

Celebrated in Story and Legend, These Accomplished Insects Are Musicians, Ventriloquists—and Thermometers

BY CATHERINE BELL PALMER

National Geographic Magazine Staff

ONE September evening in Silver Spring, Maryland, the incessant *chirp, chirp, chirp*, of a cricket in the house interrupted my reading. During the summer I had become so accustomed to these insects' familiar calls outdoors that I rarely noticed them. But within the four walls of a house the chirp seemed to double in volume and fill the whole living room.

My collie, Ginger, cocked her head, looked up at me with a quizzical expression, and trotted off in search of the noisemaker. I joined her, but whenever we reached a spot where we thought the cricket was, its call seemed to come from another part of the room.

Fiddle by Scraping Wings

This aural illusion was no accident. Most crickets, like cicadas, become ventriloquists to deceive pursuers.* Nature's fiddlers, they produce their shrill music by rubbing their wings together. When the common field cricket wants to make his call, he raises his fore wings at an angle of about 45° to his body. A file on one wing rasps against a scraper on the other, creating the sound variously described as *treat-treat-treat*, *cree-cree-cree*, or *gru-gru-gru* (page 391).

During this fiddling process, called stridulation, the insect controls the volume and direction of the sound by position of the wings in relation to the body. To make the muted, muffled notes giving the illusion of distance, the wings are lowered close to the back. Some species—certain small bush crickets, for example—do not sing at all.

Of the 2,000 known species, the one we were chasing probably was *Acheta assimilis*, the common field cricket. Although *Acheta domesticus*, the house cricket of the Old World, has been introduced here, it is not nearly so numerous as the field cricket.

Through the ages the cheerful chirp of the cricket has been woven into literature and legend. Charles Dickens did more than any other writer, perhaps, to popularize the little creature with his classic *The Cricket on the Hearth*. In this charming story there is a contest between a kettle and a cricket to determine which can sing louder and longer. Cricket wins when the kettle boils over.

The song of the snowy tree cricket, *Oecanthus niveus*, evoked extravagant praise from

Nathaniel Hawthorne. "If moonlight could be heard," he wrote, "it would sound like that." Henry David Thoreau called the sound "a slumberous breathing" and "an inner dream."

To many, the steady chirping of a cricket, reminiscent of a singing teakettle, suggests peace and comfort. The French entomologist, Jean Henri Fabre, proclaimed, "I know of no insect voice more gracious, more limpid in the profound peace of the nights of August."

But a *New York Times* nature writer, Hal Borland, apparently had an experience similar to mine. In a *Times* editorial he described a cricket as "a black, ambulatory noise surrounded by a sentimental aura. On occasion it lives in the open fields, but its favorite habitat is behind a couch or under a bookcase in a room where somebody is trying to read. It has six legs, which make it an insect; two antennae, which make it a creature of sensitive feelings; two wings that can be scraped together, which make it a nuisance."

In old England it was considered good luck to have a cricket chirping on the hearth.

For centuries cricket fighting has provided a national pastime in China. Records of celebrated insect fighters are preserved by the Chinese as records of thoroughbred race horses are kept in other countries. Weighed in before every fight, crickets are divided into heavyweight, middleweight, and lightweight classes (pages 388, 389).

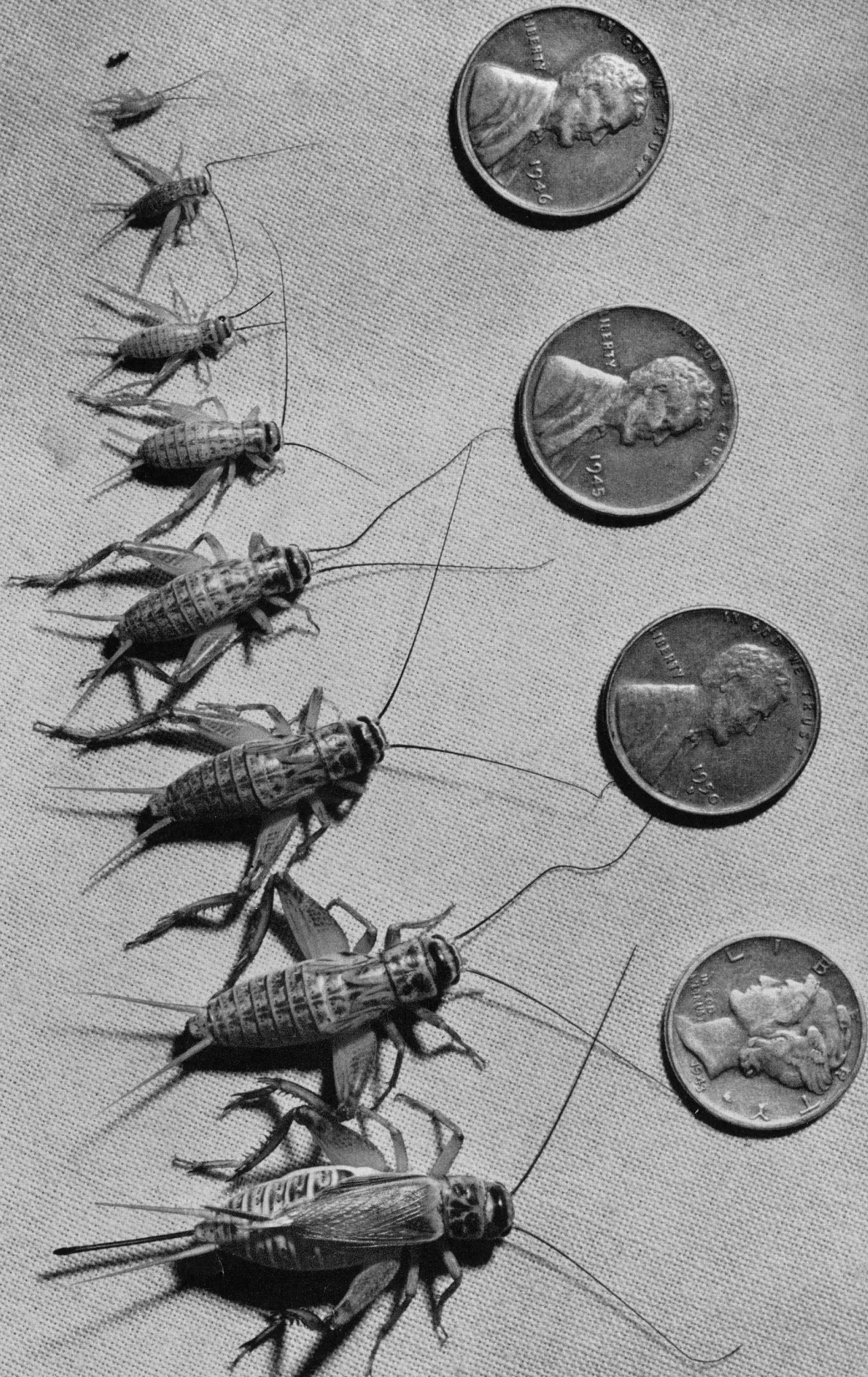
Some devotees of cricket fighting raise the insects and hire professional trainers to feed and care for them. Special diets consisting of rice, boiled chestnuts, and mosquitoes are given before a fight.

Temperature Affects Song

In both China and Japan crickets are also kept as musical pets. In the days of the Chinese empire even the palace had its royal chorus of crickets. Beautiful specimens of cricket cages are now museum pieces (page 393). Common folk had to be content with cages of bamboo or of coconut shell; the rich had gourds with covers made of carved ivory and jade. Cricket cages in the collection of the Chicago Natural History Museum include one made from a carved walnut shell.

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* See "Rip Van Winkle of the Underground," by Kenneth F. Weaver, NATIONAL GEOGRAPHIC MAGAZINE, July, 1953.



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Crickets Bred in a Georgia Hatchery Arrive at the National Geographic Society

Receptionist May Haney signs for an express shipment of hopping, chirping fish bait from College Park, Georgia. Bass especially are fond of live crickets. For a close-up of one, see page 390. After serving as models, these were taken home by a staff member to his children, who later released them.

← The nine crickets shown (top to bottom) range in age from one day, one week, two weeks, and so on to the largest, eight weeks old. Bait-age crickets (four to six weeks) sell for \$1.50 a hundred.

Nature's orchestra is music or discord to your ears, you can tell the temperature by some species. Entomologists have found that the chirping rate of the snowy tree cricket rises and falls with the thermometer. Just count the number of chirps in 15 seconds, add 40, and you have the number of degrees Fahrenheit with surprising accuracy.

Variations of their notes in tone and strength according to the temperature are also noticeable. In general, crickets do not chirp at all when it is colder than 55° F. or at temperatures much higher than 100° F.

To the human ear the song of *A. assimilis* is a series of chirps. Each chirp, however, is not a single pulse of sound but a group of three or more. In a series of experiments conducted over a period of 12 years Dr. George W. Pierce, professor emeritus of Harvard University, found that this species has two distinct classes of song, common and courtship. In the common song the cricket strikes 47 percent of the teeth of his file. Vibration frequency is about 4,900 cycles a second. During the courtship song, however, Mr. Cricket raises his pitch to 17,000 cycles



"Get In There and Fight!" A Balinese Trains Battling Crickets

To goad an insect to combat, the owner prods it with a bamboo stick. Conditioning regimen also includes baths in a strengthening mixture of aromatic herbs. For exercise, crickets bounce up and down on twigs stuck into a coconut. Bamboo cages are the insects' homes.

a second and strikes 89 percent of his file teeth.

As a result of his experiments with a sound-receiving and measuring apparatus he designed, Dr. Pierce discovered that some crickets make supersonic noises, sounds too high for the human ear to hear.

Why Does a Cricket Sing?

Another scientist timed a snowy tree cricket at 90 chirps per minute, or 5,400 chirps per hour in a 12-hour night. At that rate he would chirp nearly 4,000,000 times in 60 nights! Only adult male crickets chirp. Females, with ears in their knees, listen; wingless baby crickets are seen and not heard.

The carrying power of crickets' chirps is surprising. One species barely an inch long makes notes audible for almost a mile. Chirping of crickets has been recorded on sound film by the late Dr. Frank E. Lutz, former curator of the Department of Insect Life, American Museum of Natural History, New York City. Analysis showed that the notes of some species consist of beautifully executed slurs like those of an expert violinist.

Why crickets sing is a question naturalists have been trying to answer for years. The courtship song explains itself, but why the common song? Some believe that crickets and their cousins, katydids and grasshoppers, chirp for the same reason that birds and



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Bettmann Archive, drawing by A. Castaigne

↑ **Crickets Slug It Out While
Bug-eyed Bettors Watch**

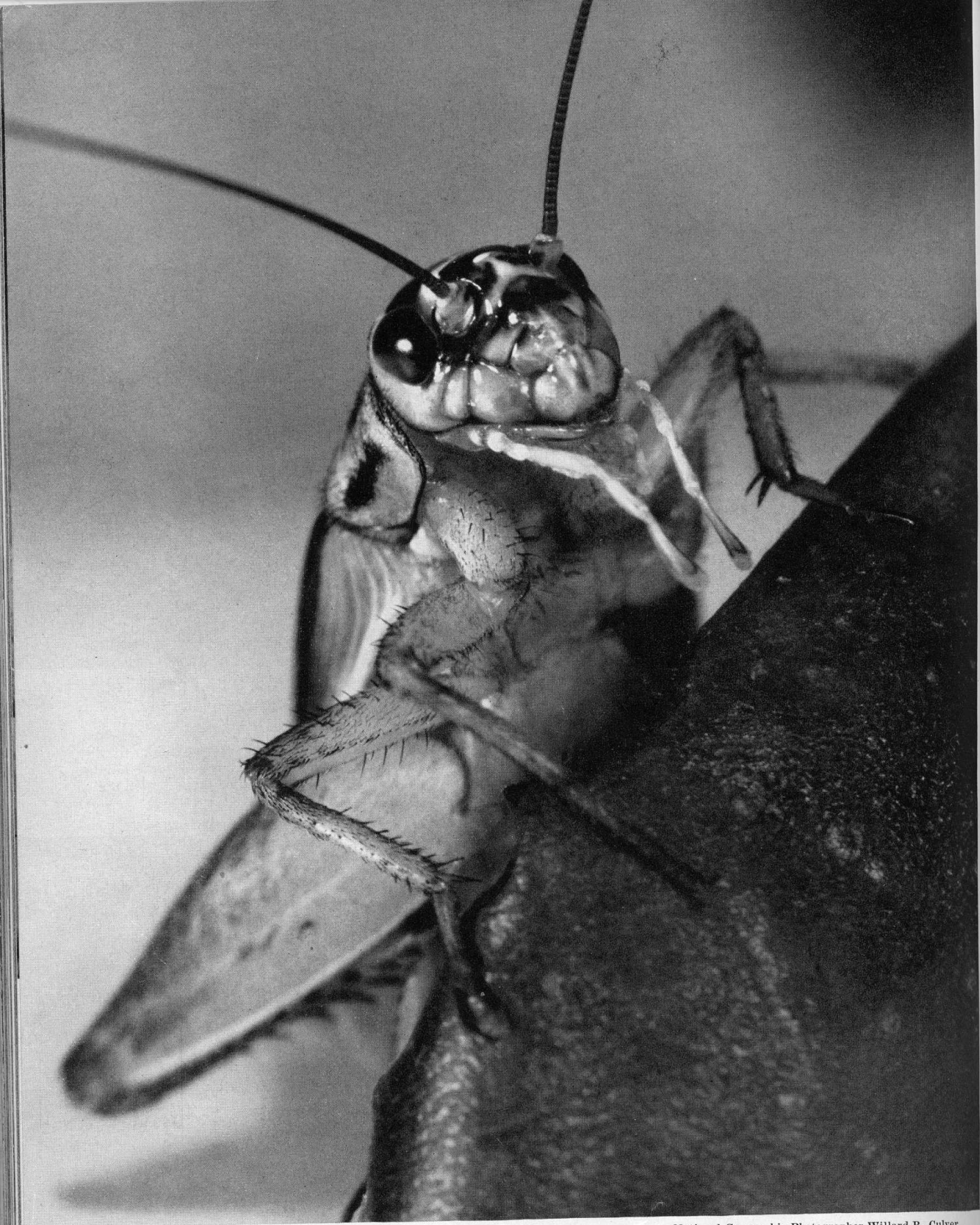
Since A. D. 960 Chinese have bred crickets for battles to the death, as shown in this old drawing. Large sums often are wagered on the bouts. Pre-fight diet includes mosquitoes fattened by feeding on trainers' arms.

↓ **Tickling Makes a Cricket
Mad Enough to Fight**

The girl demonstrates a Chinese cricket tickler usually made of rat or hare whiskers in a reed or bone handle. A wire cage holds the insect while its jade-topped gourd (right) is being cleaned.

National Geographic Photographer Willard R. Culver





Jiminy Cricket, Symbol of Cheer, Becomes a Horned Monster by Camera Magic

Chirping on a hearth, the little insect enjoys a reputation as a gentle harbinger of good luck. In its own element it fights as grimly as any other creature to stay alive.

Like its near relatives, katydids and grasshoppers, *Acheta domesticus* has biting mouth parts. Although a vegetarian by choice, the cricket readily eats other insects. If caged without other food, crickets will devour each other.

During their stay at National Geographic headquarters, crickets from a Georgia live-bait hatchery were fed apples and lettuce. Here one, greatly magnified, perches on a bit of apple.

Most crickets lay their eggs in the ground in summer or autumn. Others bore into trees or shrubs. Eggs hatch the following summer if laid in the fall; older crickets usually die when winter arrives.

humans sing: they love sound and find it a means of self-expression. Another theory is that male crickets sing to challenge members of the same sex.

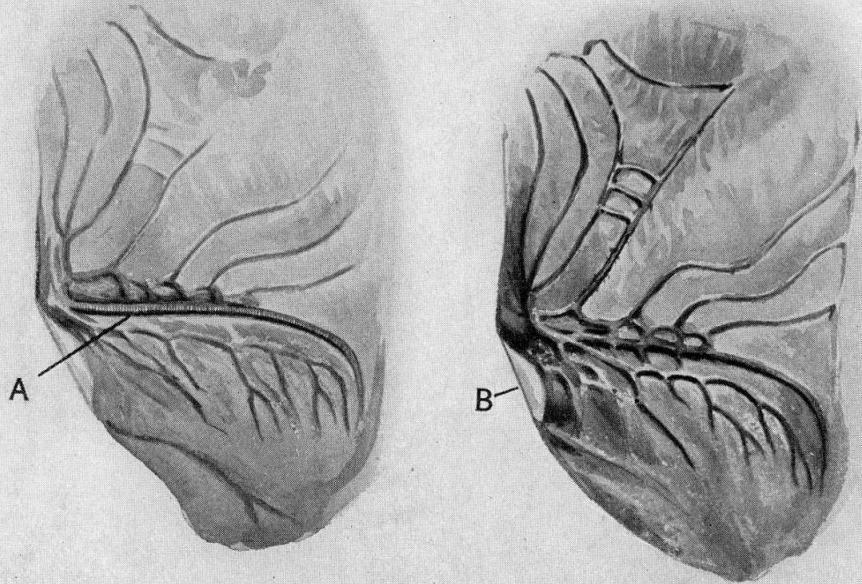
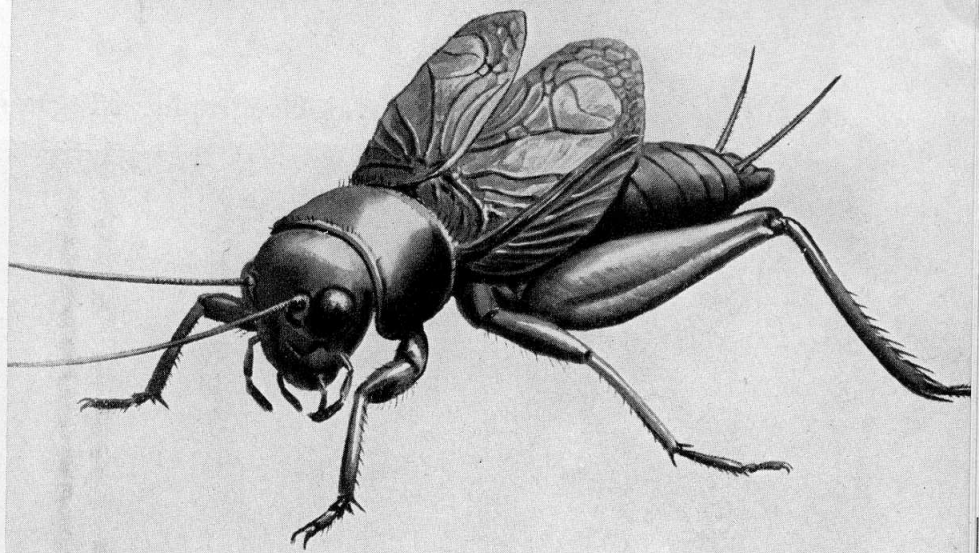
In contrast to the sawing of the grasshopper and the lisp of the katydid, a distinctive feature of cricket music is its definite musical pitch. One naturalist recorded the sounds of three different species of tree crickets and found they were singing, respectively, C (D on warm nights), E, and F, starting two octaves above middle C.

Not normally household residents, crickets do enter houses in late summer when vegetation becomes scarce. Once inside, they will eat clothing, upholstery, carpets, and even rubber goods. To get rid of them, the United States Department of Agriculture recommends DDT as a 5-percent spray or 10-percent powder; or chlordane as a 2-percent spray or 5-percent powder applied around baseboards or other places where the crickets may be hiding.

In Cleveland, Ohio, angry housewives whose homes were invaded by crickets from a city dump armed themselves with cricket-filled paper bags, marched into the office of the city's service director and released the insects. Their action forced the director to order a 10-foot strip cleared between the dump and private property, a DDT barrage in the strip, and a special watchman to guard against "wildcat" garbage dumping.

Chirps Drown "Yankee-Doodle"

A few summers ago, crickets in the thickets around the Carter Barron Amphitheatre in Rock Creek Park, Washington, D. C., chirped so loud during a performance of Paul Green's "Faith of Our Fathers" that the management had National Capital Park Service people spray with insecticide. But the crickets' chirps were just as loud, especially when the orchestra played "Yankee-Doodle"!



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Drawn by Walter A. Weber, National Geographic Artist

Cricket Produces His Cheery Chirp by Rubbing One Wing Against Another

To sound off, the male insect raises wings above body and moves them back and forth laterally so that the file (A) rubs against the scraper (B). This action vibrates the wings and creates the sound (page 385). Only adult males chirp. Some scientists say the cricket's song is a mating call. Others insist it is a challenge to battle; still others say it is merely a means of self-expression. The insect's name comes from the French *criquer*, to creak.

When crickets are numerous outside, the United States Department of Agriculture has another remedy to destroy them. A good bait formula contains 25 pounds of bran, 1 pound of sodium fluoride or sodium fluosilicate, 2 quarts of molasses, and 2½ gallons of water. Care should be taken to prevent children and pets from eating the bait.

Western United States farmers are sometimes beset by the crop-devouring Mormon cricket, *Anabrus simplex*. A notable invasion by this species, not a true cricket but related to the grasshopper, was the plague of 1848 in the Mormon settlement at Salt Lake City. Their crops doomed to destruction, the Latter-



Howell Walker, National Geographic Staff

Georgia's "Bug Factory" Turns Crickets into Cash

George Smith, of College Park, started his live-bait hatchery with a handful of crickets left over from a 1950 fishing trip. Now he raises 1,000,000 a year for direct and mail-order sale to anglers (pages 387, 394). Fresh-water fish strike eagerly at the insects. Here a couple, headed for a stream, stocks up with bait in screened boxes.

day Saints prayed for help. As if in answer to their prayers, sea gulls came in droves to gorge on the insects. Today a monument to the birds stands in Temple Square of Utah's capital.*

The western meadowlark, Brewer's blackbird, and the sage thrasher are avid eaters of adult Mormon crickets and their eggs. One species of wasp, *Sparaisson pilosum*, also is their enemy.

Crickets Harm and Help Fruit Trees

Tree crickets sometimes spread a canker disease in apple twigs by their egg laying. The female hollows out cavities in twigs with her ovipositor. Then she lays pale-yellow banana-shaped eggs in them.

Because of their egg laying and their taste for berries, tree crickets are considered harmful by fruitgrowers. On the credit side, however, a single snowy tree cricket was found to eat from 300 to 900 destructive scale insects in one night.

In late summer, when the chorus of male field crickets is at its height, females are busy laying their eggs just below the surface of the ground.

To study the insect's ovipositor, Dr. Vincent G. Dethier, Johns Hopkins University biologist, offered five cents apiece for 1,000 female crickets a few summers ago. Dr. Dethier hoped

* See "Utah, Carved by Winds and Waters," by Leo A. Borah, NATIONAL GEOGRAPHIC MAGAZINE, May, 1936.



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James E. Mays

A Williamsburg, Virginia, Hostess Admires a 17th-century Chinese Cricket Box

Gift of Mrs. John D. Rockefeller, Jr., this treasure carved from porcelain is on display in the Governor's Palace at the restored colonial capital of Virginia. The Chinese, lovers of cricket fighting (page 389), housed their insect warriors in such boxes between bouts.

that the same cooperative youngsters who caught fireflies for Dr. William D. McElroy, another Hopkins scientist, would catch crickets for him.*

He received so many crickets in the first two weeks that the *Baltimore Sun* had to come to his rescue, begging the children not to bring any more.

Mole Crickets Live Underground

Of all the species, the mole cricket is perhaps the strangest. Resembling a mole as nearly as an insect can, this cricket is covered with fine, short hairs which give it a furry appearance.

In his *Book of Monsters* Dr. David Fairchild calls the mole cricket "a monster of the underworld." Most of its existence is spent underground in permanent galleries. Powerful front legs, four-pointed like spading forks, enable it to dig under the soil. They also

serve as oars in water and as shears to snip roots.

One entomologist, in describing the song of male mole crickets, states: "Their music is solemn and monotonous, being always a series of loud, deep-toned chirps, like *churp, churp, churp*, repeated very regularly about a hundred times a minute.

"Since the notes are most frequently heard coming from a marshy field or from the edge of a stream, they might be supposed to be those of a small frog." Others compare some mole crickets' notes to those of the European nightjar, a nocturnal bird, also known as the goatsucker. These insects have spotty distribution throughout the United States, but are rarely seen.

For one reason or another, crickets have

* See "Torchbearers of the Twilight," by Frederick G. Vosburgh, NATIONAL GEOGRAPHIC MAGAZINE, May, 1951.



One More Step and This Fireside Troubadour Will Sing No More

The author's collie, Ginger, deeply interested in the cricket, was totally oblivious of the photographer's activity with high-speed lights and other gear. To keep the insect from hopping out of camera range, it was drugged momentarily with a painless chemical. The episode ended unhappily: Ginger ate the cricket.

been of interest to primitive and civilized people alike.

At College Park, Georgia, an enterprising man runs a cricket hatchery (pages 387, 392). George Smith returned from a fishing trip in 1950 with a few crickets left over. He decided to breed the insects for fish bait. In 1952 he sold a million.

One species of cricket is widely eaten in Burma. It is sold, fried, on the market in Mandalay.

Caught by professional collectors from near-by villages, the crickets sell for one rupee and four annas (about 23 cents in United States currency) a hundred. During festivals, baskets of fried crickets often are consumed as a special treat.

The insects are also greatly prized as food by the Siamese, who roast them over a fire. One Occidental visitor to the country found courage enough to try eating crickets, but thought them insipid; others have described their flavor as similar to lettuce.

As one entomologist points out, it would be

difficult to give sound reasons why Americans eat oysters, crabs, snails, and lobsters but disdain to eat equally clean, palatable, and nutritious insects.

Crickets May Speak Dialects

An American entomologist is working on the theory that crickets have dialects, and he believes that a careful study of their songs can place them geographically. For instance, a distinguishing trill might prove the cricket was a southerner; an unusual flourish could mean he was a Yankee.

Outside my house, in the darkening hours of the night, hundreds of crickets, tuning up their fiddlesticks, struck the opening bars of the insect opera. Inside, Jiminy Cricket answered with a solitary chirp.

Giving up the search, I returned to my book. My dog was more persistent. Suddenly I realized that the chirping inside had ceased. Some people believe that to kill a cricket will bring bad luck, but apparently Ginger is not a superstitious dog.

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