

for honey, and no longer aim at an "all-purpose" bee.

Allow me to mention here an institution worthy of notice; there was started, about two years ago, an organization known as the American Breeders' Association, and breeders of both plants and animals are uniting in the study of the principles of breeding with a view to improvement of their stock. Breeders of all kinds of plants and animals have seen that they have interests in common and there is absolutely no ground for a belief that the same principles of breeding do not apply to bees, and I believe no one claims it, yet none of our queen-rearers have seemingly cared enough about the information to be derived, to pay the one dollar membership fee which entitles the member to a volume of proceedings worth five dollars to any breeder. According to the directory in the first volume the total number of members interested in bee-breeding is one, and that one is not included in the last published list of members of the National Bee-Keepers' Association. I am happy to say that since then one other person interested to some extent in bees has joined, and he is also a member of the National. I would urge that the National Bee-Keepers' Association join the Association and then let every member who cares anything at all about the improvement of his bees do likewise. The fee is small and the benefits large. This scarcity of bee-keepers may be due to the fact that the organization has not been properly mentioned in bee journals. I trust that the editors of the journals will look into this association and then give it a little free advertising for it is a worthy object, and is in no sense a commercial enterprise. The editors can do great good in a matter of this sort because they have an easy means of access to the men who should be interested.

Since much scientific work has yet to be started in queen-breeding it may not be amiss to enumerate some of the approved principles of breeding and apply them to bees. You will notice that I say queen-breeding not queen-rearing, for there is a vast difference.

The two great factors of all life, both plant and animal, which make improvement possible are Variation and Heredity.

It is proverbial that no two individuals of any one species of race of animal or plant are exactly alike, and this of course applies to bees. During the past winter I examined five hundred workers and one thousand drones, making in all between five and six thousand measurements, and the results showed remarkable variability in this species. Drones vary considerably more than workers in color, and size, and although I did not have large numbers of queens to measure, it is well known how variable they are. These measurements were of structures, but equal variability is present in the ability to do work, either of egg laying or honey producing, as witnessed by the inequality in stores and population of different colonies. There is, then, enough variation.

The other great fact in nature which makes it possible for man or nature to improve a species or race is at first thought directly opposed to the foregoing; "Like begets like," is also true. A prolific female produces daughters that are also prolific, though not all to the same degree; but it is an established principle of breeding that excessive prolificness in a female tends to produce in her offspring prolificness at least above the average for the race. If variability existed without this hereditary tendency, no improvement could be made, for at every generation the individuals would again vary in all directions. On the other hand,