

or autumn for about a month have not a great choice of flowers; and of course we never look for autumnal bees on spring flowers. Usually the length of time an oligotropic bee flies and the flower it visits is in bloom are about the same. The honey-bee is practically a monotropic bee in certain seasons of the year. While the basswood and white clover are in bloom the honey-bee visits these flowers almost exclusively. Again, in the fall, in Maine, it confines its attention solely to the golden-rods. In California, at times, it collects nectar exclusively from the sages; in Michigan from the willow-herb, and in other regions from other plants. If from any one of these plants it also obtained its supply of pollen and was on the wing only while it was in bloom, it would be regarded as a monotropic bee in the strict sense of the word. That it exhibits a strong tendency, when collecting pollen, to be constant to one plant species is well known; and the little packets of pollen it brings into the hive seldom consist of two kinds of pollen. But when a bee flies from spring till fall and requires a large amount of stores, it is evident that it can never become oligotropic. This aspect of the relationship between flowers and bees reminds us of the marvellous and beautiful manner in which living things are created and carry on activities. From the simplest forms to the most complex, from the earliest eras to the present, everything plasticity of life endows the innumerable forms it assumes with endless impossibilities. Dead-set crystallization is not found anywhere in organic nature. Our honey-bee, of which we bee-keepers imagine we know a great deal, is but one of a great family, which exhibits amongst its members, wide and marvellous differences of forms and habits. From the lowest type of solitary bee upwards in the scale are found wonderful instances of the way in which Na-

ture creates. These form the incidents in the true history of life. Such variations in the habits of the bee, as Mr. Lovell points out in his admirable article, are not the results of mere chance. The relationship between the bee and the pickerel-weed represents, in a more lowly way, perhaps, the alliance entered into by races of mankind, in that behind them is a long space of history. The bee-keeper who would learn more about the habits of the honey-bee would do well to seek out some of the secrets locked up in the lives of the humbler relatives of the honey-bee. To such, the writings of naturalists like Mr. Lovell appeal with great force. They lead him into a new world of thought, where he will gain a higher conception of things as they really are.

IMPROVEMENT IN BEES

The two following articles, reprinted from the *American Bee Journal* present opposing views on the subject of "Improvement." Dr. Bonney is no slave to orthodoxy, and our readers will notice how in more than one statement he runs counter to the ordinary beliefs held by bee-keepers. For instance he says "We are ignorant as to when the male egg of the bee is fertilized while all knowledge of life tells us it must be." It would be very interesting to read Dr. Bonney's views on this particular question. Dr. Snodgrass himself in one of the last passages of his work on the anatomy of the honey bee expresses doubt as to the accuracy of the Dzierzon theory.

Mr. Sladen appears to have no doubts in the matter of improvement. For some years he has been "improving" his bees by "artificial selection" and he is convinced that he has succeeded in a very large measure. The two articles furnish useful and interesting reading.

BY A. F. BONNEY

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