

sphere the speed of sound is about 650 miles an hour.

For this reason Mr. Wimperis anticipates that as the speed limit is approached the record may be set at low altitudes. It is probable that records will be over 500 but less than 600 m.p.h.

Twenty thousand kilometers or 12,400 miles, a little more than half way around the earth, has been set by fuel experts as the maximum distance a plane can go on a single load of gasoline. When that point is reached, the internal combustion engine will be hauling its largest theoretical load; beyond that the present type of motor cannot be improved. This forecast, perhaps the most precarious of the lot, is based on the knowledge that for engines having given efficiency, using fuels of specific characteristics, the maximum possible ton-miles per gallon of fuel tends to be independent of altitude. Under still air conditions there is no advantage in flying higher to beat distance records.

The fact that a plane has a "ceiling" of 61,000 feet depends on another fact—that the air at 61,000 feet is so thin that supplying oxygen to the engine becomes a problem that cannot be solved with the means at our command today or likely to be in the near future.

But men may yet design means of flying totally different from those we now know and in that way achieve what appears impossible today. "By assembling this row of aeronautical ninetpins," Mr. Wimperis declares, "I encourage the resourcefulness of coming generations by providing them with the zest of knocking them down."

Science News Letter, September 25, 1937

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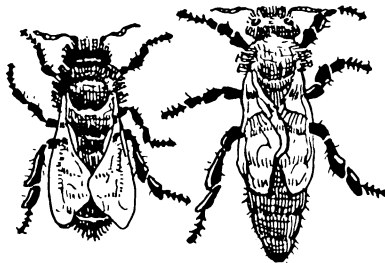
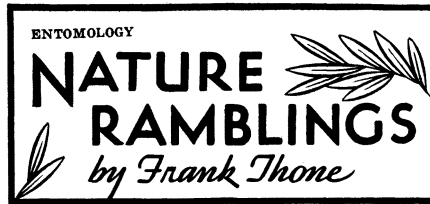
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Widows' Sons

WIDOWS' sons are proverbially drones. It doesn't matter that in human society that proverb is a libel; it sticks anyhow. But in the beehive the drones are of necessity sons of a widow. And paradoxically, even though that widow has once had a mate, her male offspring never had a father.

Queen bees are all widows. When a young queen is ready for mating, she leaves the hive and flies high in the air, with a whole flock of males in pursuit. One captures her and weds her—and pays for his success with his life, for his reproductive organs are torn from his body and he falls to earth and dies of the mutilation. The queen then returns to the hive, always to meet the deadly hostility of her mother.

If she is not killed by the jealous older queen, she founds a new colony, taking part of the old swarm with her. Within her body she has the beginnings of all the eggs she will ever lay—many thousands of them. She also has, stored in a special sac, the male germ cells she received from her departed mate. They will remain alive and able to fertilize her eggs as long as she herself lives, usually several years.

In some way, the queen is able to control the outlet of this storage sac of sperm cells, so that she can lay fertilized eggs or not as she chooses. Usually she permits the eggs to be fertilized, and those fertilized eggs always develop as females, for the male germ cell contains the particular "gene" or hereditary unit that determines femaleness in the offspring. These females become workers or queens, depending on how they are fed during the larval or grub stage.

Such eggs as the queen passes from her body without fertilizing invariably produce males or drones. Without the

"sex chromosome" of the male cell they cannot be females. Thus we have the peculiar phenomenon of bee fathers able to have only daughters, bee mothers able to have sons without the aid of fathers, but able to produce daughters only with the aid of fathers.

The paradox of the beehive does not end even here. If through some misfortune the queen dies there can be no more workers, for the queen is the only possible source of worker eggs. If there happen to be any eggs or very young larvae in the brood cells the workers can remedy this situation by feeding suitable food to produce a new queen.

But if this is not possible a strange thing happens. Some workers (which are undeveloped females, and of course unmated), begin to produce a few eggs, which they tend very carefully. But since these eggs are unfertilized they inevitably produce nothing but drones; and the poor workers are incapable of mating with them. So it is all a gesture of futility, and the colony is doomed to eventual extinction.

Science News Letter, September 25, 1937

RADIO

September 28, 5:15 p. m., E.S.T.

DISEASES OUTSIDE OUR DOOR—Dr. C. V. Akin, Chief Quarantine Officer for the Port of New York.

October 5, 5:15 p. m., E.S.T.

SALT OF THE EARTH—Miss F. E. Harris of the U. S. Department of Interior.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

BULBS

THE Post Office Department has taken action against individuals and concerns located at Vogelenzang, near Haarlem, Holland, who have advertised in various American publications that they will send bulbs at a low price if money is remitted to them. Evidence satisfactory to the Postmaster General has caused him to issue fraud orders which will prevent the delivery of mail and postal money orders to such persons. Subscribers to the SCIENCE NEWS LETTER are advised not to respond to such advertisements without further inquiries in which we will be glad to cooperate. The Post Office evidence indicates that one person or a group of persons is using various names in this connection.