

ENTOMOLOGY

# Corn Conqueror in First Round of Chinch-Bug Fight

## Trench Warfare in Addition to Barriers of Creosote And Pit Traps Served as Defence Against Marauders

**C**OUNT round one in favor of King Corn in his battle against Kid Chinch-Bug.

With the able seconding of farmers and scientists, the most vicious onslaught of the boring-in enemy of Uncle Sam's principal grain crop has been stopped. The fight now enters the second round, with no predictions good for much, though the odds seem to favor Corn again.

When the oats crop, the chinch-bug's first training-table, began to dry up in the early summer heat, the insects started their regular invasion of the corn-fields. Here they were met by trenches, barriers of creosote oil, and pit-traps in which they could be burned or crushed. In general, throughout the whole corn belt of the Midwest, alert farmers supplied with ammunition by State and Federal authorities kept their fields free of the crawling hordes. Practically all the chinch-bugs that tried to get into the corn were blocked out, and subsequently destroyed.

Now the crawling stage of the first brood of the bugs has ended. The survivors that did not attempt direct assault on the corn have grown their wings and flown over the barriers. They are at present feeding in reduced numbers in the corn, but not doing it appreciable harm.

### Real Threat to Come

Their real threat will come after they have bred, for their offspring are the insects that will survive the winter, lurking in stubble and in the weeds and grasses of the fencerows, to be ready to make a fresh attack next year.

This renewed threat will be met by cleaning up the fields, plowing the stubble under, and where practicable by burning the growth along the fencerows.

Principally, however, the question whether 1935 will be another bad chinch-bug year will have to depend on the winter weather. January and February may be the Midwestern farmer's best friends, as they were once Russia's

best generals, when Napoleon retreated from Moscow. But if the winter months turn out to be too mild, the chinch-bug war will have to be renewed next summer.

Chinch-bugs have spread over territory far to the north of their usual range, due to a succession of hot, dry summers in the past few years. In Iowa, for example, they normally occur in troublesome numbers only in the extreme southwestern corner of the state and to some extent across the southern tier of counties. At present they are rated as "bad" well up into central Iowa, as far north as Des Moines, and reported "present" clear up into the northeastern section, though not reaching to the extreme northeastern corner of the state.

The areas hardest hit by the pest are

Missouri, southern Iowa, Illinois, and northwestern and northeastern Indiana.

Nearly a million dollars has been spent by the United States Government in battling the enemy, and the results have been very satisfactory. During the time when the insects were migrating from the small grain to the corn and the pest fighters were working frantically to provide barriers against this migration, the United States Government distributed about seven million gallons of creosote oil to the states for this purpose.

The next generation of the insects will begin their attack during the present season.

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PHYSIOLOGY

## Radio Currents Add To Knowledge of the Brain

**T**HE same kind of electrical impulses that carry music and speech to your radio promises to aid in discovering the unknown functions of the deeper regions of the brain.

Dr. Clarence W. Brown of the University of California psychology department uses high frequency radio currents in blocking out those parts of the brain which are not accessible to study by



### BABY LOCOMOTIVE

*This diminutive locomotive, running on a single rubber tire, was developed in Germany for the economical shunting of freight cars. One "engineer" can operate the device without difficulty, and when the car is in place, the device can be detached and then will travel under its own power across ordinary paving to another part of the railroad station. The small wheel in front enables it to cross the rails. An ordinary commercial fuel mixture operates the shunting device.*

other surgical procedures. These regions are put out of function without the actual removal of any tissue.

The current used has a frequency of three million cycles, which cannot be felt by the animal. It is conducted into the brain by means of a pointed electrode fourteen thousandths of an inch in diameter, the region affected being immediately adjacent to the tip.

The higher cortical centers of the brain are not greatly affected, as is the case with other methods, so the animals

remain normally healthy and can be studied for an indefinite time. This makes it possible to study the relation between the nervous centers blocked out and all of the many activities of the animal. In this manner it is possible to learn just how the various parts of the brain function in controlling the different activities of the body.

Dr. Brown is particularly interested in investigating emotional responses. Fear, anger and play responses in cats are now being studied.

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#### PHYSICS—RADIO

## More Ionized Layers Are Suggested by Scientist

### Above the Already Known "E" and "F" Layers May Be Layers "G" and "H" at Heights of 375 and 725 Miles

**T**WO new "roofs" of ionized electrical particles far above the earth are suggested by Dr. Harry Rowe Mimno of Harvard University in a letter to the British scientific journal, *Nature*, just published. Experiments on the reflection of radio waves indicate that echo layers "G" and "H" may soon be added to the layers "E" and "F" already known to science.

Electrical roof "G," Dr. Mimno indicates in his communication, is probably at an altitude of 375 miles above the surface of the earth. Layer "H" seems to be at a height around 725 miles.

The already known layers are at altitudes of 62 miles and 155 miles.

Reflecting layers of ionized, or electrically charged, air molecules high above the earth have been known since 1902 when Prof. A. E. Kennelly of Harvard University and Prof. O. Heaviside in England independently came to the conclusion that such layers must exist to explain the long distance transmission of radio waves.

#### The Ionosphere

The reflecting layers, later found, are called the Kennelly-Heaviside layers in honor of these two men. All the layers are now generally known collectively as the "Ionosphere." Ordinary broadcasting is commonly reflected by the lowest of the reflecting layers, at 62 miles.

Within 50 or 100 miles of a power-

ful broadcast station the reflecting layers are not needed for reception because the "ground" wave has sufficient intensity. Beyond this range, however, reception is possible only because the radio waves go up to a reflecting layer and are then turned back down to earth as if they had hit some radio mirror.

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#### ICHTHYOLOGY

## Color Changes in Fish Determined by Half an Eye

**F**ISHES that grow darker or lighter, chameleon-fashion, to match their backgrounds, do so in response to stimuli perceived with only "half an eye." Experiments establishing this point were described by Prof. Francis B. Sumner of the Scripps Institution of Oceanography, La Jolla, Calif., before the meeting of the American Association for the Advancement of Science.

Prof. Sumner slipped over each eye of the fishes used in the experiments a close-fitting little cap of transparent celluloid-like material, which clung closer than the traditional monocle of the English dandy. When part of the surface of these "fish-monocles" was darkened in such a way as to prevent light from reaching the upper half of the retina, or light-sensitive layer of the eye, the fish became dark, just as it would have done in a black-lined

aquarium. But darkening the lower half of the retina had no such effect; on the contrary, under certain circumstances it produced an opposite effect. As Prof. Sumner explained it, "Increasing the apparent source of illumination (the background remaining constant) tends to call forth the same response as darkening the background."

Prof. Sumner also reported, in another paper, an experiment intended to determine whether the color of mammals' hair can be changed by light stimuli, as can the skin color of lower vertebrates, the fishes, amphibians and reptiles.

He kept numbers of mice in cages painted in various colors, and even supplied with suitably dyed nesting materials. The cages were subjected to bright light, both day and night. The mice, however, "did not turn a hair"; so that Prof. Sumner concluded that the color of their surroundings meant nothing to them in determining the color of their hair.

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#### ENGINEERING

## Smoothness of Surface Now Indicated by Sound

**I**T IS now possible to "hear" how smooth a polished surface really is.

Irregularities on a polished metal surface are now transformed into sound by a needle and amplifying apparatus similar to a victrola, it is reported by the metallurgical magazine, *Metals and Alloys*. When the needle passes over the surface it encounters minute hills and valleys which set up vibrations on a diaphragm. A very smooth surface would emit a very high note as the ridges are small and close together, while a coarse surface would give out a bass note.

A method for determining the same thing was developed several years ago in France. This made use of the photoelectric cell and is considered by Dr. P. H. Heyl of the National Bureau of Standards to be a slightly more accurate gage of smoothness, but the apparatus involved is somewhat more complex. Light was focused on a surface and its reflection directed on a photoelectric cell. Variations in the resulting current indicated the ridges and hollows.

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Mechanical refrigeration is valuable to about 300 industries.