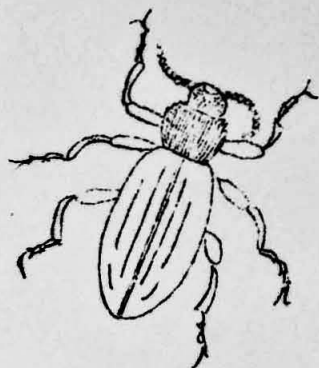
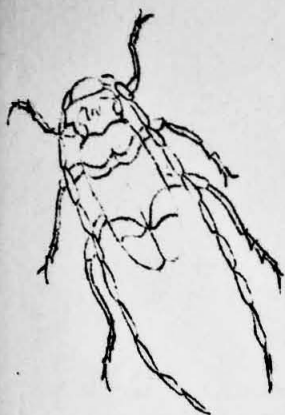
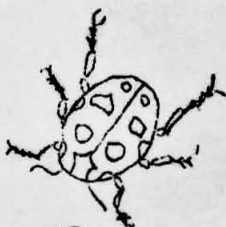
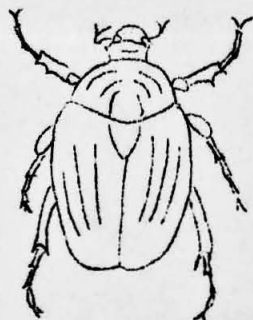


NATURE NOTES



GRAND CANYON



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GRAND CANYON NATIONAL PARK

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This Bulletin is issued monthly for the purpose of giving information to those interested in the natural history and scientific features of the Grand Canyon National Park. Additional copies of these bulletins may be obtained free of charge by those who can make use of them, by addressing the Superintendent, Grand Canyon National Park, Grand Canyon, Arizona.

M. R. Tillotson, Superintendent

Edwin D. McKee, Park Naturalist

Table of Contents

Some Beetles of Grand Canyon

Ranger-naturalist Clyde C. Searl

A Lively Little Beggar

Barbara H. McKee

Pocket Mice!

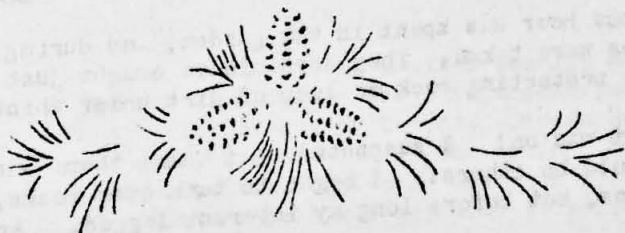
Park Naturalist Edwin D. McKee

Early Stages in the Development of

Rainbow Trout

Ranger Chester R. Markley

Notelets --



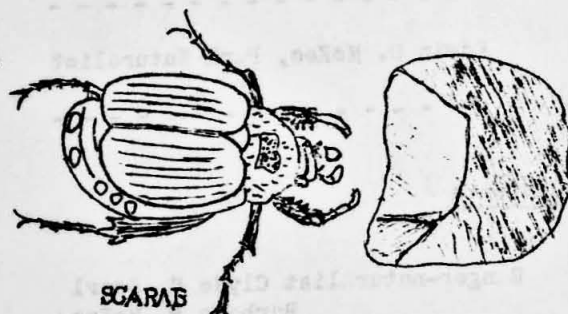
SOME BEETLES OF GRAND CANYON

By Ranger-naturalist Clyde Searl.

A few days ago, while looking over one of the wildflower gardens at the Yavapai Observation Station, a steady rapid buzz caught my attention. Before my eye could locate the source of this sound, I knew that I was in the presence of either a beetle or a bee. I enjoyed a thrill when I at last found the insect which was buzzing. It was a beetle, and from its action in flight I knew that it was a Scarab.

A majority of people are more familiar with the Scarabs (Scarabaeidae), in name at least, than they are with any of the other groups of beetles. To the Scarab group belongs the June bug - a beetle known to nearly everyone. It is probable, however, that if people from several different localities were asked what a June bug was, each one would describe a different insect. There are thousands of species of Scarabs and many of them are called June bugs.

It is an interesting fact that Scarabs were held in great reverence by ancient peoples, especially the Egyptians. This was probably due to the habit of the scavenger members of a certain branch of this family of rolling along little round balls of dung and dirt. The Egyptians saw in this habit a typification of the revolutions of the earth and as the seasons varied, the coming and going of the Scarabs became emblematic of eternal life.



To return to the garden at Yavapai - - I was determined to catch the beetle. A net was not necessary, for apparently its thoughts were centered on finding a soft spot on which to light and begin burrowing into the ground. The loose soil of the garden undoubtedly was attractive to it. Lower and lower it hovered, and suddenly dropped to the ground and began to dig beneath a clod of earth. I then easily caught and dropped it into a poison jar. The greed of the collector was satisfied, but posterity for the beetle was gone; it had not been allowed to lay its eggs.

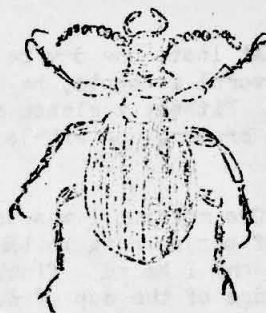
A glorious hour was spent in the garden, and during the interval a number of Scarabs were taken. They were always caught just as they reached the edge of some protecting rock or lump of dirt under which to burrow.

The sport was on! I suspected that where there was one kind of beetle, there would be others. I began to turn over rocks, hoping to find some other species, but before long my interest lagged. Apparently there

were no beetles beneath the stones. Finally, however, I was rewarded for when a heavy rock was turned, a little black beetle, about three-eighths of an inch long, started to scuttle away rapidly. It was a Carabid beetle, belonging to the family Carabidae, one of the most interesting groups of insects. The Carabid is often a friend to man whereas the Scarabs are held in no great esteem since one of that group is the green Japanese beetle, so disastrous to vegetation in the eastern United States. The Carabids, although a rather smelly lot as beetles go, are very interesting.

Some Carabids wage war on the larvae of the coddling moth; others are the enemies of the brown-tail-moth, and the hairy bent caterpillar. There is a group known as the bombardiers, the members of which whenever disturbed live up to their name and bombard the aggressor with a series of little puffs of gas which will, if discharged on a person's skin, leave a stain and smell very like that of iodine. A species of this highly colored little Carabid is found beneath the damp rocks along Bright Angel Creek in the Grand Canyon.

The Carabids are usually very fast runners. When a rock is lifted, often scores or hundreds of these beetles will start scampering in all directions. They are a very sociable lot. Most of those found at Grand Canyon live under fallen logs and rocks, and feast upon the smaller denizens that live in the same places. It is interesting to watch a Carabid battle with some creature as big as itself. Its jaws are large and well developed so it usually wins. There is one group which lives upon snails, and the manner in which it extracts the snail from the shell is very ingenious. Some of the jaw parts of this beetle are so constructed that they can be forced into the shell and scoop out the body of the snail.

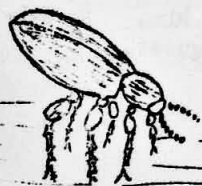


CARABID TYPE WHICH
FEEDS ON SNAILS.

There is another interesting beetle, common to the warm dry parts of western United States, found at Grand Canyon. It belongs to the family Tenebrionidae, and has a number of common names. The Darkling Beetle seems to be the most appropriate, although it is also known as the Pincate Bug or just Stink Bug. The last two common names are misleading inasmuch as beetles are not bugs.

The Darkling Beetles usually have fat bodies and for this reason they are seldom found except beneath flat stones or boards. Pieces of cardboard, or old gunny sacks lying on the ground, offer havens for them. The wise collector will not even leave unturned a tin can or a shingle when searching for these beetles.

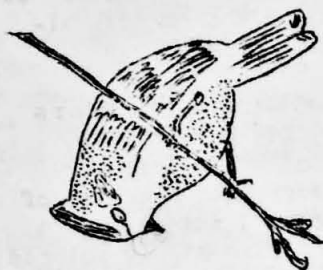
Most Darkling Beetles are clumsy fellows and very slow moving. One group, the Eleodes, when disturbed will elevate the hind part of the body and emit an offensive-smelling, oily fluid.



ELEODE IN A
TYPICAL POSITION

A LIVELY LITTLE BEGGAR

By Barbara H. McKee.



TITMOUSE

During the past winter the birds visiting our window feeding tray became quite tame and friendly. One lively little gray Titmouse, especially, decided that we were quite harmless so became very bold. At first he sat in a nearby pinyon pine tree watching the fearless pigmy nuthatches as they took pinyon nuts from our outstretched hands. Envy was written in his every movement as he balanced and fluttered, trying to screw up his courage enough to snatch a nut from the apparently inexhaustible supply. His eyes would sparkle and his expressive crest would stand erect or lie flat on his head as various emotions surged through his quivering little body.

At last, one day he darted from his perch toward my nut-filled hand. After several attempts, he managed to find enough courage to light on my fingers. Without a glance at me he snatched a nut and fled. But the ice had been broken, and with each nut taken he became bolder and more sure of himself.

One morning I was too busy to feed the birds from my hand and the supply of pinyon nuts in the tray was soon exhausted. The kitchen window was open and I heard a flutter of wings, - there was our titmouse sitting on the edge of the cup of nuts I had left on the table. He hastily took one and flew away with it. Again he came in, but this time he tried to escape through a closed window and beat quite fiercely against the glass. Without difficulty I caught him. He stayed quietly in my hands looking at me with large frightened eyes until I put him out. After several such experiences I was forced to keep the windows closed.

I tried to keep the feeding tray filled with food, but sometimes I would allow it to get empty. On one such occasion I heard a gentle tapping on the window-pane and there was titmouse pecking on the glass and looking at me. I put a few nuts on the sill outside for him and went into the front room. Imagine my surprise; when I heard the same little tap on a window there a short time later. It was the titmouse asking for more nuts. Before long the little bird learned to go from window to window around the whole house until he saw me in one of the rooms - then he would tap softly, and when he saw I had noticed him, would fly to a nearby tree to wait until I had put some nuts on the windowsill for him. He evidently had such faith in me that I could never refuse his request.

The Gray Titmouse which is found at Grand Canyon is common throughout the Western United States from California to Colorado - from Idaho and Wyoming to southern Arizona. It lives in the upper Sonoran Zone among the pinyon pines and junipers and apparently does not migrate. It is usually found throughout the year in a particular area. Only 5.7 to 6.1 inches long, it is a little bunch of animated light gray feathers with bright eyes and a crest which helps express its varied emotions. Its underparts are whitish gray. Its food consists of nuts, seeds, and many injurious insects, all of which are busily searched for each day among the trees and bushes.



POCKET MICE !

By Park Naturalist Edwin D. McKee

While travelling by night along the winding sandy roads of the Painted Desert one's attention is not infrequently attracted by the peculiar jumping motion of a diminutive creature known as the Pocket Mouse and his somewhat larger relative, the Kangaroo Rat. Time and again these strange animals may be seen crossing the road with great leaps before the glaring headlights of an automobile.

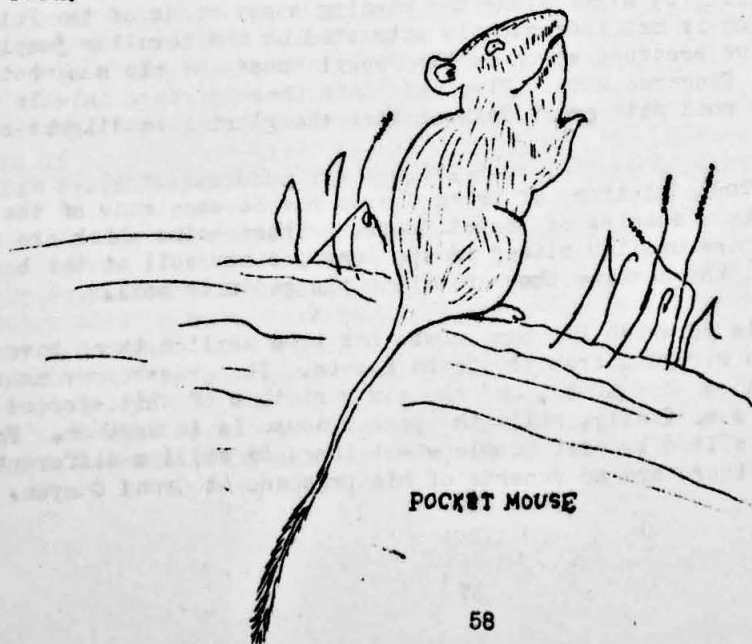
Down on the Tonto platform of Grand Canyon may be seen many of the short simple burrows made by a species of Pocket Mouse. These holes which are about one inch in diameter are usually placed in the loose, sandy soil at the base of bushes or shrubs. In the daytime they are often plugged with soil.

Of the mammals to which the name mouse has been applied there have been thirteen species recorded from the Grand Canyon. The grasshopper mouse, the harvest mouse, the meadow mouse, and the six varieties of white-footed mouse are all in the same family, while the pocket mouse is in another. The house mouse - - so disliked by most people - - belongs to still a different family. Fortunately there are no records of his presence at Grand Canyon.

Probably the only close resemblance that the pocket mouse bears to the other mice is in size. He is a small rodent with a very long tail, large hind feet, and poorly developed claws on the fore feet. He has external fur-lined cheek pockets much like those of the pocket gopher. The general range of the pocket mouse is recorded by H. E. Anthony as "southwestern and midwestern North America". Dr. C. Hart Merriam in his biological field work of 1889 discovered two species - the Dusky and Woodhouse Pocket Mice - in the San Francisco Mountain area, and three others - the Apache, Baird's, and Intermediate - in the Painted Desert and Little Colorado regions. Only the last named of these species is known to occur within the Grand Canyon.

A specimen of Intermediate Pocket Mouse recently collected on the Tonto Platform and now in the Grand Canyon collections measures eight inches from head to tip of tail. The tail alone measured four and three-quarters inches. The specimen is a male with dark upper parts, paler sides, and white underparts. Aside from the feature of its extremely long tail, its outstanding characteristic is the fine, smooth and long hair of the body which is in strong contrast to the woolly fur of other mice.

The general knowledge of pocket mice is comparatively limited both because of their small size and because, being entirely nocturnal, they are seldom seen. Their food consists principally of seeds which they eat by using their front feet as hands. As already mentioned, their enlarged hind feet enable them to bound along much like a kangaroo - - their tail acting as stabilizer. They are also known to crawl or creep along. Breeding is in late spring. Altogether this little rodent is one of the most interesting yet least known mammals found within the boundaries of the Grand Canyon National Park.



EARLY STAGES IN THE DEVELOPMENT OF RAINBOW TROUT.

By Ranger Chester R. Markley.

During February 1931, the National Park Service undertook to plant the waters of Havasu Creek with Rainbow Trout. This creek is in the western part of Grand Canyon National Park, accessible only by 14 miles of rough trail from the south rim of the canyon. A previous attempt at stocking with Brook Trout fry had failed due to many adverse conditions. This time after a preliminary study of local conditions, 25,000 rainbow eggs, were ordered from the hatchery at Springville, Utah, and placed in three experimental plants. In this article are noted some observations of Experiment Number One made in the field hatchery which was a make-shift affair, built from pine siding, wire screening, and canvas.

The hatching trough was planted with 4,000 eggs at 4:30 P.M., February 6, with a water temperature of 64 degrees, and an air temperature of 54 degrees in the shade. On February 7, 14,000 additional eggs were placed on the trays, with a water temperature of 61 degrees, and air temperature of 47 degrees at 9 A.M. These eggs were placed one deep on wire trays, with three inches of water below, and four inches of water above. The eggs died at a rate of 75 per day; some were dead upon arrival, others were injured by shipment and died later. The warm water, ranging from 58 to 68 degrees caused rapid fungus growth overnight which attached itself to healthy eggs and later to weak fish, eventually causing their death. The accumulation of silt, portions of dead eggs, and fungus, trapped many healthy eggs. The last dead eggs removed from the trays were 200 unfertile ones which were small and undeveloped. The first eggs hatched in 4 days 17 hours, continuing over a period of 4 - 1/2 days. The dead eggs and fish were removed from the trough every morning and afternoon.

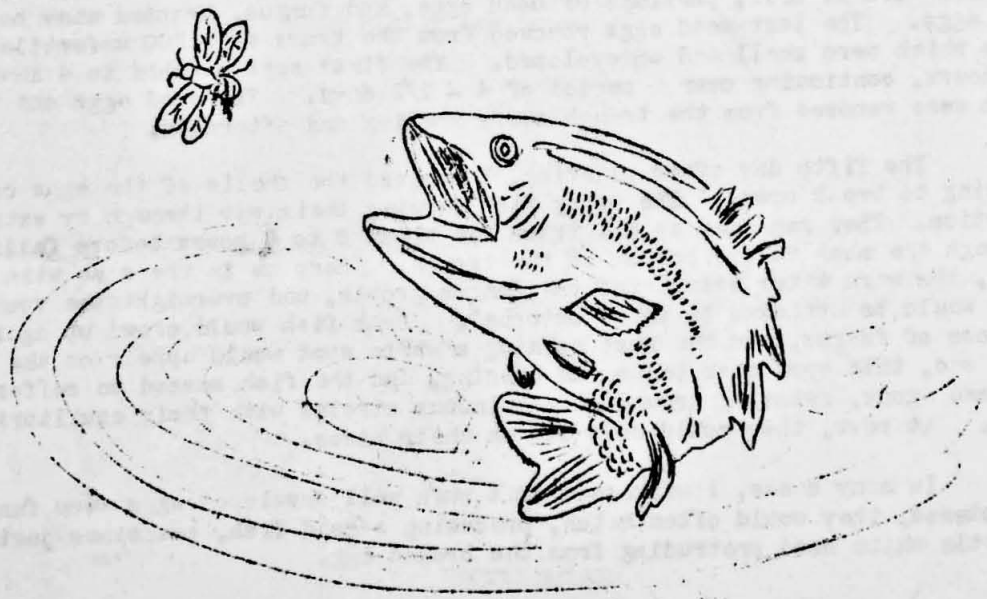
The fifth day after planting, I noticed the shells of the eggs commencing to break open, the young fish forcing their way through by extreme exertion. They remained on the trays for about 6 to 8 hours before falling through the mesh to the bottom of the trough. Here as in the case with the eggs, the warm water stimulated the fungus growth, and overnight the young fish would be attacked by this "octopus". Weak fish would crowd up against a piece of fungus, and the next morning a white spot would appear on the food sac, this spot soon became an opening, and the fish seemed to suffer extreme agony, swimming around in continuous circles with their equilibrium lost. At rest, they could only lie on their sides.

In many cases, I witnessed that when well developed eggs were fungus-stricken, they would often hatch, producing a dead fish, sometimes just a little white head protruding from the broken egg.

All weak or injured fish died during the stages of development in the hatchery. Pine knots on the bottom of the hatching trough became covered with slime, which undoubtedly contained fungus growth. These several areas were death traps for the young fish that were often snared. The strong fish would segregate themselves from the weak ones, usually crowding together in the darker sections of the trough. Their continual wiggling would force the weaker fish back stream. It was interesting to note that as the food sacs were absorbed, the young fish did not bunch up at the head of the trough, but spread out over the entire surface, which was due to the fact that the water created a back current, with numerous directions of flow, giving the trout many places to head up stream.

After hatching, the young fish carried a food sac for eight or ten days, which was gradually absorbed as the trout increased in size and activity. The young fish rose to the surface, and commenced to feed two to three days before the egg sac was completely absorbed into the stomach. Since the eggs hatched over a period of four days, the egg sacs were absorbed over a like number of days, which enabled me to net out the fish at the proper stage of development. The young trout remained on the bottom of the trough until the food requirements became greater than the diminishing sac could provide for, and were then forced to the surface in search of food.

In hatching these 18,000 rainbow eggs, and rearing the young fish to the fry stage, the results showed an approximate loss of 11.11%.



Netelelets

The Tusayan Ruin on the South Rim of Grand Canyon which was partly excavated by the Gila Pueblo staff of Globe, Arizona, this past summer has been definitely dated by Mr. E. W. Haury of that institution. By the use of tree rings he determined that it was occupied between 1180 and 1205 A.D. This work was based on results from the examination of six pieces of charcoal - four from "Kiva A" and two from "Kiva B". The accuracy of this dating was confirmed by Dr. A. E. Douglass of the University of Arizona. Mr. Haury also determined that "Kiva B", which is continuous with the rooms of the dwelling, was built about fifteen years prior to the unattached "Kiva A". The former apparently burned down, thus necessitating the building of the latter. These and many other interesting details concerning the Tusayan Ruin are described in a recent publication of the Gila Pueblo by Mr. Haury.

The graceful little Patch-nose snake (*Salvadora grahamiae*) was found near Panarama Point on the Kaibab Trail, April 13. This is the second record of this typically Southwestern reptile from the Grand Canyon National Park.

--- E. D. McKee ---



American Coot -

An American Coot (*Fulica Americana*), commonly known as a "Mud Hen", was recently found dead near the Grand Canyon village. The only other Grand Canyon record of this interesting water fowl is from a tank near Desert View Point (Autumn 1926, Mrs. Cook of San Diego).

--- E. D. McKee ---

The Plumbeous Vireo was first seen among the pinyons of the South Rim on April 21. It filled the woods around Grand Canyon Village with its cheery song.

--- E. D. McKee ---

