

ENTOMOLOGY

Bee Is Guided by Sun

Finder-bees do a dance indicating to others where the nectar is to be found but a clear sky is necessary for correct orientation on the part of the bee.

► A BEE'S ability to tell her fellow workers the direction to a new supply of nectar she has discovered seems to depend on her having a clear glimpse of the sun, or at least of the sky. This is one of the things discovered by the noted Austrian entomologist, Prof. Karl von Frisch of the University of Graz, who spoke before an audience of scientists in Washington.

When a scout bee has discovered a new source of supplies, she passes the good word on to her sisters by doing an excited dance in which, to quote an old light-opera favorite, "every little movement has a meaning of its own." Distance is indicated by the dance pattern; direction by the way the bee's body is pointed most of the time.

Normally, the "honey dance" is performed on the vertical face of the honeycomb; the pull of gravity on the bee's body apparently assists in maintaining her sense of direction. However, Prof. von Frisch found by laying an observation hive flat on its side, the finder will still point the direction successfully if sunlight or sky-light falls on her.

In total darkness the finder-bee will dance, but she becomes utterly confused about direction, pointing her body "every which way". It was possible to observe

bees in what was to them total darkness by using a red light within a light-tight shelter, since it was proven long ago that bees cannot perceive red light.

When Prof. von Frisch held a strong pocket flashlight in the approximate position of the sun, the hitherto dark-bewildered bee immediately oriented her dance-position in the direction of the nectar find. When he held his "ersatz" sun in a false position, the bee gave a correspondingly false pointing.

There is fairly strong indication that to be effective for bee-guiding purposes the light must be polarized, that is, have all its wave-fronts moving in the same plane. This was indicated when the finder-bee gave accurate performance as long as she could see a small round patch of blue sky. When a white cloud drifted across the opening she became confused, but again oriented her dance correctly when blue sky again became visible. Light reflected from the sky is polarized, but light reflected from clouds is not.

Prof. von Frisch's lecture was sponsored jointly by the Washington Academy of Sciences, the Biological Society of Washington and the Entomological Society of Washington.

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ford to use such a limited resource to compete with coal?"

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Science Service Radio

► LISTEN in to a discussion on "Exploring Cosmic Rays" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST, Saturday, April 30. Dr. Victor Neher of the California Institute of Technology, Pasadena, Calif., and Dr. Urner Liddel of the Office of Naval Research, Washington, D. C., will be guests of Watson Davis, director of Science Service. Dr. Neher has been observing cosmic rays on B-29 flights at heights of six miles above the earth because cosmic rays bombard the earth from outer space constantly smashing the hearts of atoms. The new results to be reported promise to be of fundamental importance.

Science News Letter, April 23, 1949

CONSERVATION

Fuel Economy Needed

► OIL and natural gas must be used more economically than they are at present if the nation is to remain industrially healthy and defensively strong, warns Secretary of the Interior J. A. Krug in his annual report. Declining to share the alarm with which some observers look upon America's fuel situation, he nevertheless feels that some readjustments in power development would be in the nation's best interests.

We have used up most of the easily accessible oil, he states, and are going farther afield and drilling deeper for fresh supplies—necessarily at greater expense. We could produce immense quantities of oil synthetically from solid fuels and by shale extraction, but "it probably would be cheaper in the long run to use some foreign (or imported) oil than to develop some of our own more expensive sources and substitutes."

However, in the uneasy state of the world's peace, it is risky to depend on oil supplies far from our own shores, the Secretary points out. If sudden war should

cut us off from overseas sources on which we had become too dependent, "we would find ourselves in a much tighter spot on oil than in the last war."

The answer, he feels, is to be found at least partly in a more careful use of oil, permitting our almost vanished reserve capacity to be restored. This should be backed up with development of synthetics and other substitutes as rapidly as possible; though he estimates it will take at least 10 years to develop them far enough to keep our transportation systems running in a continuing emergency, not to mention keeping many factories running.

Secretary Krug is especially critical of the waste of natural gas into the air, and its diversion, via pipelines, to compete with coal in Eastern industrial areas. He states:

"Industry estimates of proved natural gas reserves place them at somewhere between 166 and 200 trillion cubic feet, or only enough to last 40 years at present rates of consumption. Already our Eastern resources are almost exhausted. Can we af-

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