

# POOR DOCUMENT

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THE EVENING TIMES AND STAR, ST. JOHN, N. B., FRIDAY, NOVEMBER 18, 1921

### SCIENTISTS TO TEST THE SIGHT OF BEES

Experiments Expected to  
Have an Important Bearing  
on Natural Selection--Color  
Blindness at Issue.

A series of delicate experiments will soon be started by three eminent American scientists to discover whether bees and other insects are color-blind or not. The scientists who are now busy inventing devices for testing the vision of bees are Dr. F. E. Lutz, a biologist of the American Museum of Natural History; Dr. J. Arthur Harris, an entomologist of the Carnegie Institution, and Prof. F. K. Hightmeyer and specialist in color vision. They form the Committee on the Biological Relations between

Flowers and Insects of the National Research Council.

Their tests of the sight of insects are expected to last for years and to establish just what a bee or a moth can see and what it cannot see. These years of elaborate experimentation have not been planned by the National Research Council and undertaken by three eminent scientists solely for the purpose of ascertaining a bee's optical equipment. A greater question lies behind. The controversy about the bee's sight, it is said, involves the validity of the whole theory of natural selection.

The evolution of man from the lower animals and the evolution of all plant and animal life from a primitive form of life originating on earth billions or hundreds of millions of years ago are almost universally believed by scientists, by the hypothesis that the evolution was brought about almost solely by the process of natural selection has come under attack recently from many quarters. This is where the bee's sight becomes important.

**Theory on "Selected" Flowers.**  
The theologian holds generally that the beautiful colors of the flowers were placed there by the Creator for the delight of man. The biologist has generally denied this, and argued that the colors are there because they attract the attention of bees. The vision of the bees result in carrying pollen from one flower to another, which fertilizes the seeds. Unless they receive the pollen the seeds do not grow.

The cumbersome phrase of natural selection in this case is intended to describe a process probably millions of years old, under which the flowers which most attracted the bees by their colors or scent were selected by great numbers, while those less attractive received fewer visits from the bees and tended to die off. In each generation the flowers which pleased the bees most would be "selected" to live.

These "selected" parents would have offspring, some brighter than themselves, some about the same as themselves and some less bright (that is, of course, bright from the standpoint of the bee, whose standards of brightness might differ greatly from ours). The action of the bees, tending to preserve the prettiest colors, would make each generation of flowers slightly lovelier than its predecessors, thus producing



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finally the gorgeous natural varieties in existence today.

**Are Bees Color-Blind?**

This theory has been accepted for many years, but recently it has been rudely shaken. Investigations in Germany and Belgium have made it doubtful whether a bee can tell one color from another, or whether the flowers which are gorgeous to human eyes have any power, by reason of their coloring to attract the attention of the bees at all. The results have so far been so uncertain, however, that the American scientists and institutions agreed that it was necessary to make a far-reaching study of the whole subject.

Initiating the Greek painter Zeuxis, who painted cherries so perfect that birds pecked them out of the canvas, the Belgian scientists, Plateau and Wrey, made artificial flowers and attempted to use them to deceive bees. The bees lit on Plateau's artificial flowers, but ignored Wrey's. Plateau arrived at the conclusion that bees could see colors, and Wrey asserted that they could not. The two men studied each other's work.

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"The bees were not attracted by the colors of your flowers," asserted Wrey to Plateau, "but you used starch to stiffen the petals and the bees lit on them to eat the starch."

"That is not so," replied Plateau. "Further than that, the bees would have been attracted by your flowers, except that you made the mistake of coloring them with aniline dye. The odor of the dyes offended the delicate sense of smell of the bees, and they were driven off on that account."

Two Germans, von Hess and von Frisch, who are investigating the subject, tentatively hold contrary conclusions. One of the Germans placed bits of paper of various colors in a room, placed drops of honey on the blue spots and let bees fly into the room. He did this for day after day to accustom the bees to obtaining their honey from a blue background. Then one day, he set out the colored spots without placing honey on any of them. The bees did not fly to the blue spots, as would have been expected if they could distinguish that color and associate it with the sweet flavor. Their behavior here indicated that they were guided by smell alone. One of the German scientists concluded that the bees took no note of color at all, while another held that many bees could see colors, and Wrey asserted that blue did seem to make some impression on them.

If the colors of flowers have not been

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developed to insure their perpetuation by stimulating bees to pilferate their stores. The religious explanation that they are there to cause the mortal being of man to rejoice, if not rejected by the biologist, is usually held in abeyance by him, while he is preoccupied with the more susceptible of exact proof. Sir Oliver Lodge and many other scientists held the beauties of Nature were designed, regardless of the manner in which they are manufactured, for the benefit of the human soul, but this explanation is usually dismissed as "mystical" or "creationist" philosophy, and as having no proper influence as a guide to the research man.

Dr. F. E. Lutz has pointed out that there are many organic objects which please the taste of man and for which no biological origin could be named. "For instance," he said, "there are types of snails whose shells are beautiful in the hidden interior. As for the beauty of flowers, it may be that they have colors simply as by-products of the physiology of plants. I would not say, however, that this was through 'chance.'"

Biologists have attempted to account for the coloring of many insects or animals, as well as flowers, on the principle of "natural selection." The plumage of birds, and the colors of fishes aid in courtship, mating and the increase of the species. Zebras, giraffes and thousands of types of animals, birds and insects, have camouflage or protective coloration which makes it difficult for their enemies to detect them at a distance. The curious coloring of the skunk is supposed to warn his enemies that he has developed a wicked art of self-defense, while at the same time his colors blend with the twilight, so that the skunk makes a natural part of the skyline to the mice and insects on which he preys. The light of the lady glow-worm is her matrimonial advertisement.

While evolution explains thousands of these things, it has many hard nuts to crack. One thing hard to explain, for instance, is the beauty of the pearl, which grows inside the body of the oyster. The pearl is really the mummified remains of a parasite which has invaded the shellfish and is elaborately turned by it in lustrous calcium carbonate, slightly different from the material of which the oyster makes its shell.

**Arranging for Experiments.**  
Dr. Lutz and his associates spent two days in this city last week, outlining experiments to be suggested in a report to the National Research Council. These will include experiments as to the vision of the bee, wasp, moth, fly, and other insects, but primarily the bee.

The inquiry may have a valuable practical result. If it is found that the bee does not have color vision and is especially fond of a particular color, it may be possible by grafting to combine the bee's favorite color with rich honey-producing flowers which are not thoroughly exploited by the bee at present.

Dr. Lutz said that the preponderance today was that the bee cannot see red, but that it can see blue. It is thought possible, also, that the bee's vision may be adjusted so that he can see flowers which reflect ultra-violet rays, which are invisible to the human sight. Certain desert flowers are now believed to reflect ultra-violet light. One of the important parts of the inquiry will be to ascertain what other flowers, if any, reflect the ultra-violet rays, and whether these flowers make any special appeal to the bee. This will be done by concentrating light on the flowers through a spectroscopic and photographing it. While invisible to

the eye, the ultra-violet rays act energetically on the photographic plate. Other beams of light reflected by flowers will be projected on fluorescent substances like sulphate of quinine, which glow when the invisible rays fall on them.

The principal attack on the theory of natural selection in recent years has come from scientists who refused to admit that natural selection accounted for the development of certain organs and members which apparently had to undergo ages of development before they became useful. Natural selection, it is argued, could not cause feathers, which would be of no immediate value to a reptile, to grow on the reptile, because the feathers were to be of great value later when the reptile turned into a bird. Special instruments of living things have been alleged recently to be equipped by natural selection, as the theory is commonly understood.

**ST. LUKE'S W. A.**  
The Girls' branch of St. Luke's W. A. held an enjoyable and profitable evening on Monday last. In the absence of the president, Miss Bessie Harrison, Mrs. Lester W. Mowry, first vice-president, presided in the chair. The devotional part of the meeting was taken by Mrs. R.

P. McKim, president of the senior branch, after which Mrs. John McKay, deaconess chorae, gave the branch an interesting talk on the work of her department. Letters were read from the Chaplain Indian school, to which school this branch sends an outfit, also extracts from a letter from Miss Shaw, formerly of St. John, now in Japan. On the conclusion of Mrs. Hay's address, a hearty vote of thanks was extended to her, after which refreshments were served and a social half hour spent.

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