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evelopment of y described by iest of Karlsbee-keeper of ince been verin the subject. the oviduct on es of the queen me a female it

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that find place in the books on apiculture. The Theory of Dzierzon can be divided into two parts: (1) Drone eggs are unfertilized, while female eggs are fertilized. To this part all observations lead us to subscribe. (2) All the eggs in the ovary of the queen are male eggs, and the fertilization of the egg changes its sex and it becomes female.

The latter portion of the theory is not founded on actual observation, but on logic only, and not on sound logic, either. Let us state the theory in a different manner. Male eggs are unfertilized and female eggs are fertilized. As far as we can see, this is the only difference ketween them, and, since we can see no other difference, this must be the thing which changes the sex. Is it not clear he spermatheca, that the conclusion does not necessarily follow, for is it not possible that there is theca one, and some difference between these eggs not if it is to be yet observed, which is the all-determining

if it is to be yet observed, which is the all-determining o spermatozon, factor, rather than that fertilization is? unfertilized, as Fertilization may have nothing to do a layer. A not y lays a drome else in the animal kingdom, except in vice versa, pro-animals exhibiting parthenogenesis, is it are present, and d to the conche ence on sex. (2) The ants, which were d to the conds ence on sex. (2) The ants, which were ike to admit is formerly considered to be similar to the way can control be in their parthenogenesis, sometimes, fferent sex, be according to some recent work, have fe-stery. I say is males produced from unfertilized eggs. use it is entired (3) In the vast majority of cases where in and as state the problem of sex has been investigated talk, one of the there is strong evidence that the sex of bservation is the the offspring is determined before the egg ings observed leaves the ovary. (4) Certain observa-oports the there ions made during the past two summers at workers in tend to show that there is some other ly queenless we difference between male and female eggs. As we have said In studying the problem of partheno-ens are female mesis I was struck by the illogical con-mating, and it dison concerning sex, and to test the luce nothing is heavy spent some considerable time in abservations on the subject. I found that bservations on the subject. I found that theory of paramany of the eggs laid by a drone-laying Theory of Difference in the theory propounded by Dzierzon and its of the theory is followers, all the eggs in the ovary

are male, and if they are unfertilized all should develop and become drones. But all do not develop. I have observed drone-laying queens in one-frame observation hives, and in eight-frame hives, and in all my observations there were always a considerable number of eggs which dried up and did not develop. Of course, all that did develop became drones.

From these facts it is possible that the sex may be determined in the ovaries before fertilization. Male eggs do not require fertilization, and therefore can develop when laid by a drone-layer, but the female eggs of a drone-layer require fertilization, and since they do not get it they die. I am as yet unable to give an exact ratio between the number of eggs which develop and those that do not, owing to difficulties in observation, but of the fact that some do not develop I am sure.

Of course, it will be recognized that this is but a theory with a somewhat small basis of fact, but the facts observed seem to me to be enough to throw doubt on the second part of the Dzierzon theory -that sex depends on fertilization. For fear of being misunderstood, let me repeat that my observations confirm the view that drone eggs are unfertilized, so that the first part of the Dzierzon theory remains unchallenged, as far as I am concerned. The entire subject of the parthenogenetic development of the drones is still but little understood. A few facts are well known, but around these facts there has been woven a mass of good and bad guesses which must be cleared up. If the theory could be stripped of these surmises, the whole subject would be much clearer; and one who undertakes to work on this line must drop all but wellverified facts.

There is one other line of work on bees in which I have been interested for some time, and on which there is yet considerable work to be done. According to the views of the majority of zoologists, the variation of animals is the result of cross-

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