

ENTOMOLOGY

17-Year "Locusts" Emerge

Periodical cicadas, misnamed "locusts," will appear by the millions this spring over eastern United States after 17 years underground. Their numbers will be amazing.

See Front Cover

By HORACE LOFTIN

► THIS IS the big year for 17-year cicadas, or "locusts." After spending 17 years of adolescence hidden below the ground, the great brood X will soon be emerging into the world of sunlight. The lazy males will sing and the females will lay their eggs; and in six short weeks they will all be dead.

These periodical, or 17-year, cicadas, will spring from the soil of wooded areas in most of the country east of the Mississippi. One such cicada, of which there will be millions, is pictured on the cover of this week's SCIENCE NEWS LETTER.

The farmers who think a disastrous "plague of locusts" has descended upon them will be greatly mistaken. The rather inoffensive periodical cicadas were greatly wronged when someone first called them locusts. True locusts, the kind that sweep across a field in clouds, destroying every green thing, are grasshoppers, equipped with very efficient jaws with which they can strip a plant bare in no time flat.

Cicadas, on the other hand, have no biting mouth parts. They do have a sort of snout, or proboscis, with which they can suck plant juices. However, it is generally believed that the majority of 17-year cicadas do not feed at all in their six-weeks' life as an adult. What minor bit of damage cicadas occasionally may do to a few fruit trees is caused by the female, when she pierces branches with her sharp tailpiece, or ovipositor, to lay eggs in the cavity.

This year's crop of cicadas, known as brood X (10), is the biggest and widest-spread of the 17 different broods that emerge, one each year, until the full cycle of 17 years is completed. The broods are numbered I through XVII. The last time brood X was seen was in 1936. The 17-year cicadas emerging this year are the offspring of the 1936 brood.

The cicadas of other broods are generally fewer in number and restricted in area. Brood III, for instance, is almost wholly found in the area around Iowa, Illinois and Missouri. Brood V is concentrated about Ohio, West Virginia and southwestern Pennsylvania. Brood XI, due next year, will mostly be restricted to a tiny area in southern New England.

Scientists think brood X may be the parent brood of all 17-year cicadas.

Let us drop back to 1936 and follow the life of this year's brood X from when they were eggs deposited in a tree branch,

through their 17 years underground, until they emerge as full-grown, winged cicadas this spring of 1953.

While papa cicada was carelessly passing away the last few days of his life, singing from a treetop, the conscientious, voiceless mama was busy puncturing paired cavities into the tree branch, slipping about 10 eggs into each hole. This process took her about 45 minutes to complete.

Then she repeated the egg-laying at another spot, repeating the process over and over, until her complete store of eggs, 400 to 600, had been safely deposited. Weakened from her heroic efforts, she soon fell to the ground to die or be eaten by a hungry bird.

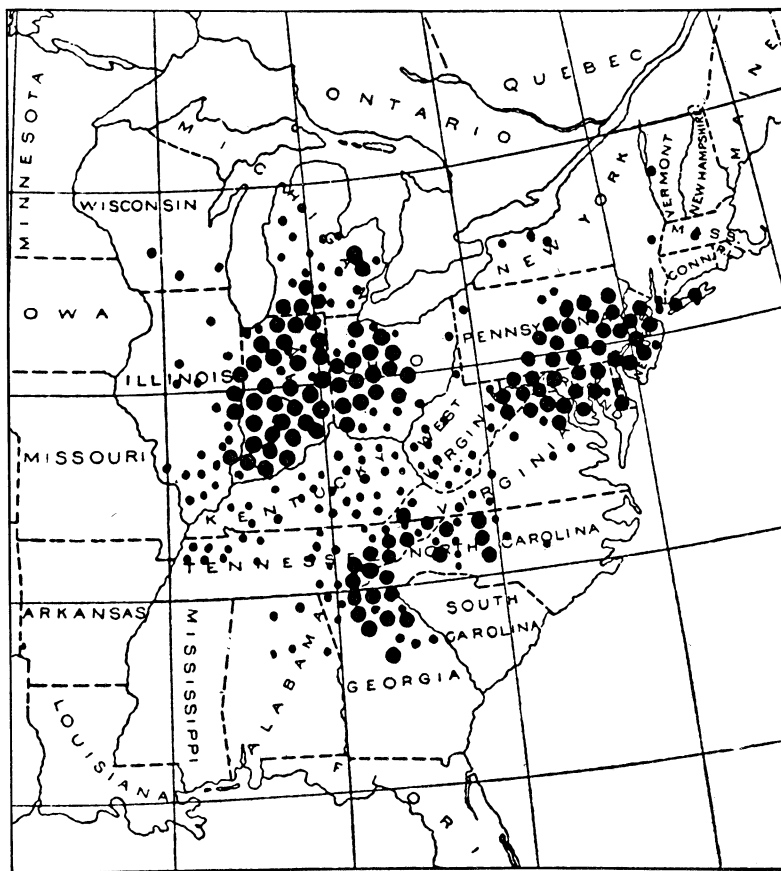
The eggs, about one-twelfth of an inch long, remained in the nest for about six or seven weeks. Then, when an egg case

ruptured, a tiny larval cicada, barely one-sixteenth inch long, wriggled free and moved about with quick ant-like motions for a few minutes. The larva went to the side of the branch and, seemingly, deliberately loosened its hold and fell to the ground. It was so light that the fall did not injure it at all.

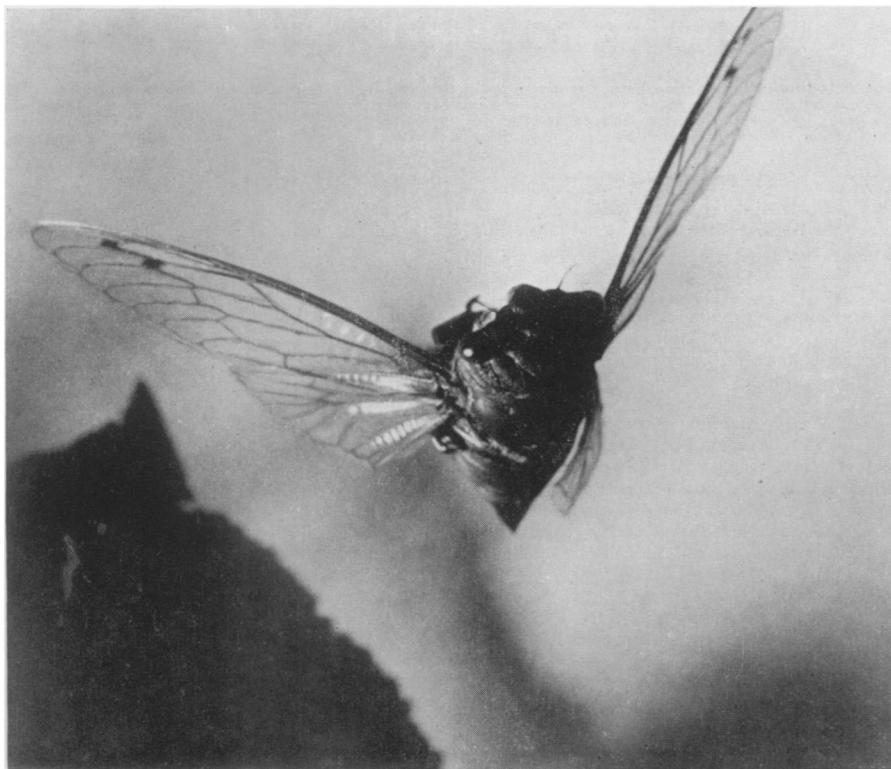
Once on the earth, the larva went underground almost immediately to remain for 17 dark years.

In its new subterranean dwelling, the larval cicada dug about with its oversized front legs until it found a succulent bit of rootlet. It built a sort of case about the rootlet and settled down to suck its juices and pass the years calmly.

Little happened to this cicada in its time underground. Perhaps there were some harrowing moments when it was almost eaten by a carnivorous beetle larva. But more than likely, the monotony of eating and sleeping was broken only by the times it shed its skin. Insects increase in size by molting. The cicada larva shed its skin first about 1938. It molted again around 1940



BROOD X DISTRIBUTION—Where the 17-year cicadas, due to emerge this spring, will be spotted is shown on this U. S. Department of Agriculture map. Broods of other years are smaller, not widely distributed.



CAUGHT IN FLIGHT—The fast beatings of a cicada's wings, 45 times a second, are caught as it flies directly at the camera. Exposure time was 1/25,000 of a second.

and in 1944, at which time it was almost one-half inch long.

A startling change took place with the fourth molt, which happened about 1948. When the fat, soft-bodied larva shed this fourth skin, it emerged as a pupa—a sort of wingless, half-finished model of the adult cicada it would be five years later. There was only one more molt underground, which left the pupa from one to one and a half inches long, as it is today, waiting for the irresistible, nameless urging which will cause it to come into the sunlight this spring, split its old skin and

emerge in the adult stage of the cicada.

Besides the 17-year cicada, there is a race of periodical cicadas in the southern United States called the 13-year cicadas. The life history of this cicada is like that of its more northern brother, except that it emerges every 13 years.

The broods of 13-year cicadas are numbered from XVIII to XXX, to keep them distinct from the 17-year cicada broods, I to XVII. This year's brood of the 13-year cicada is XXVI. It will only show up in a few spots in Louisiana, Mississippi and Texas. Brood XXIII is the biggest year for the 13-year cicada—due to appear in 1963.

Disappear by End of July

The periodical cicadas will all be gone by the last of July. Then their cousins, the "dog-day" cicada or the "harvest fly," larger species of cicadas, will take up the singing from the treetops until the end of summer. Little is known about the life history of these other cicadas, except that they are usually around in comparatively small numbers every summer. No one has discovered if they pass a prolonged adolescence beneath the soil like the periodical cicadas.

In spite of many rumors to the contrary, the cicadas are perfectly harmless. They have never been known to "sting" anyone, and they can be handled and studied while alive. The male may even oblige you with a stirring solo while you are holding him.

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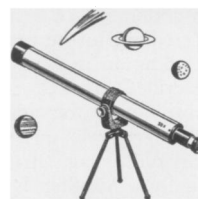
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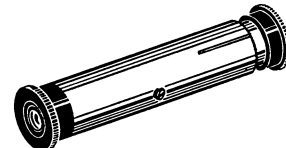
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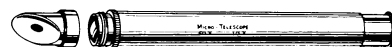
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He makes his "song" by vibrating two little ear-like drums located on the sides of the basal part of his abdomen. A series of sounds have been accredited to the male cicada. First and most common is a sound that can only be described as "tsh-e-e-E-E-e-ou," uttered continuously for about a half-minute.

Next is the "Pha-r-r-ah" song, made early in the season usually. Another is a series of short chirps, which lasts about five seconds.

Cicada's Song Described

Here's how one scientist described the 17-year cicada's singing back in 1851—and how the melancholy song affected him:

"The music or song produced by the myriads of these insects in a warm day from about the 25th of May to the middle of June is wonderful. It is not deafening, as many describe it; even at its height it does not interrupt ordinary conversation.

"It seems like an atmosphere of wild, monotonous sound, in which all other sounds float with perfect distinctness. After a day or two this music becomes tiresome and doleful, and to many very disagreeable. To me it was otherwise, and when I heard the last note on the 25th of June the melancholy reflection occurred—shall I live to hear it again?"

To hear that brood of cicadas sing again, the scientist would have had to live through the period of the Missouri Compromise, the South's secession, the whole Civil War, the assassination of Lincoln and the beginning of Reconstruction. Yet during these 17 hectic years for humans, the cicadas would have been disturbed only by the tread of soldiers' feet on the ground above them.

Science News Letter, May 9, 1953

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ANALYSIS OF ALUMINUM ALLOYS: A Compilation of Modern Methods—G. H. Osborn and W. Stross, Eds.—*Chemical Publishing*, 144 p., illus., \$3.50. A survey of analytical methods, new, modified and standard.

AQUARIUMS—Anthony Evans—*Dover*, 115 p., illus., paper 60 cents, cloth \$1.50. Covers fish-keeping equipment, water plants, fish foods, and all types of fish.

THE ARMY AIR FORCES IN WORLD WAR II, Vol V: The Pacific, Matterhorn to Nagasaki, June 1944 to August 1945—Wesley F. Craven and James L. Cate, Eds.—*University of Chicago Press*, 878 p., illus., \$8.50. Fifth in a seven-volume series, this completes the narrative of combat operations of the AAF in World War II.

BEGINNING ALGEBRA FOR COLLEGE STUDENTS—Lloyd L. Lowenstein—*Wiley*, 2nd ed., 279 p., \$3.50. Intended for the student who has had no background in algebra.

BICYCLE IN THE SKY: The Story of Alberto Santos-Dumont—Rose Brown—*Scribners*, 183 p., illus., \$2.50. Tells about the Brazilian pioneer in aviation and his many experiments with balloons, dirigibles and early airplanes. Ages 9-14.

BIRDS AND PLANES: How They Fly—John Lewellen—*Crowell*, 134 p., illus., \$2.00. An account of the "hows" and "whys" of flight, natural and mechanical. Ages 10-14.

THE CARE OF CATS—Kit Wilson and Addison Webb—*Dover*, 106 p., illus., paper 60 cents, cloth \$1.50. A practical guide for all kinds of cat fanciers.

CHILDREN OF DIVORCE—J. Louise Despert—*Doubleday*, 282 p., \$3.50. Covers the effects of marriage failure in its impact on the child. With case histories.

CLOTHES MOTHS AND CARPET BEETLES: How To Combat Them—Agricultural Research Administration, U. S. Department of Agriculture—*Government Printing Office*, 12 p., illus. paper, 15 cents. Describes the many products and methods home owners can use to protect their woolsens.

THE DECLINE OF THE ROMAN EMPIRE IN THE WEST—Frank W. Walbank—*Schuman*, 97 p., paper, \$1.00. A re-examination of the problem of the causes of the collapse of the Roman Empire, using the wealth of archaeological discovery of the past 50 years.

THE DISTEMPER COMPLEX—Leon F. Whitney and George D. Whitney—*Practical Science*, 219 p., illus., \$5.00. The history, symptoms, diagnosis, pathology and treatment of 11 diseases which comprise the distemper complex.

ELECTRONICS IN INDUSTRIAL RESEARCH—Axel H. Peterson—*Mellon Institute of Industrial Research*, 5 p., illus., paper, free upon request direct to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa.

ENCYCLOPEDIA OF ABERRATIONS: A Psychiatric Handbook—Edward Podolsky—*Philosophical*

Library, 550 p., \$10.00. Discusses all types of aberrations, with particular emphasis on their psychodynamics and legal aspects.

FAITH AND MORAL AUTHORITY—Ben Kimpel—*Philosophical Library*, 186 p., \$2.75. The author maintains that the function of moral principles is to help individuals to make choices that contribute to human well-being.

FAUNAL AND ARCHEOLOGICAL RESEARCHES IN YUCATAN CAVES—Robert T. Hatt et al.—*Cranbrook Institute of Science, Bul. No. 33*, 126 p., illus., paper, \$2.50. Concerns excavations conducted in caves of Yucatan during 1929 and 1947.

FEUDAL ORDER: A Study of the Origins and Development of English Feudal Society—Marion Gibbs—*Schuman*, 147 p., paper, \$1.00. A study of the social order and civilization that played a major part in shaping the history of modern Europe.

FREE AND UNEQUAL: The Biological Basis of Individual Liberty—Roger J. Williams—*University of Texas Press*, 177 p., illus., \$3.50. The author believes that we have ignored the facts of genetics in our social and political thinking, and advocates the abandonment of the false concept of "the average man."

HEATING, VENTILATING, AIR CONDITIONING GUIDE, 1953—*American Society of Heating and Ventilating Engineers*, 1560 p., illus., \$7.50. Contains a technical data section on the design and specification of various systems, and information on modern equipment.

HELPING YOUR HEART—Emanuel Goldberger—*Longmans, Green*, 240 p., \$3.75. Explains what heart disease is, how a person can live in spite of an ailing heart, and what he can do to help such a heart and himself.

THE INTELLIGENT USE OF THE MICROSCOPE—C. W. Olliver—*Chemical Publishing*, 192 p., illus., \$4.00. A guide to the understanding of the possibilities and limitations of the microscope, its principles of design and the functions of its component parts.

INTRODUCTION TO GEOPHYSICAL PROSPECTING—Milton B. Dobrin—*McGraw-Hill*, 435 p., illus., \$7.50. Discusses all geophysical methods of prospecting in current use, with emphasis upon the gravity, magnetic and seismic techniques.

INTRODUCTION TO THE THEORY OF STATISTICS—Victor Goedicke—*Harper*, 286 p., illus., \$4.50. Text for a one-semester course in beginning statistics based on the assumption that the student has not had calculus.

LANGUAGE AND MYTH—Ernst Cassirer, translated by Susanne Langer—*Dover*, 103 p., paper \$1.25, cloth, \$2.25. Intended to prove that reason is an achievement of man, this analyzes the myth-making tendencies of mankind.

LIFE OF THE PAST: An Introduction to Paleontology—George Gaylord Simpson—*Yale University Press*, 198 p., illus., \$4.00. A non-technical discussion of how the history of living things is preserved, discovered and interpreted.