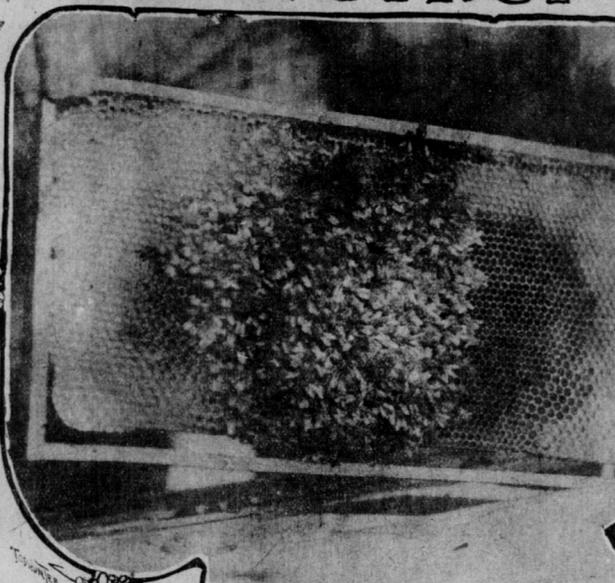


A Wonder-Worker Among Bees

RALPH BENTON
BEE EXPERT,
PASSING WAX
COMB FOUNDATION
THROUGH LEAD
ROLLERS

RALPH BENTON
YOUTHFUL EXPERT,
tells some of the
SECRETS
HE HAS DISCOVERED
IN THE BUSIEST KINGDOM
IN THE WORLD —
A BEE HIVE!



THE DROOD COMB



PLACING FOUNDATION
IN THE COMMERCIAL
HONEY COMB FRAME

CAPPING THE
COMB

out, she departs like an arrow to the zenith of the blue. She soars to a height, a luminous zone, that other bees attain at no period of their lives. Far away, careering their idleness in the midst of the flowers, the males have beheld the apparition. . . . Immediately crowds collect and follow her into the sea of gladness whose Hymn boundaries ever recede. She, drunk with her roving, obeying the magnificent law of the race that chooses her lover, and enacts that the strongest alone shall attain her in the solitude of the ether, rises still. . . . "A bird must be found unhaunted by birds that else might profane the mystery. She rises still; and already the ill-assorted troop below are dwindling and falling asunder. Only a small indefatigable cluster remain, suspended in infinite opal, she summons her wings to make one final effort; and now the chosen of incomprehensible forces has seized her, and bounding aloft with united impetus the ascending spiral of their interwined flight whirls for one second in the hostile madness of love."

Mr. Benton gives an explanation of the shiny black bees which are likely to all one with terror. They are robber bees and in the course of their raids from hive to hive they are continually put on the defensive and at length lose their natural coat of hair. A larger classification is made between the social and the solitary bees. The social bees belong to the family of apidae, commonly known as honey bees. They form permanent colonies and conduct a community life of extraordinary economy and usefulness. Members of the solitary classes are what the name indicates, each one living and working alone, even when the species is gregarious. The smallest species known is that of the Prosopea, which is considered the type whence all the species known today have issued. The little prosopid, "unable to produce wax, bores holes through wood or digs in the earth, contrives clumsy galleries in the tender pith of dry berries, stores these with a little food for the offspring she will never see, and then goes off and dies in a corner as solitarily as she had lived." This is the smallest species known. On the other hand, the Apis dorsata of the Far East is of gigantic size and its peculiarities were first discovered by Frank Benton, the father of the young entomologist at Berkeley. The university hives contain many interesting specimens. Especially is it

Reading Character by Eyebrows

It is not generally recognized what a vast amount of character is concealed in the eyebrows. I can imagine someone reading this saying: "What nonsense! The eyebrows are only the hair growing over the eyes." They are more than this. Put your finger to your brow, and you will find directly under that portion of the forehead on which the hair grows that there is a bone. If so, all the better for you, for you will probably succeed where others fail if the bone is the right shape. Now feel very carefully from the angle of the nose along the eyebrow, and if you have a successful temperament you will find a slight bump. Then your fingers will run along smoothly, and you will find a second bump and a hollow on the other side. The larger that second bump is the greater chance you have of being a successful man or woman. You will see from this that it is not actually the hair which betrays the character, but the bone beneath it, which, forming as it does the front floor of the skull—if I may use the expression—holds that part of the brain which controls our thinking powers. Coming home in a railway train or trolley this evening, just glance at your nearest neighbor opposite. Possibly you will find his brows close together, almost touching, and running first in an upward direction from the eyes, and then taking a sudden turn down. Beware of him! He is not steadfast in character. His brows denote meanness and deceit, and although he may lead others to think him clever, yet he will never rise beyond a certain point. He

OVER at the University of California is a slight, dark-haired young man who is one of the most noted bee experts in the United States. Ralph Benton comes by his fame honestly, for his father, now assistant entomologist in the Department of Agriculture at Washington, has given long years to the subject of the domestication of bees under varying climatic conditions; and the son, a graduate of the Agricultural College of Montana, is now taking a post-graduate course at Berkeley along biological and zoological lines, while holding the post of assistant instructor of entomology in the same college.

Ralph Benton is interested in his work and knows what he is talking about. He speaks with the air of a man who knows his subject thoroughly, and his face lights up in a way that shows his love for it. He is very busy at present preparing a bulletin which the Montana college will issue.

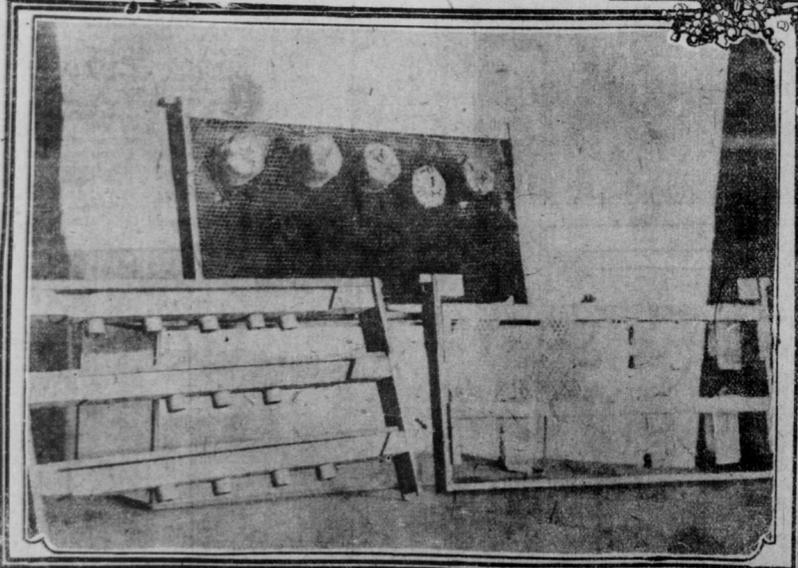
Besides careful investigation of those bee habits which have a direct value in the successful pursuit of apiculture, Mr. Benton has many interesting and unusual things to say about the little honey-makers. He declares that for insects, a power of organization and social instinct rarely stand at the head of the whole insect tribe. He has made close observations of the bee in its exhibition of pleasure, rage, fear, surprise and the like, and says that a remarkable sight in a hive is the regular daily exercise of the young bees. A young bee is one barely two weeks old, and it begins its lifework early. From its second day to the completion of its second week it is engaged as nurse in the hive. This is a sedentary occupation and the health of the infant nurse might suffer were it not that every bright day between 2 and 3 o'clock the entire corps of nurses come out for their needed exercise. Twenty minutes is allowed for this. Upon first coming out the bees fly in a small semicircle, but by the time the twenty minutes is up the circle has increased to considerable magnitude. By means of this methodical strengthening and vitalizing of the muscles the young bees are made ready for their next essay in life—that of the honey flight. Apart from this short daily exercise the young bee knows only monotony unless an ant or other insect should happen to intrude.

The wintering of bees is a subject which has given entomologists much food for discussion. Until the last few years it was not known how to preserve the bees in a climate where the winter was severe. This also is a subject to which Mr. Benton has given his special attention, although in California it is not a vital matter; but in Montana, Mr. Benton's home State, he has been largely instrumental in the satisfactory experimental results of recent winters. In one section of his bulletin he describes in detail the advantages of certain modes of wintering. He emphasizes the necessity of having a good queen bee in the hive; of fortifying the hive with young bees and of having plenty of good food in the storerooms, so that famine or other unfavorable conditions may not result. These are the primary essentials. The real difficulties of wintering, however, arise from the need of keeping the hives dry and warm. The warm air exuding from the bodies of the bees comes in contact with the honeycombs, thus producing moisture with no chance of immediate evaporation. The result of such a condition is soured honey, most pernicious in its effect upon the bees.

Wintering the Bees
In winter all things have to be done for the bees, for it is their time of rest. They are quiet, feeding usually but once in the week and lying the rest of the time as if dead. For outdoor wintering in cold climates the chaff hive is highly recommended, being a double walled hive, whose walls are three-eighths of an inch thick, with a space of two inches between them. Between these walls dry chaff or ground cork is packed. This non-



THE NET FOR
CATCHING A
SWARM



QUEEN REARING OUTLET

conducting pack retains the natural heat in the hive, but at the same time permits the passing out of moisture. Over the roof, which must be absolutely watertight, there should be spread newspapers, quilting and carriage cloth, with the enamel side down, and which should be well coated with paint. The Davis hive, with newspaper packing between the walls, is also recommended, and by the use of this type of hive Mr. Benton has found outdoor wintering quite as satisfactory as any mode of indoor wintering, whether in bee houses or cellars. In cellar wintering water must be used as an evenor of temperature. Mr. Benton mentions the species of bee known as Carniolans as excellent winterers. How important it is that a bee should buzz is made clear by the statement that ventilation is accomplished by the buzzing of a chain of bees through the colony. Sometimes,

especially at night, one may hear a continuous roar. This comes from the bees, who, having toiled all day in the harvest fields, spend the night in driving a current of air through the hive to evaporate the new honey, for the nectar gathered has a large percentage of water in it, which must be removed. While bees abound in all parts of the world, they are, of course, more numerous in warm latitudes. Science knows about 5000 species, which render their most important services in their influence upon the vegetable world in the cross fertilization of plants. As a bee usually devotes itself to a single species of flower as long as it serves its purpose, it is to this habit that the great service it renders in cross fertilization is due. A number of plants depend wholly upon the bee for propagation. The mouth of the bee is peculiarly adapted to its many uses, the exten-

sive tongue being hairy and ending in a little spoon which brushes the nectar from the flower and conveys it into the mouth. Here it is partly swallowed and the dilatation of the oesophagus which ensues is called the "crop" or "honey bag." Here it remains to ripen, and when enough has been obtained it is disgorged to be used either as food or for winter stores. But in gathering the supplies of pollen needful for their young, no part of the mouth is used. The body of the bee, especially the legs, is partly clothed with feathered hairs and these hairs retain the pollen which adheres to them which the bee brushes into a hollow on the outer surface of the first joint of each hind pair of legs. This joint is very large and of a square or triangular formation—a thing not found in any other family of insects. The receptacle itself is known as the pollen basket, and in the social bees is

possessed only by the workers, since the perfect males (drones) and females (queens) never collect pollen.

Three Classes in Hive

A bee community is made up of three classes, and usually numbers from 10,000 to 60,000 individuals. The first and highest class consists of a single fully developed female known as the queen bee or mother of the hive. Another class consists of the male bees or drones, and the third class, which is numbered by thousands in a flourishing community, is made up of the workers or females who do not produce eggs. These workers have a body about half an inch long and one-sixth of an inch in breadth. The males are drones, so called from the peculiar noise they make in flying, are much larger, and their eyes are remarkably large, meeting upon the crown. The perfect female or queen bee is considerably longer than either the females or the males, and is by far the most interesting member of a bee colony. She employs herself chiefly in laying eggs at the rate of 2000 or so a day. One of the most interesting and vivid accounts of the nuptial flight of this bee is the one given by Maeterlinck in his "Life of the Bee," which exceeds all others in its beauty of graphic description: "Around the virgin queen and dwelling with her in the hive are hundreds of exuberant males forever drunk on nectar. Each day, from noon until three, when the sun shines resplendent, this plumed horde sallies forth in quest of the bride, who is, indeed, more royal, more difficult of conquest, than the most inaccessible princess of fairy legend; for twenty or thirty tribes will hasten from all the neighboring cities, her court thus consisting of more than 10,000 suitors, and from these 10,000 one alone will be chosen. "However great her impatience, she will yet choose her day and hour, and linger in the shadow of the portal till a marvelous morning—flings wide open the nuptial spaces in the depths of the great azure vault. . . . Then she appears on the threshold. . . . She starts to fly backward, returns twice or thrice to the alighting board, and then, having definitely fixed in her mind the exact situation and aspect of the kingdom she has never yet seen from with-