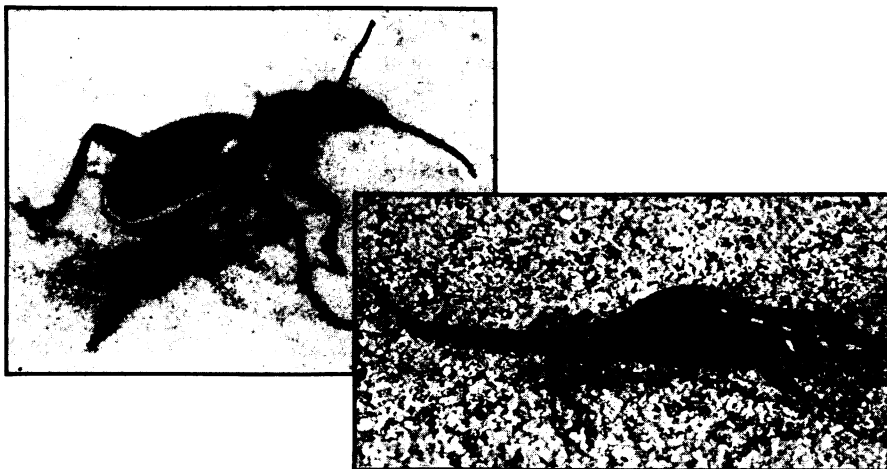


will be to "spend the money and do it right" with two new spacecraft. From a scientific standpoint, an informal polling of researchers reveals differing viewpoints about whether it is better to take advantage of Viking's momentum by shooting for the earlier date, or to wait and take advantage of Viking's data-packed return.

Being considered for future space missions are a pair of low-thrust, long-term propulsion systems—solar electric

propulsion and solar sails—envisioned for such goals as a long, velocity-matched flyby of Halley's comet. Neither is included in the fiscal 1978 budget request, but both are being studied at Jet Propulsion Laboratory under recently reprogrammed fiscal 1977 funds for a possible decision in August. The request does, however, include funds to begin production of the third, fourth and fifth space shuttle orbiter stages. □

A lizard in beetle's clothing



Survival of the mimic: Juvenile lizard imitates *Anthia* beetle in color and gait.

Volkswagen isn't the only imitator of the lowly beetle. Juvenile lizards of the species *Eremias lugubris* in southern Africa walk stiffly and jerkily with arched backs in an apparent attempt to imitate a neighboring insect. And researchers now have evidence that the lizards' mimicry is successful.

According to an important hypothesis of evolutionary theory, palatable and unprotected individuals can gain protection from predators by imitating an unpalatable or well-armed species. "The resemblance of juvenile *E. lugubris* to oospister beetles represents not only the first substantive case of mimicry involving a quadrupedal lizard, but also, to the best of our knowledge, the first case of a terrestrial vertebrate mimicking an invertebrate," say zoologists Raymond B. Huey of the University of California at Berkeley and Eric R. Pianka of the University of Texas.

The oospister beetle is well equipped to discourage attackers. The beetle can eject a pungent fluid of formic acid and assorted other acids and aldehydes.

The juvenile lizards are certainly in need of protection, being palatable and relatively defenseless. Against the pale sand, a lizard's jet-black skin with white broken stripes makes it an obvious target for birds, snakes, foxes and jackals. Paradoxically, because it is conspicuous and looks like a noxious beetle, predators avoid the lizard.

In their field study, funded in part by the National Geographic Society, Huey

and Pianka observed that the lizards changed to adult coloration, pale red-tan, when they reached body lengths of 40 to 50 millimeters. That length is about the maximum size of an oospister beetle. At the same time, the lizards' foraging movements also changed. Adults move with lateral undulations, typical of most lizards, instead of the stiff juvenile gait.

The lizards and beetles meet various criteria for successful mimicry. The lizards are fewer in number than the beetles, are active only during times of day and year when the beetles are active and live only in areas also populated by the beetles.

"These noxious beetles are thus ideal models; juvenile lizards have apparently converged on them both in behavior and morphology," the researchers write in the Jan. 14 *SCIENCE*. "Indeed, on occasion we have initially mistaken juvenile lizards for oospisters."

But does the disguise work against the lizards' natural enemies? "We cannot measure predation rates directly, but the frequency of broken tails can be used to index relative intensity of predation," say Huey and Pianka. They found that of all the related lizard species in the southern Kalahari, *E. lugubris* has the lowest frequency of broken tails.

This indirect evidence, they explain, is one of the few nonmanipulative examples supporting the hypothesis that natural selection promotes mimicry of species with stronger actual defenses. □

Female hormones and birth defects

In 1971, there was a disturbing scientific discovery—that the synthetic estrogen DES (diethylstilbestrol), a medication used for threatened miscarriage, could cause vaginal cancer in female offspring many years later. Then from 1973 to last year, other equally unsettling reports started to surface—that use of not only DES but also other estrogens and progesterones during pregnancy could lead to cardiovascular defects in offspring.

Now those initial reports, based on small numbers of subjects, have been confirmed in a much larger study. It is reported in the Jan. 13 *NEW ENGLAND JOURNAL OF MEDICINE* by Olli P. Heinonen, Dennis Slone, Richard R. Monson, Ernest B. Hook and Samuel Shapiro of Boston University Medical Center, Harvard School of Public Health and Albany Medical College.

The group conducted a study of 50,282 pregnant women at 12 American hospitals between 1958 and 1965. They obtained extensive information about which estrogens and progesterones the women were exposed to during early pregnancy, either through prescriptions for threatened miscarriage or other pregnancy problems or through inadvertent use of oral contraceptives after they were pregnant. The investigators found that these agents were used by 1,042 of their subjects. Of them, 438 (42 percent) used both estrogens and progesterones (278 from oral contraceptives), 176 (17 percent) used estrogens exclusively, and 428 (41 percent) used progesterones exclusively. All the subjects' offspring were examined for congenital heart disease without prior knowledge of which ones' mothers had been exposed to hormones during pregnancy. This way observer bias was unlikely.

Out of 50,282 total pregnancies, 19 children with heart defects were born to 1,042 women who received female hormones during early pregnancy (18.2 per 1,000). Among 49,240 children not exposed to these agents, there were 385 with cardiovascular malformations (7.8 per 1,000). In other words, women who took the hormones were twice as likely as other women to have babies with heart defects.

When the researchers separated out prenatal exposure to specific hormones, they found that the risk was 2.1 times as great as normally expected for combined estrogen and progesterone use, 1.4 times for estrogen only and 1.5 times for progesterone only. For oral contraceptives, which was a subgroup of combined exposure, the risk was highest of all—2.4 times as great. However, the data on the separate effects of estrogen and progesterone were inadequate to be statistically significant. "The separate and combined roles of estrogenic and progestational

agents need to be clarified," the investigators conclude, "and it is particularly important to evaluate the effect of inadvertent use of oral contraceptives after conception."

How much scientific evidence is necessary to convince physicians of the dangers of prescribing such hormones during pregnancy also remains to be seen. In January 1975, the Food and Drug Administration warned physicians against prescribing progesterones for pregnancy testing and to prevent threatened miscarriage. However, the Health Research Group, a consumer organization in Washington, reported on the basis of drug industry records that in the year following the FDA's warning, doctors wrote 500,000 hormone prescriptions for pregnant women, the same number as before the warning. □

Deuterium quantity and cosmology

The abundance of deuterium in interstellar space is a datum of great importance to cosmologists. Deuterium, which contains one proton and one neutron, is the simplest nucleus after hydrogen. Lots of it must have been made in the early stages of the big bang that theoretically started the universe.

If most of the deuterium now seen can be taken as primordial, then its ratio to ordinary hydrogen is closely related to the density of matter in the universe, which determines whether the universe will expand forever or eventually start to collapse back. The ratio can also be used to estimate the time since the big bang.

All of this depends on assuming, as cosmologists generally like to do, that little or no deuterium has been made in the processes of stellar evolution that have gone on over the billions of years. A survey of deuterium abundance in our galaxy, done by A. A. Penzias, P. G. Wannier, R. W. Wilson and R. A. Linke of Bell Laboratories at Holmdel, N.J., now gives cosmologists nearly carte blanche to go with that assumption.

Using radio measurements of the relative abundances of deuterated and hydrogenated hydrocyanic acid (DCN and HCN made with carbon 13) the Bell Labs observers report in the January 1 *ASTROPHYSICAL JOURNAL* that the D/H ratio throughout the galaxy is relatively uniform except near the center, where it is markedly lower. If stars were making a lot of deuterium, the abundance should be high near the galactic center because stars are concentrated there. What the result of Penzias and collaborators seems to mean is that most of the deuterium is indeed primordial, but that stars do use some of it as fuel for nuclear burning, since there is less deuterium where stars are more numerous. □

Dyslexia: A hemispheric explanation

Learning to read English is not especially difficult. Most children master the task within six or seven years of age. But when d's look like b's and when p's look like q's, the job of learning to read becomes a serious challenge. Confusion in the spatial orientation of letters is among the problems faced by children who suffer from a clinical syndrome known as developmental dyslexia. The disorder affects as many as 5 percent of school-aged children in the United States who are otherwise intellectually, emotionally and medically normal. Even though such children may have no other serious problem, the difficulty in learning their letters is particularly incapacitating in modern, highly literate societies and frequently results in serious secondary behavioral and emotional problems.

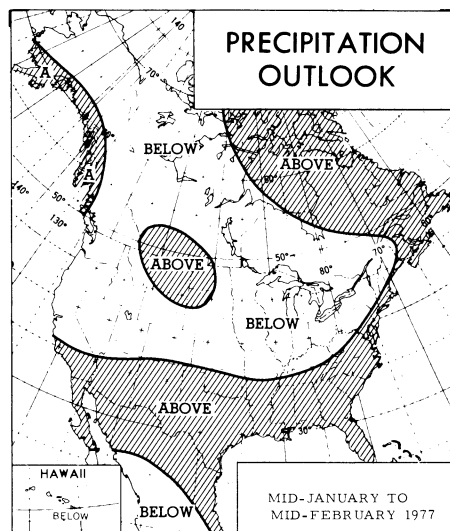
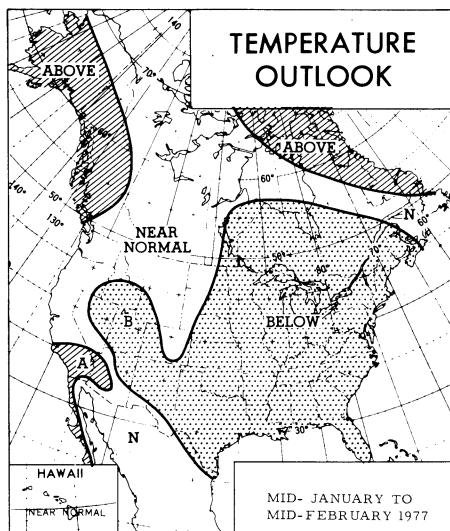
Dyslexia and its effects have been recognized for years, but plausible explanations of its cause have been hard to come by. Neurological, social and educational factors have been implicated, but none has received strong or consistent support—until now. One long-standing hypothesis, originally suggested in 1937, implicates abnormal cerebral dominance or functional asymmetry of the brain's hemispheres. With the recent explosion of research on left-right hemisphere processes, it has become possible to test this hypothesis. In the Jan. 21 *SCIENCE* Sandra F. Witelson of McMaster University in Ha-

milton, Ontario, reports that dyslexia may be associated with representation of spatial data (including alphabet letters) in both hemispheres, instead of primarily in the right as is the usual case.

Witelson's findings are based on studies of 85 right-handed boys, 6 to 14 years of age (the condition is seen most often in males), who were administered a battery of tests commonly used to determine hemispheric specialization. The results were compared with those of 156 control subjects. Evidence for bilateral representation of spatial functions was found among the dyslexic children. Dual representation of a cognitive process such as spatial perception could, says Witelson, "affect cognition by overloading one hemisphere [the left, in this case] and interfering with those functions 'native' to it." The functions native to the left hemisphere include sequential and linguistic processing. Interference with such processes would lead to poor performance in linguistic tasks and reading.

The fact that spatial processing appears to be represented in both hemispheres in dyslexic children suggests, says Witelson, "that it may be possible to design an approach to reading that elicits an optimum balance between linguistic processing (the phonetic approach and spatial processing ('look-say' method) which may allow dyslexics to progress in reading." □

More cold on the way



The National Weather Service's 30-day forecast offers little comfort to millions caught in some of the century's worst winter weather. Most of the nation will continue unseasonably cold for at least the next month, and unseasonably wet in the southern regions. However, the drought that is threatening crops in much of the midwest shows no signs of slackening. A glance around the nation indicates the mounting toll: The Ohio River froze for the first time in 30 years, New York City broke low temperature records going back to 1869, ice jams blocked traffic on the Mississippi River from St. Louis to Cairo, Ill., lack of fuel forced closing of many plants along the Great Lakes industrial belt. In Washington, troops had to use pneumatic hammers and torches to remove ice for the inaugural parade.