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THE STORY OF STEVE, AND OTHERS

Steve was a Leopard frog. I say "was" because he long since vanished into the maw of a snapping turtle, and would straightway have been transformed into a part of that twenty-pound bundle of ferocity, had not said turtle been thrown into a furnace by an irate janitor who was fond of Steve but disliked the snapper. Hence, the end of Steve was the occasion for this story of frogs in general and Steve in particular.

Steve, himself, never knew anything about his origin, but he began life in a pond one cold day in March along with several hundreds of others like himself. He, and the whole wriggling crowd, had come out of a slimy mass of jelly about as large as a man's fist, and appearing very much like a lump of tapioca pudding. Moreover, when he crawled out of this jelly-envelope, he looked no more like a frog than an acorn looks like an oak tree. In fact, he had no mouth, or at any rate, his mouth had not yet opened into his intestine. So for a few days he went without food, but he did not feel hungry meanwhile, there still being some food left in his digestive tract from the egg which had produced him. While waiting for his mouth to develop, he fastened himself to a waterweed by means of a sucker beneath his head, and remained as quiet as he could.

But he had received no lessons in this hanging on process or in the eating of vegetable matter which he began a few days later, for there was no one to teach him. He never saw, or at least never recognized his parents. His father and mother had separated after the marriage of which he was the outcome, and his

mother had done no more than to deposit her eggs, each surrounded by a triple envelope of sticky jelly, in a convenient pond. That was the extent of her mothering of the numerous brood which came from the egg mass and of which Steve happened to be one. She never looked at the eggs after she laid them—probably never even knew what came from them. With such carelessness on her part, it might seem strange that anything came at all from her attempt at frog-raising, and, indeed, little would have come of it had it not been for the jelly around each egg which made them distasteful to a host of hungry pond-feeders, and which absorbed the sun's rays faster than it let them escape.

As was said above, Steve didn't look much like a frog when first hatched, or for two or three months afterward for that matter. He looked more like a fish; in fact, he really was a fish with gills and tail, and all the internal make-up and habits of a fish. That a frog is really a fish in its early stages, may mean simply that its ancestors, a long ways back, were fishlike in form, and that every frog harks back to that fact during the course of its growth. But however that may be, Steve breathed air from water without coming to the surface, rasped off portions of plants with his horny jaws to satisfy his hunger, and propelled himself through the water by means of his powerful, vertically flattened tail. Every now and then, he had to move amazingly fast to get away from certain vague shapes which tried to seize him. He didn't know what these things were, but something within him told him to keep out of their way, and this he did with all the speed at his command. He was fearfully scared every time anything

struck at him, but though in a dim way he kept something of each adventure, and so knew better how to get away next time, each fear lasted only about as long as actual danger threatened, and in a few minutes after the enemy had gone, Steve was back again at his usual occupation of gnawing at his favorite foods. But many of his brothers and sisters were less fortunate than he, and by the time he was seven weeks old, and his hitherto clubby legs had begun to differentiate into joints and toes, more than half of the original brood had disappeared. But Steve paid no attention to this; he was too busy becoming a frog to mind other peoples' affairs, thus showing, even at this early stage, what a selfish fellow he was to become later on as an adult. When a brother tadpole shouldered or pushed him, he merely shouldered and pushed in return. When a piece of decaying meat was found—for by this time he had begun to eat flesh—he held his place at the feast, by sheer muscular power as long as he could. If pushed away, he merely crowded back in again, or failing in this, he went in search of another feast; for food getting was then his chief interest in life.

When Steve was two months old, his hind legs were of considerable length, but it seemed that he was not to have any front ones. Strangely enough, however, he had a pair of front legs already. In fact, they had been there almost as long as his hind ones, but they had been growing quietly under a fold of skin which covered his gills, and so did not show from the outside. About this time, also, Steve began to do something that he had never done before. Hitherto, he had been content to remain under the water, but now he felt a strange choking urge to come to the surface, and he obeyed this urge by making many trips to the top of the pond, thrusting his mouth through the surface of the water and taking in a gulp of air every time he did so.

Two or three weeks later, so many marvelous and unbelievable things began to happen to him that Steve nearly lost track of himself. In the first place, he completely lost his appetite, and refused to touch the most

inviting foods. His skin began to shrivel, the outer layer loosened badly and fell off; his gills disappeared; the horny coverings of his jaws fell away; his mouth lost its rounded form, and became amazingly wide; his eyes, which previously had been beneath the skin, now came to the surface, and his front legs broke through their coverings to the outside. His great tail, which had been his pride, also began to shrink, the materials of which it was made being rebuilt into other parts of him; his hind legs grew enormously, and now Steve, no longer a fish, but a squat, four-footed, pop-eyed creature, transformed out of all semblance to his former self, came out of the water and sat on the bank, a frog.

Not a very big frog it is true—scarcely more than an inch long, and a quarter of that in breadth—he hardly seemed as large as he was when a tadpole, but how different he was for all that! And how fine it seemed to sit on the bank in the sun! He could see so much better for one thing out there in the air. If anything bothered him he merely gave a great push with his hind legs which he always kept folded up beside him for just that purpose, and was shot off the bank into the water as if he had been thrown by a spring. When he hit the water he would dive to the bottom, always turning shoreward, and hiding for a few minutes in the mud and ooze down below. Before coming on to the bank again he usually poked his nose and eyes above the surface for a preliminary examination of the surroundings, and if nothing threatened he crawled out and settled again near the water, his head pointing away from the shore, his hind legs always drawn up in readiness for another leap. For though popularly supposed to be a water animal, Steve, like others of his kind, really spent most of his time out of the water, taking to it only as a means of escape or as a protection against cold in winter. Once settled comfortably upon the bank, he would sit for hours at a time scarcely moving a muscle except an occasional blinking of his eyes and a quick shift of his legs. This knack of sitting perfectly still, made him alike hard to see by those who would capture him

and those who would keep out of his way.

He was always hungry, but by no means finicky about what he ate; in fact he had only one requirement—his prey must be moving, or he would starve rather than touch it. With a flick of his long, sticky tongue which was fastened at the front and free at the rear, and so could be thrown an inch from his mouth, he would capture the unwary spider or insect which happened to come within range. Sometimes he would creep awkwardly upon his prey until within striking distance, but usually he waited patiently for it to come to him. If the creature chanced to be an earthworm, or as happened occasionally when he became adult, a very small snake, he would seize it with jaws as well as tongue, using his front feet to help crowd it into his mouth. When he swallowed anything his prominent eyes, the orbits of which projected into his mouth, invariably rolled deeply backwards and inwards thus helping to force the food down his throat.

As the result of all this food taking, at the end of three years, Steve was a big frog, as Leopard frogs go, fully four inches in body length with a pair of hind legs that, stretched out, were as long as the rest of him. Thousands of small creatures had been eaten by him and transformed into his big body, yet it must not be understood that all of his three years had been spent in eating and growing. Four months or more of each year he spent in hibernation, a kind of semi-stupor, or winter-sleep at the bottom of a pond. During this period, his heart almost stopped beating, he breathed only through his skin, ate nothing, scarcely moved; subsisting, of course, only upon the reserves that had been stored up from food eaten during the summer; it was nature's method of tiding him over an unfavorable season.

But always when spring came and the sun began to warm the water, he would awake from his stupor, and emerge, lean and ravenous, from his hiding place, but with another urge upon him which made even the call of hunger await its turn for satisfaction. It was the sexual urge, a

blind, instinctive desire to propagate his kind, and it was upon one of these occasions, a great mating powwow, where hundreds of leopard frogs, males and females, mingled in one confused mass of gelatinous eggs and croaking tangled bodies, that Steve lost his freedom. But so oblivious was he at the moment to all but the sexual call, that he was captured and swept into a gunny sack before he even knew that he was in danger. And since he never knew what happened, it will be necessary for me to tell the story, for I was his captor.

Steve made a good prisoner. The mating season being over for him, and no enemies to avoid, he had nothing to do, but to sit quietly on a floating board in his ten-foot tank, and wait for food to come. What an appetite he had! Five or six large earthworms would be snapped up and pushed into his mouth one after the other, though often the last one remained hanging and wriggling part way out until his tortured stomach made room for it down below. He seemed to have no choice as to kind of food; flies, beetles, cockroaches, butterflies, larvae of various kinds, spiders, bugs—each and all were alike to him. Even stinging insects such as bees and mud-daubers were greedily seized and swallowed, and though after eating a stomach-full of such insects, he would often shrug his shoulders and wriggle his abdomen as if experiencing internal disturbances, I never saw him reject one of these creatures, even when, as several times happened, the sting thrust entirely through his tongue. On one occasion he ate a young white rat, at another time two young mice, and several newly hatched English sparrows were eaten at different intervals.

Curiously enough, Steve had no aversion to the eating of his age-long enemy, the garter-snake. A captive gartersnake in my laboratory had produced a litter of twenty snake-lings each about six inches long, and perhaps the width of a soda-straw. I presented these to Steve one at a time, and he ate the entire group in a few days swallowing them as readily as he would an

earthworm. I have since seen other Leopard frogs do this, and on one occasion I saw the same frog swallow the same snake three consecutive times, this seeming impossibility being due to the fact that I twice rescued the snake from the esophagus of the frog by means of a long pair of forceps.

Dr. C. C. Abbott once found an eighteen inch gartersnake in the stomach of a large male bull-frog. Upon examination of the snake, he found that it had a field-mouse half-swallowed, and therefore was nearly helpless when the bull-frog attacked it. He concludes from this interesting fact "that the frog recognized the helpless condition of the snake at the time, and took advantage of it." This presupposes a considerable degree of intelligent discrimination on the part of the frog, "for certainly", he adds, "a frog, however large, will not attack even a small snake if it is possessed of its usual activity."

I have never found a gartersnake in the stomach of a bull-frog, although I have found some curious things there, including a small turtle, and a two-inch piece of wood about the thickness of a lead pencil. But I have no doubt that the bull-frog swallowed the snake, and that he swallowed it, not because he recognized its helplessness, but simply because it happened to come near him. It was a moving object in front of him—the only incentive a frog needs to strike.

Steve was mortally afraid of any gartersnake big enough to attack him, for I several times allowed a snake to seize him just to note his reactions, but anything small enough to be swallowed, snake or otherwise, was just so much "grist to his mill." His stimulus to eat came to him only through his eyes; pangs of hunger he may well have experienced, for I compelled him on several different occasions to go two or three weeks without food; but though he would seize a piece of meat flicked in front of him, or grab at a rolling shot or bean, when left to himself, he obeyed the iron-clad rule of his kind; nothing moving, nothing eaten.

Although Steve began his existence as an egg in water, and spent most of his early life there, he never

knowingly drank a drop of it after he transformed from tadpole into frog. Like all frogs, he was a "total abstainer" and yet an "old soak" for all that, since he took his water literally by soaking it up through his skin.

One morning the janitor, who had taken a fancy to Steve, came to me almost with tears in his eyes, and holding out something in his hand. It was Steve, black, dry, shriveled, shrunken to almost half his normal size, apparently dead, but not quite. He had jumped out of the tank during the night. I took him and dropped him into the water where he sank to the bottom and lay flat on his back, which in a frog is a sign that he is just about "done for." But to my amazement, in a few minutes he began to lose his shriveled appearance, his wasted form took on plumpness as if by magic, he turned over on his front, and in a few hours was back on his board again looking as if nothing had happened. Using this as a clue, I experimented with other frogs, and found that they could lose by drying about forty per cent of their total weight without fatal results, and gain it all back again in about six hours. A one hundred fifty pound human losing sixty pounds weight over night and gaining it all back again next day, would be a strange creature indeed!

One evening in my absence, a boy brought a large snapping turtle into the laboratory, and not knowing what to do with it, he placed it in Steve's tank over night for safe keeping. It was safe enough for the "snapper" but highly unsafe for Steve. The turtle had attained his huge bulk by the simple plan of incorporating into himself any edible thing that his great, cutting jaws could get hold of, and to him who had "slain his thousands," Steve was only another delicious bit in the process. But he had not counted on the janitor. That worthy chanced to see Steve disappearing down the gullet of the "snapper", and, as I said at the outset, at once threw him headlong into the furnace. Which finished the "snapper", and effectually prevented Steve from becoming what every frog is sooner or later likely to become—a part of some other living creature. Roy L. Abbott.