

## Controlling Sex in Bees— Control in the Formation of Sex.

—PETER BOIS, British Bee Journal.

The editors of this Journal (on page 202 of the issue for May 25) requested a few lines from me with reference to what I stated in my lecture before the members of the Jersey Natural Science Association on the subject of "Controlling Sex in Bees." I lectured during two hours on a great variety of matters appertaining to bees, their habits, uses, etc. But the subject on which I spoke mainly, while the egg of a bee was pictured on the screen, was that of "The effect of checks on the sex of the egg." The remarks which I made were somewhat as follows:—

"Bee-keepers are able, in a measure, to regulate the production of drones in the hive, and cause the queen to produce almost entirely worker female bees, with but a small percentage of drone or male bees. This is effected to some extent by having almost all worker comb in the hive and only a small amount of drone comb. And I consider that bee-keepers have paid more attention to this matter of the production of sex, and that they have obtained better results than the breeders of other stock generally. I have been able to keep my hives for several years past from swarming, and producing but very few drones per hive, while in worker bees, or female nurses, my colonies have been exceedingly strong. This has been achieved by noticing that drones were produced, and swarming also, when the queen in full 'lay' received severe checks; these 'checks,' at such a time, I distinctly noticed, produced drones or male bees, while freedom from checks, which enabled a queen to go through her laying season, produced female workers only, but with very few males. If, therefore, bee-keepers can govern the production of males at will, the breeders of other stock ought to be able to do the same if they know the law of male and female.

"Fowl fanciers can induce birds to lay very early in the season, and ensure that a fair percentage of the eggs are fertile; but such eggs usually produce cockerels, and the more fertile the hen the greater the percentage of cockerels. Now if we notice that checks are much more likely

to be produced early in the season, when the weather is more varied than later on, and that these changes of temperature would chiefly affect the fowls whose ovaries were the most developed, we get at the reason why eggs set early produce a preponderance of male birds.

The queen wasp gets in full 'lay' more towards the fruiting part of the year than does the queen bee, and at such time cold nights begin to set in, and greater atmospheric changes take place that during midsummer. This has the effect of causing her to produce some drone eggs while she laid only worker eggs previously. Animals generally are more equal in the production of males and females than bees and wasps. On the other hand, the queens of bees and wasps, although their ovaries are far more largely developed than those of other animals, and would be thereby more liable to be affected by checks, yet they are better protected against outside influences than animals generally. The mother-bee, like the mother-wasp, is in the midst of a full colony of her own progeny, which becomes an increased protection in proportion as the maternal ovaries become developed; secondly, they are fed with a food that can be made to produce but little variation in its influence; thirdly, they have the protection of the combs to guard them against sudden changes of temperature, and the combs of each of these insects, although so widely different in the material of which each is composed, yet both are recognized as among the best non-conductors of heat and cold; fourthly, the hive in which they breed is so protected from the extremes of temperature as to retain the warmth of the brood-nest in a very great degree while the queen bee is extensively employed in egg-laying. Other animals, while less fertile, are at all times far more exposed to outside influences, and this may in some measure account for their producing a more equal number of males and females than the two insects cited. I infer, therefore, from these observations and others of a like nature, but all giving indirect evidence, that checks can, and do affect the production of sex in the egg prior to fertilization, or at the time when the egg is ready for that purpose. More direct evidence, however, could, I think, be obtained by experimenting with the eggs of animals, such as frogs and fish, whose eggs are fertilized only after being laid.

The above is, in substance, what I said in the lecture referred to on the subject