kansas frogs and toads practice external fertilization; that is, the female lays the unfertilized eggs into the water and the male immediately deposits sperm over the eggs as they are laid. The eggs consist of a tiny ovum, or egg cell, with a large amount of yolk material, surrounded by a transparent, gelatinous envelope. Each egg is pigmented with brown or black.

Some frogs, such as the Chorus Frog or Cricket Frog, lay eggs singly or in small clusters and attach them to underwater objects - plant stems, twigs, or other debris; whereas the Leopard Frog and the Bullfrog produce large masses of eggs that float on the surface. In contrast to these, toads lay long strings of eggs, with the individual eggs neatly spaced along the string. The number of eggs that comprise one laying event varies considerably, from one to two or several in smaller species up to 20,000 in the Bullfrog. Eggs are laid in still water of small ponds and woodland pools or in temporary habitats, such as ditches or rainpools in flooded fields.

LARVAE

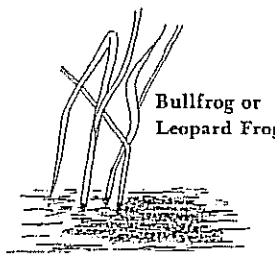


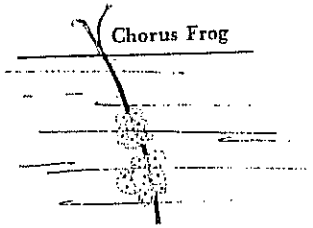
The transitional stage from egg to adult in Kansas frogs and toads is the aquatic larva generally known as "tadpole" or "polywog." They differ from the adult in a number of important ways: (1) tadpoles are herbivores, scraping algae from sticks and rocks, whereas the adults are generally insectivorous; (2) a moveable mouth with jaws is present in the adult, but larvae have small, horny beaks surrounded by several rows of horny, file-like teeth, and lack jaws; (3) a tail is present in the larval stage, but absent in the adult; (4) oxygen is taken from the water which enters the mouth and passes over internal gills and out through a spiracle in the tadpole, whereas the adult respires by utilizing atmospheric oxygen with lungs and through the skin; (5) no eyelids in the larva, but present in the adult; and (6) the gut is much shorter in the adult. This wonderful transformation, metamorphosis, creates a land-dwelling form from an aquatic one.

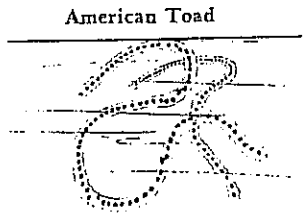
Duration of the tadpole stage varie, from less than two weeks in some toads to more than two years in the Bullfrog. Local conditions often cause variation in the time occupied in the larval stage. Size of the transformed individual depends in part on the length of the larval period.

VOCALIZATIONS

One of the times that we are aware of the presence of frogs and toads is when they are vocalizing. Sometimes these sounds are referred to as "songs," but many hardly rate that title, for they are merely grunts, or chirps, or screams. The term "calls" is also applied — and is better — for it implies that the individual making the sound is calling to another individual, and this is the case most of the time. Only males call, gathering other males and females together into a breeding congress when conditions are appropriate. Often, large numbers of individuals are calling at the same time from the same general area, and the result of this "chorus" can be a terrific din, particularly in southern swamps when a number of different species are at the same breeding site. Whereas most vocalizations are made to attract mates, calls may be stimulated by changes in humidity, declaration of territory, fright screams, or sometimes apparently "just because they feel like it."

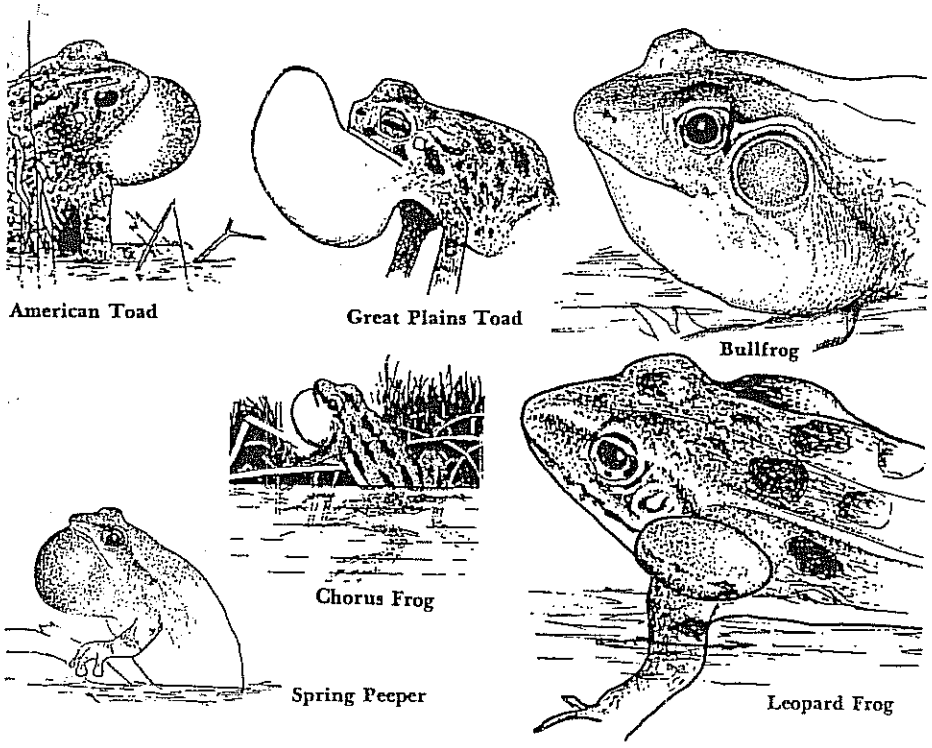






The sound is made by air shuttled back and forth over vocal cords between the mouth cavity and lungs. Lowering and raising the floor of the mouth cavity with the mouth and nostrils closed accomplishes this. In most cases, the sound is amplified by a resonating chamber known as the **vocal sac.** There may be a single external sac, which swells under the chin, and is sometimes quite prominent, as in **Bufo** toads; or a single internal sac, as in the Bullfrog; or in a double internal sac, as in the Leopard Frog.

Calls of the various species are different from one another and it is easy to learn to recognize the identity of the caller. One that should be familiar to most is the "jug o' rum" call of the Bullfrog, heard in late spring and summer. When the mid-March rains fill ditches, the Chorus Frog begins; its sound is a series of notes ascending the scale, somewhat like the sound you get by running a fingernail along the points of the teeth of a comb. At this same time that Chorus Frogs are calling, the Leopard Frogs also begin; the call is not very loud, and is said to resemble the low clucking of a hen or fingers dragged across a blown-up balloon. Cricket Frogs get their common name from the cricket-like "chik-chik-chik" sound they produce almost constantly along the edge of creeks, ponds, and lakes. Spring Peepers have a single, high-pitched "peep;" Tree Frogs, a short, loud trill; Green Frogs sound like the plucking of



the low string of a banjo; Woodhouse's Toad has a startling scream; the Narrow-mouth Toad sounds like a muffled door buzzer; and the American Toad has a beautiful, high-pitched trill that may last for 30 seconds.

Although most of the mating call choruses are conducted at night, a considerable amount is heard during the daytime at the height of the season, specially after rains. Other types of calls may be heard at any time.

FAMILIES

PELOBATIDAE. Known as "Spadefoot Toads" because of the hard tubercle on the hind foot that is used in digging. These toads live where the soil texture is such that they can easily dig in, and they spend considerable part of the year underground. Apparently they evolved in the desert Southwest, breeding when the opportunity was afforded by the infrequent rains.

BUFONIDAE. These are "true" toads — ones that come to mind when the name is used. They are characterized by thick, dry skin that is covered with glandular "warts," the paired parotoid glands behind the eyes are used as diagnostic features in identifying species.

HYLIDAE. This family consists of "tre frogs," which have toes expanded at th tips to form suction pads used in climb ing. They call frequently during warn weather when there is increasing or higl humidity; thus, they are said to be abl to predict storms. Tree frogs have som of the prettiest members of the frog and toads, not only in coloration anc pattern, but also in body form. Not al members of the family have the ability to climb and the toe pads are reduced or absent. Cricket Frogs and Chorus Frogs are examples of Kansas forms tha do not climb.

RANIDAE. This family consists o "true" frogs — the type that you think of when the word "frog" is mentioned In general shape, they are all pretty much alike, but there are many specie worldwide which vary in pattern, col oration, and behavior. In Kansas, th Leopard Frog and Bullfrog are well known examples of this family.

MICROHYLIDAE. Ant-eating, or Nar rowmouth, Frogs are strange-looking little creatures with flat, swollen bodies and pointed heads. They spend most o their time concealed under rocks o other surface cover, often next to an an path, for ants form almost the entire diet of these frogs.

FAMILY PELOBATIDAE

PLAINS SPADEFOOT (**Scaphiopus bombifrons**)

Size: 1½ to 2 inches (35-50 mm)

Distribution: All of Kansas, except southeast quarter; occurs more frequently in western half of state.

Identification: (1) eye pupils are cat-like, (2) snout round, (3) moist skin, (4) mottled gray pattern, (5) a black, sharp-edged, hard "spade" at base of each hind foot, (6) parotoid glands indistinct or absent.

Notes: Spadefoot Toads spend a large amount of time burrowed into the soil, the "spade" being utilized as a digging tool.