ENTOMOLOGY

Hot Waves Bring Northwest Grasshopper Invasion Menace

Great Drought and Mild Winter Conspired to Produce Pests In Hordes That Are Already Stripping Farms of Green

See Front Cover

GRASSHOPPER outbreaks in Nebraska and South Dakota may be only the advance guards of a much worse and more widespread insect horde to arrive before very long if hot waves continue to sweep the country. So say entomologists of the U. S. Department of Agriculture. The coming of these insects in June was in a sense premature, they state, for even in bad grasshopper years the pest does not ordinarily assume serious proportions until July.

Just how bad the grasshoppers can be expected to be in the West this year it is impossible as yet to estimate. The Bureau of Entomology, however, has a number of scouts in the field, investigating the areas most under suspicion as probable breeding centers of the hoppers, and battle plans are being laid. The principal means of combat against the grasshopper armies is chemical warfare: poisoned bait, consisting of a molasses-sweetened bran mash loaded with sodium arsenite or other arsenical, is distributed where they can find it.

Severe Winter Kills Them

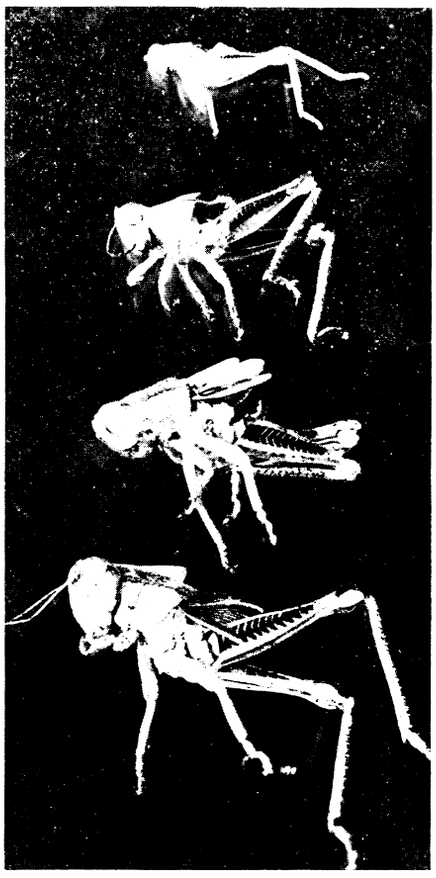
Events of last summer and winter have conspired to make the present situation threatening, the Federal entomologists explain. Last year there were moderately severe grasshopper outbreaks in a number of western states. It was feared at first that the situation might become serious even then, but the hoppers failed to develop in really large numbers. However, there were enough of them to deposit huge quantities of eggs in the drought-hardened soil.

But even with myriads of grasshopper eggs in the ground, the country can still be spared a grasshopper plague during the following year, if only the winter is severe enough. January and February are often the northwestern farmer's best friend. However, last winter was a very mild one, so that a relatively large proportion of the eggs survived. Early warm weather this year brought forth the advance guards and continued heat may call out the main army.

The grasshoppers that are raising the trouble today are the direct descendants of the ones that caused the terrible "grasshopper years" in the pioneer West, and near relatives of the locusts that Moses called up out of the desert to scourge hard-hearted Pharaoh for breaking his word to let the Children of Israel go. They are long-winged grasshoppers, with considerable powers of flight, and the most unselective appetites in the insect world. They will eat literally anything they can take a bite out of, and when a horde of them hits a farm it simply cleans the place up.

Grasshoppers are unlike the insects used most commonly in the schools as nature-lesson objects. They do not pass through the stages of grub or caterpillar, pupa or chrysalis, and full-grown insect or adult, as do such insects as bees, ants and butterflies. When a grasshopper egg opens, a tiny grasshopper comes out. It looks as much like a grown-up grasshopper as a baby looks like a grown-up man. Such an infant grasshopper is called by the wholly over-complimentary name of "nymph" by entomologists.

Grasshopper nymphs feed greedily and grow rapidly. They shed their skins four times, with each change attaining longer wings and a more adult-like appearance. Finally, after the last change, they have wings they can use for flight, and then they are ready to launch themselves into the air in streaming clouds.



BABY CLOTHES

As the ravenous insect grows he leaves worn-out skins behind him, each discarding four skins before becoming full-grown.

Science News Letter, July 11, 1931

MEDICINE

Female Gland Extract Checks Bleeders' Disease in Males

ONE of the female sex hormones may play an important part in the future treatment of the strange bleeders' disease known as hemophilia, if the preliminary studies just reported to *Science* by Dr. Carroll La Fleur Birch of the University of Illinois College of Medicine are confirmed.

This condition is a rare disease of the blood with a strong hereditary tendency. Only males suffer from it, but it is transmitted through the unaffected women of the family. The outstanding symptom is a tendency to excessive bleeding which may be spontaneous or may result from a slight injury that would pass unnoticed in an ordinary individual.

A strong hemophiliac tendency exists in several of the royal families of Europe today. The oldest son and heir of the recently deposed King of Spain suf-

fers from this disorder, as did the ill-fated Czarevitch of Russia. A feature of the disease is the fact that it takes the blood much longer to clot than is usual.

Dr. Birch reported that he and his associates had located a family of hemophiliacs in southern Illinois whose family records were traced back 125 years through six generations. There had been sixteen bleeders in this family, seven of them now living.

Dr. Birch started his investigations on the theory that if the women of such a family can transmit the disease, they must potentially have it, but something in the female mechanism holds it in abeyance. The greatest difference between males and females is in the sex organs. He therefore treated two boys who were marked sufferers from the disease with ovarian extract and implanted ovarian tissue in one of them.

These boys had scarcely ever been free from hemorrhage for a month at a time before this treatment. After the treatment, the boy who had the extract from the female glands was free from bleeding for eleven months, and the one who had the ovarian transplant was free from bleeding for five and one-half months.

Dr. Birch and associates are continuing their studies on this disease, as their present experiments are incomplete, he reported.

Science News Letter, July 11, 1931

ASTRONOMY

Super-Giant Star Discovered In Large Cloud of Magellan

A SUPER-GIANT variable star with light flashing up and down so vigorously that its brightness changes from 12,000 to 33,000 times that of the sun within less than one month has been found in the Large Cloud of Magellan, a distant mass of stars visible in the sky of the southern hemisphere. This star is but one of many super-giant variables in the great star cloud that lies at a distance of ninety thousand light years from the earth. A light year is approximately six trillion miles.

One star out of seventy has been found to be variable, among the hundred thousand super-giants in the Large Cloud. In 1908 Miss Henrietta S. Leavitt, at the Harvard Observatory, published a list of eight hundred variable stars which she found in the Large Magellanic Cloud. Her discoveries were made by the method of superposing a negative plate of the Cloud on a positive, and examining the double images so obtained. The two plates used were taken at different times, and the changes of light of the variables in the interval between made their images look bright on one plate and faint on the other. Thus the pulsating stars were detected. An examination of several such pairs of plates, taken at different intervals of time to reveal the different periods of variation, resulted in the discovery of the variables.

Since Miss Leavitt's time, such work has been done in the discovery of variables in the Milky Way. But until very recently no further hunt was made in the Magellanic Clouds. Within the past few years, however, a number of new photographs of this galaxy have been taken at the South African station of the Harvard Observatory. These new plates, when recently examined, have yielded a rich harvest of some seven hundred hitherto unknown variable stars in the same regions that contain the earlier discoveries.

The finding of these fifteen hundred variables, together with the probability that there are still others too faint to be detected on the photographic plates, furnishes important information on the structure of galaxies, the distribution in brightness of stars, and the distance of the systems that contain them.

Important Relation Verified

One of the outstanding results of this recent survey has been the verification of the important period-luminosity relation found for variable stars. Miss Leavitt noticed, in determining the period of time it took the variables to complete one pulsation cycle, that this period was directly related to the brightness of the star. From her data, and from the data derived from variables in star clusters, Dr. Shapley established the period-luminosity relation, by means of which the intrinsic brightness and therefore the distance of the stars can be determined. This relation has done more than any other empirical fact to give us knowledge of the distances of stars and clusters and the structural form of the Milky Way.

It is significant that new periods derived for the Magellanic Cloud variables confirm this relation. Not only in the Large Cloud, but in the Small Cloud of Magellan as well, this powerful astronomical tool has found its verification.

Science News Letter, July 11, 1931

ENGINEERING

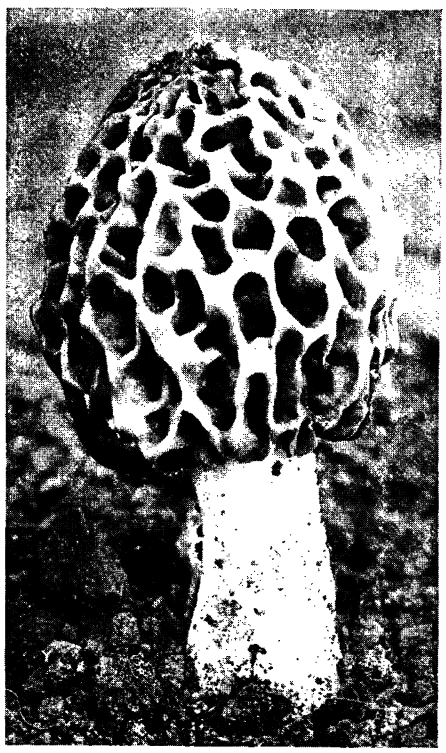
Copper Put Into Auto Valves To Make Them Last Longer

ONE of the weak spots of the modern automobile engine may be strengthened as the result of researches of A. T. Colwell, of Cleveland, which have been reported to the Society of Automotive Engineers.

Mr. Colwell hollowed out the centers of valve stems of internal combustion engines and filled them with copper. He found that this treatment added both to their efficiency and life.

The explanation lies in the fact that copper conducts heat much better than steel, it was explained.

Science News Letter, July 11, 1931



GOOD TO EAT—AND SAFE

If you see any mushrooms that look like this, gather all you can get of them. These are the edible morel, one of the most delicious of all mushrooms, and they have the further great advantage that nothing that looks at all like them is poisonous.