spring both cast swarms again, and so the cycle is repeated. Such is the activity of bees under favorable conditions; but, needless to say, this ideal is not always realized, and we will now follow colonies under other conditions.

Let us take a colony with a virgin queen like the one left after a swarm is cast. It sometimes happens that the queen is defective in some way so that she cannot fly from her hive to meet a drone. This may be caused by mutilated or weak wings, or possibly the queen shows no disposition to fly. On the other hand, the weather may not be favorable for her flight, or there may be no drones in the air when she does fly. Evidently, any of these conditions will prevent mating; and when this occurs we are enabled to see one of the most remarkable phenomena of the hive. The observer who wishes to study this phase of bee activity may bring about the same conditions by cutting off the wings of the queen or by covering the entrance of the hive with perforated zinc, so that it is not necessary to depend on chance to bring about what we are now to observe.

If a queen remains unmated for a period of three weeks she is incapable of mating, and loses all desire to leave the hive to meet a drone. After that time she may begin to lay eggs, but, strangely enough, these eggs produce nothing but drones, and the queen is then what is known as a "drone layer." Obviously then, drones are produced from eggs which have not been fertilized. Not all unmated queens become drone layers; in fact, many queens die if not mated and many others never lay at all; but if any eggs are laid they produce only drones. From my own experience in trying to bring about this condition I can say that the person wishing to verify the statements made concerning this strange phenomenon should start several virgin queens in hives, and possibly one or two will lay.

This introduces us to one of the most remarkable phenomena which is known to occur in Nature, but it is not characteristic of bees alone. In the vast majority of cases in the animal kingdom eggs disintegrate unless fertilized by spermatozoa of the same species. Just why fertilization is necessary is still a disputed point among scientists; but we know that it is necessary in most cases. To the development of eggs without the usual fertilization the name "Parthenogenesis" is applied.

The parthenogenetic development of drones was first completely described by Johannes Dzierzon, a priest of Karlsmarkt, Germany, and a bee-keeper of long experience. It has since been verified by many workers on the subject. As the eggs pass down the oviduct on their way from the ovaries of the queen they pass the opening of the spermatheca, and if the egg is to become a female it receives from this spermatheca one, and only one, spermatozoon; if it is to become a drone it receives no spermatozoon, and consequently remains unfertilized, as do all the eggs of a drone layer. A normally mated queen rarely lays a drone egg in a worker cell, or vice versa, provided both kinds of cells are present, and consequently we are forced to the conclusion, as much as we dislike to admit it, that the queen in some way can control the laying of eggs of different sex, but how this is done is a mystery. I say we dislike to admit this because it is entirely beyond our comprehension and as stated in the earlier part of this talk, one of the difficulties in recording observation is the giving of reasons for things observed.

Another fact which supports the theory of parthenogenesis is that workers in a colony which is hopelessly queenless will often begin to lay eggs. As we have said workers as well as queens are females but they are incapable of mating, and the eggs laid by them produce nothing but drones.

This statement of the theory of parthenogenesis or the "Theory of Dzierzon," as it is commonly called, differs from the usual statements of the theory