

PANAMA'S GOLDEN FROG

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The Republic of Panama is a country of about 20,000 square miles which links North and South America. Besides its famous Canal, exuberant tropical forests, magnificent rivers, lakes, coasts and many other natural resources, it also boasts an extraordinary variety of wildlife. The fauna of Panama is one of the richest and most fascinating on the American continent.

The golden frog is among the most spectacular and renowned of these animals. Known to the native people of Panama as 'Rana Dorada', it represents one of the several geographical races of the species *Atelopus varius*. This species is notably variable in coloration and is distributed from Costa Rica south into Panama.

A true jewel of nature, the golden frog immediately arouses the curiosity and admiration of those lucky enough to see it. Its striking orange-yellow coloration may be either plain, or ornamented with black spots and designs of various shapes and sizes. The latter appear to be more typical of the younger animals. Not surprisingly, this amphibian has always been associated with the beautiful stylized golden figures of frogs produced by the pre-Columbian Indian cultures of Central America and northern South America. However, there is no evidence indicating that this frog was ever used as a model by those skilled artisans of the past. In fact, no ornaments of this nature have yet been discovered in excavations made within the range of this animal, or even from neighboring areas.

Traditions among the Guaymí Indians, who live in the chain of mountains of eastern Costa Rica and extreme western Panama, keep alive a number of ancient and exciting legends about a golden frog's magic power and splendid beauty. This wonderful amphibian, according to the legends, is extremely shy and lives in the most peaceful and secret parts of the mountains. The major virtue of this enchanted frog is its power to give happiness to any person who has the luck to find it. The effects of the animal's beauty are

The golden frog is confined to Panama, where it is now quite rare. Despite a fine of five dollars for capturing or killing a golden frog, many of them are sold to tourists as pets or souvenirs, or exported



said to be very impressive. He who sets eyes on it will experience an extraordinary joy, but at the same time may feel extreme fear.

The existence of a vivid golden frog in the marvelous mountains of the Guaymi territory perhaps has no solid foundation, and it is evident that the golden frog of my article cannot be linked with the fantasy of the Guaymi tales. However, this charming animal, *Atelopus varius zeteki*, may have been the source of inspiration for these fascinating legends.

In addition to its golden coloration, the frog has a slim, delicate body, smooth skin, a short, somewhat pointed snout, prominent eyes with horizontally elliptical pupils and legs much longer than its arms. The hands have four fingers which are slightly webbed; the feet possess five toes which are extensively webbed.

Golden frogs are relatively small in size; most adults reach only about 57 millimeters in length. A full grown adult may weigh about half an ounce. They have excellent vision but their sense of hearing is poorly developed, since they have no ear drum. Except for a gentle and delightful chirping occasionally emitted by the male, they are unusual amongst frogs in being almost silent.

Like the gaudily-colored arrow-poison frogs of the genera *Dendrobates* and *Phyllobates*, which it resembles but to which it is not related, the golden frog secretes a poison via glands in its skin. The poison, an antelapidtoxin, is different, both chemically and pharmacologically, from the toxin of the arrow-poison frogs. It is known to be less toxic than batrachotoxin from *Phyllobates*. It might be effective (perhaps in combination with their bright 'warning' coloration) in discouraging potential predators such as birds of prey and carnivorous mammals.

The various species of the genus *Atelopus*, also known as the neotropical harlequin frogs, are distributed in certain areas of Central and South America. It now appears that these frogs have strong affinities with the true toads of the family *Bufo*idae, such as the well-known North American species, the southern toad and the giant or marine toad. Like the golden frog and its relatives, the majority of the true toads also secrete venom from their skins. In the true toads, however, the poison is often concentrated in 'warts' distributed on the skin and in a pair of glands located behind the head (paratoid glands), which are absent in the neotropical harlequin frogs.

Golden frogs are active during the day and are usually seen sitting on leaves near streams or on rocks or logs in torrential rivers. During mating, they may be seen in pairs, with the female carrying the male on her back. In these situations they often remain motionless for extended periods of time. In fact, golden frogs are not very active

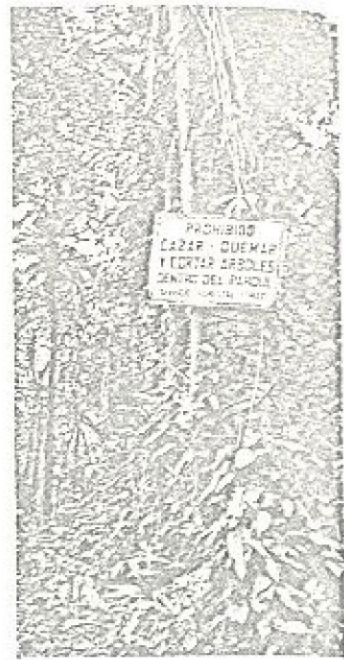
animals. Their movements are definitely slow, and they practically walk, instead of hopping like other frogs. In water, which they do not often enter, they swim with little ability. They seem to enjoy the sunlight, but only for brief periods, since they are delicate creatures and may die under prolonged exposure. Apparently the young animals remain in the forest until they reach maturity.

Both sexes are externally similar, but the female is usually larger than the male. The breeding behavior of golden frogs is not well known. It is possible that they breed throughout the year, though more probably during the rainy season, since during this period (which extends from late April or early May to the latter half of December) the rivers and streams are at their optimum levels.

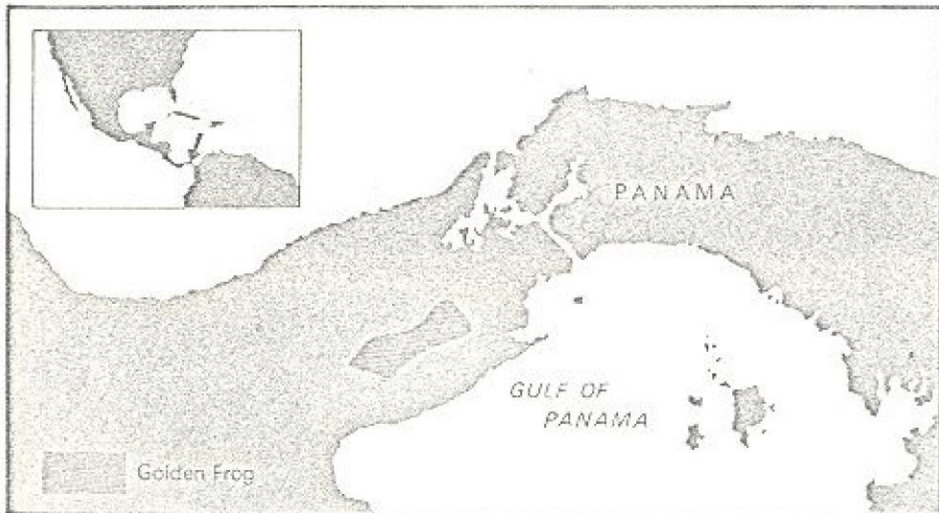
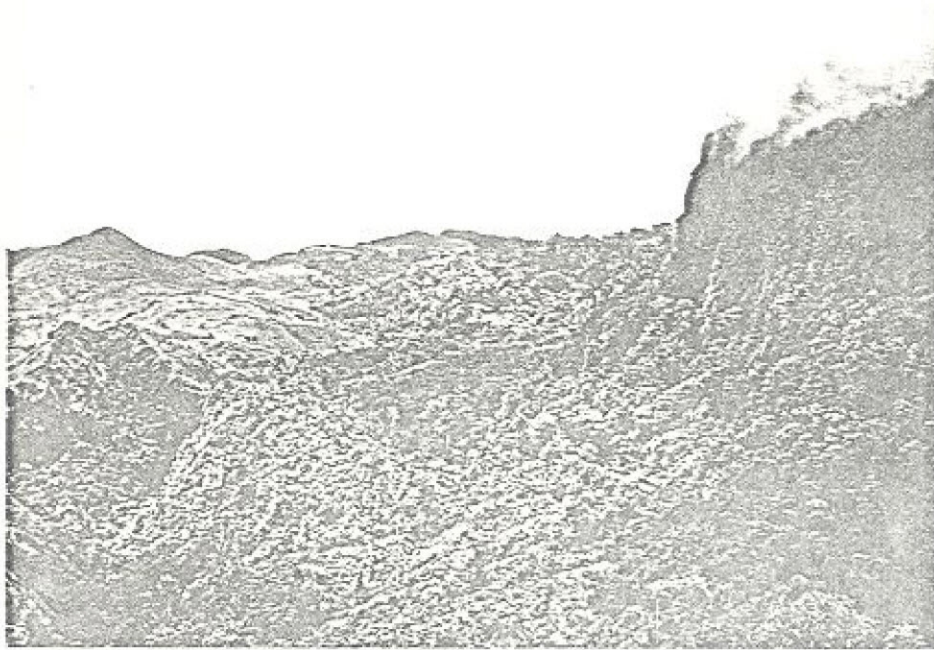
Golden frogs seem fearless, and for this reason they can be approached closely. This is why they are so easily collected. During the night they can be found sleeping on leaves of plants which border the streams. Their favorite prey is flies and other insects that are captured with their long, sticky, club-shaped tongues. They are efficient hunters and become alert as soon as they detect their prey. The body is raised into a lunging position and the head is lifted at the same time. The frog remains in this position until ready to capture its victim. The tongue is suddenly extended with astonishing speed and dexterity; the prey, caught on the end of the tongue, is then introduced into the frog's mouth by a flipping motion of the tongue.

Golden frogs appear to be confined to subtropical, humid forests growing on soils of volcanic origin located at the eastern extreme of the Isthmus's central chain of mountains. The range extends from El Valle de Antón, in the Province of Coclé, to Cerro Campana in the Province of Panama.

Not many years ago these amphibians were still particularly abundant at El Valle de Antón. This area is considered to be the crater of an extinct volcano and is surrounded by mountains of moderate altitude, some of them about 1500 feet above sea level. The region is fed by several clear rivers and streams and has a pleasant, cool climate with a temperature of about 22° to 26°C. Recently, however, golden frogs have become subject to intensive human pressure. This pressure is of two sorts: deforestation, which reduces suitable habitat by causing an increase in water temperature and silt and by destroying the shading, water-holding vegetation responsible for steady stream flow; and the direct capture, alive and dead, of the golden frog for the tourist industry and the pet trade. These factors, plus the frog's quite restricted distribution, threaten the species with extinction.



Campana Heights National Park (above and right)—only fifty-five miles from Panama City—may provide the best hope for the golden frog's continued existence in the wild. Golden frogs used to be abundant in El Valle de Antón, the crater of an extinct volcano, and the photograph below right shows the frog's typical stream habitat in this area



The area of El Valle de Antón is also under pressure from agriculture and the cattle industry. The constant need for more land for these activities is progressively bringing about serious modifications of the natural environment. Deforestation by burning and other destructive means is contributing to the decline of the golden frog and other important animals of the area.

In January 1967 the Panamanian Government issued a decree protecting the unique golden frog and other important Panamanian animals that are either rare or threatened with extinction.

In spite of the fine of five balboas (or dollars) that can be imposed for every golden frog captured or killed, these amphibians are still sold to tourists as pets or souvenirs. Even worse, they are sometimes exported in large numbers, particularly to the United States. Most animals die on their journey; very few reach their destination alive. Those that do survive mostly die later due to the lack of proper food and conditions. The United States passed its Endangered Species Act in August 1970, prohibiting importation of animals from countries where they are protected. This measure should in due course help control this wasteful trade.

The combined efforts of the National Commission for the Protection of Wildlife, the Panama Department of Natural Resources, the Panama Audubon Society, the Sierra Club and other conservation-oriented organizations, are needed in order to halt the indiscriminate exploitation of the golden frog in El Valle. However, because of the difficulty of preventing deforestation on private lands, the future survival of this beautiful animal will depend upon the establishment and management of areas such as the Campana Heights National Park. With an area of more than 6400 acres it is only about 55 miles from Panama City, and is very beautiful, with many interesting plants and animals, including the golden frog. This national park was created in 1966 and is now in the process of organization. The Panama Department of Natural Resources is being helped in this task, both financially and technically, by the World Wildlife Fund and the International Union for Conservation of Nature (IUCN).

Golden frogs are not numerous at the Campana Heights National Park. This may be for natural reasons, rather than owing to human pressure upon the area. With the hope of increasing the golden frog population, the Panama conservation authorities are contemplating setting up a breeding project in suitable sites in the park. However, preservation of the habitat and protection from wholesale predation by humans will be the primary factors that will ensure the continued existence of one of the most attractive and remarkable animals to be found in Panama.