

is a well-ordered "snapshot album." The behavior of ants has been explained by them remembering the image of the complex pattern the forest canopy — the tree trunks and branches — makes against the sky (SN: 10/11/80, p. 230).

Honeybees navigate in their home range as if they had an internal map, or at least an extensive album of snapshots. They may fly to a landmark, then to food, but return to the hive by a direct route. If a bee is forced to make a detour on its way to a food source and on its way back, it will still, in its dance, communicate the location of the food as if it had used a direct path.

James L. Gould of Princeton University reports two preliminary approaches to exploring whether bees use maps. Experienced bees carried in the dark to a new feeding site circle once and then fly back to the hive. Inexperienced bees just circle the feeding site. Gould suggests the experienced bees may be using a photo from some previous flight path or may be using a map.

In another experiment, Gould gives bees food in a boat in the middle of a lake. The scout reports this find to the hive, but it gets no recruits. However, if the food is on the far shore of the lake, recruits do reach it (SN: 4/23/83, p. 271). These findings may indicate that the bee has a map that includes the location of the lake and the knowledge that water is an unlikely place for a bee to find food.

If a bee has a map, it uses it more flexibly in some situations than others, says Martin Lindauer of Wurzburg University in West Germany. When a bee is foraging, it can easily find a feeding station that has been moved 10 meters since the bee's last visit. But when the bee returns to its hive, it will be lost if the hive has been moved half a meter.

Investigators at the conference argued about how conservatively a "map" must be defined and the value of the concept. "When the animal has a detailed description of the environment, we can be fooled to think its conceptions are more complex than they are. In some cases there is just a description of environment and general rules of operation. Do we call this a map?" Wagner says.

The idea of mapping is a shorthand way of stating that animals take into account the nature and relative positions of objects, including themselves, and that they can deduce new relationships and achieve new performances beyond their direct training, Menzel says. But he has some doubts about the concept's value.

Menzel says, "... once one invokes cognitive mapping there is no reason in principle not to also talk about cognitive clocks, compasses, thermometers, lie detectors and all manner of other gadgets, which makes me [think] there must be a much simpler and more direct and monolithic way of getting around in the world." □

Books

Books is an editorial service for readers' information. To order any book listed or any U.S. book in print please remit retail price, plus \$1.00 handling charge for each book, to **Book Order Service**, Science News, 1719 N Street, N.W., Washington, D.C. 20036. All books sent postpaid. Domestic orders only.

The Amateur Naturalist — Gerald Durrell with Lee Durrell. A beautiful book by one of the world's leading naturalists, who suggests to his readers in the foreword that they "go out and greet the natural world with curiosity and delight, and enjoy it." For young and old the authors tell how to get started as a naturalist, what to look for in home and garden and various environments such as grasslands, mountains, various woodlands, ponds and streams, marshlands, and smooth and rocky shores. Knopf, 1983, 320 p., color/b&w illus., \$22.50.

Annual Review of Physical Chemistry, Vol. 34 — B. Seymour Rabinovitch, Ed. A dedication to Henry Eyring and a chapter by Joseph O. Hirschfelder telling of his adventures in theoretical chemistry introduce this volume. Annual Review, 1983, 669 p., illus., \$28.

Dictionary of Computing — Valerie Illingworth, Edward L. Glaser and I. C. Pyle, Eds. Contains over 3,750 terms used in computing and in the associated fields of electronics, mathematics and logic. The terms described range from basic ideas and equipment to advanced concepts of graduate-level computer science. Oxford U Pr, 1983, 393 p., illus., \$24.95.

Hypoglycemia: Fact or Fad? — What You Should Know About Low Blood Sugar — Lynn J. Bennion. Focuses for the general reader on what is known about blood sugar, its normal regulation in the human body and what can go wrong to result in hypoglycemia. A physician who specializes in this area of medicine explains the causes, diagnosis, prevention and treatment of hypoglycemia. Crown, 1983, 180 p., illus., \$12.95.

Inventions: The Patented Works of R. Buckminster Fuller — R. Buckminster Fuller. Much more than just the inventions of Fuller, this book includes an autobiographical article describing Fuller's background and philosophy of life. He dedicated himself to seeing what one single individual could do to help the problems that confront humanity. Each invention is introduced by Fuller. St. Martin, 1983, 316 p., illus., \$40.

The Mediterranean Was a Desert: A Voyage of the *Glomar Challenger* — Kenneth J. Hsü. An account by one of the chief scientists of Leg 13 of the Deep-Sea Drilling Program that led to the hypothesis that about five and a half million years ago the Mediterranean Sea was a desert. Princeton U Pr, 1983, 197 p., illus., \$17.95.

Stonehenge Complete — Christopher Chippindale. This history of Stonehenge since its re-discovery in 1130 A.D. shows what we have felt about the past and its remains. Tells the pre-history of Stonehenge as that has been gradually revealed. The author has tried to include "everything important, interesting or odd that has been written or painted, discovered or felt about the most extraordinary of all ancient buildings." Cornell U Pr, 1983, 295 p., illus., \$29.50.

Teaching for the Two-Sided Mind: A Guide to Right Brain/Left Brain Education — Linda Verlee Williams. Presents current research on the functioning of the hemispheres, explores implications of that research for education and provides practical teaching techniques that draw upon the capabilities associated with the right hemisphere. P-H, 1983, 213 p., illus., paper, \$6.95.

Science on the Air

Science News prints the latest written word of scientific development and noteworthy news. We've set this space aside to inform our readers of programs of scientific interest that are scheduled on television and radio. Check your local listings for exact times. (R) indicates a repeat broadcast.

Feb. 4 (PBS) Newton's Apple — (R) Weekly science series hosted by National Public Radio science editor Ira Flatow.

Feb. 5 (PBS) Nature — "Osprey" Follow one of the most beautiful species of large birds through its annual migration.



Feb. 6 (PBS) Spaces — (R) A six-part series profiling science and technology careers for teenagers.

Feb. 7 (PBS) The New Tech Times — Every Thursday, host Nicholas Johnson looks at the communications and electronics industries.

Feb. 7 (PBS) NOVA — "BaMiki BaNdula: Children of the Forest" (R) The pygmy way of life in the rain forests of Zaire.

Feb. 12 (PBS) Nature — "Big Business in Bees" The cultivation of bees and the importance of the billion-dollar bee industry in the United States.

Feb. 14 (PBS) NOVA — "China's Only Child" Efforts to control the burgeoning population in developing countries.

Feb. 15 (PBS) Smithsonian World — "Crossing the Distance" A look at the ingenious, imaginative and daring ways man gets from point A to point B.

Feb. 19 (PBS) Nature — "Jet Set Wildlife" Alien plant and animal inhabitants of Florida, and the problems they cause.

Feb. 21 (PBS) NOVA — "It's About Time" (R) The quest for the answers to the riddles of time.

Feb. 26 (PBS) Nature — "The Master-builders" The intricate process of nest-building.

Feb. 28 (PBS) NOVA — "Will I Walk Again?" Paralysis: The debate, the hope of a cure and an engineering feat that enables paralyzed patients to move with the help of a computer.