that the continental movements they found should produce. The three plotted this predicted curve on the globe (solid line in the map) and compared it with pole positions predicted by paleomagnetic data alone (the numbered dots). The two did not match. The discrepancy, the investigators concluded, implies that the north pole of the main magnetic component apparently was located along the 123 E. meridian some 65 million years ago and has since wandered about 23 degrees.

Hargraves hastens to point out that "polar wander only has meaning if you talk about it with respect to the earth's surface—for example if you can say the pole was once over New York." Strictly speaking, their findings mean only that the mantle under the European plate has moved with respect to the earth's spin axis. He admits that "unless you accept the concept that the lithosphere can uncouple from the mantle, it is probable that the lithosphere also moved. Then you have true polar wander." Since mantle convection is generally considered to be a driving force behind plate motion, the idea of mantle uncoupling is a radical one.

M. W. McElhinny of the Australian National University has suggested a technique for determining, from vector analysis of plate motions, whether the lithosphere as a whole has moved with respect to the magnetic pole. When he applies his technique to the data and compares the results with the other team's findings for the mantle, it may eventually be possible to sort out all the individual motions. Says Hargraves: "We're all working furiously on that now." □

U.S. and Soviets: 30 joint projects on environment

Whatever ideologists on one side or the other may say, it is one world as far as nature is concerned; the lithosphere, the atmosphere, the hydrosphere and the biosphere are all connected and continuous for the entire globe. Last week's U.S.-Soviet agreement on joint environmental, ecological and geological studies (all subsumed under the rubric "environmental protection") takes a long step toward recognition of this reality.

Gordon J. F. MacDonald of the President's Council on Environmental Quality termed the agreement "an important breakthrough in principle which will enable the two countries to move forward in a vast variety of cooperative ventures." But MacDonald pooh-poohed the speculation, presented in editorial columns in the Washington Post and New York Times, that seismic devices to be installed by the two countries on the others' soil (near California's San Andreas Fault and in the Pamir Mountains of Soviet Central Asia) could be used for monitoring underground nuclear tests and thus could lead to a ban on such tests. "The discussions were purely environmental," he told SCIENCE NEWS. "The instrumentation is not the kind used for detecting small nuclear explosions." But he added that the new spirit signified by the agreement—which was based on the accords signed by Presidents Nixon and Podgorny last spring—could result in a new thrust of cooperation that might eventually go far beyond the environment.

The new agreement will involve joint U.S.-Soviet scientific teams working together in both countries; Soviet scientists will study air pollution in St. Louis and water pollution in Lake Tahoe; U.S. scientists will look at the same kinds of problems in Leningrad and Lake Baikal. Altogether there are 30 such projects involving the U.S.-Soviet teams.

And there appears to be a fair balance in what each nation will gain. U.S. scientists know more about urban air and water pollution (primarily because the United States has more of it), but Soviet scientists are more familiar with arctic and subarctic ecology (for the same reason). The U.S. emphasis in earthquake prediction research is on direct measurement of strain, the Soviet emphasis is on measurement of telluric and magnetic currents associated with the strain. Some studies—such as those in urban planning and growth—will probably cause ideological confrontations. This may have a salutary effect, too. Government agencies in both countries will want to be on their best behavior as they display their particular nation's way of doing things. □

Some surprises from under the Indian Ocean

The Deep Sea Drilling Project quietly entered its fifth year of operation last month during its 25th leg. Though the number of feet of sediments the Glomar Challenger has brought up from the ocean floor now number in the tens of thousands, the latest leg showed that earth scientists have not yet exhausted the ocean's

Hexachlorophene drama: Where are those drug regulations?

Last week the Food and Drug Administration banned the antibacterial drug hexachlorophene from virtually all American nonprescription drug and cosmetic products. This includes some 400 categories of deodorants, soaps, shampoos, toothpastes, cleansers and cosmetics involving thousands of brand names and hundreds of millions of dollars in retail sales.

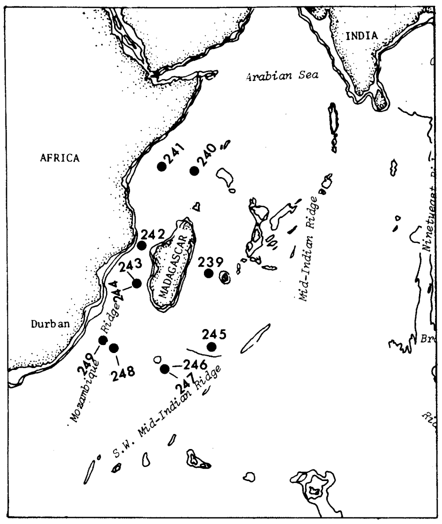
It was a big decision, but easier than many the FDA has to make, because it rests on recent, and dramatic, clinical and animal evidence.

Hexachlorophene was widely used in nonprescription and cosmetic products for 30 years, both in the United States and abroad, until a year ago. Then several FDA scientists found, rather by chance, that hexachlorophene feeding produced brain changes in rats. Subsequently they studied 50 newborn infants in a New York hospital who were washed daily with hexachlorophene, according to normal hospital practice.

They found the babies absorbed the chemical into their bloodstreams through normal, unbroken skins. Several months later Sterling Drug Inc., the maker of the most widely used three percent hexachlorophene solution, pHisoHex, reported to the FDA—contrary to their own interests—that newborn monkeys washed daily with pHisoHex, like newborn humans, developed brain lesions. In January, the FDA, backed by the American Academy of Pediatrics, recommended that hospitals discontinue bathing infants with hexachlorophene.

The clincher for banning the chemical from nearly all products, however, came this summer, as the deaths of 39 infants in France were linked with the use of baby powder containing six percent hexachlorophene.

The hexachlorophene drama is worth noting, not just because a vast public health question is at stake but also because it underscores the lack of nonprescription drug regulations in the United States. The FDA has only a rough idea of how many nonprescription products are on the market, and little idea of which products contain hexachlorophene. Thus, in recalling and banning hexachlorophene, the FDA must rely on voluntary compliance from manufacturers and on spot checks of products on the counter. Legislation is pending that would require all nonprescription drugs to be registered, and their labels to list the chemicals they contain.



Scripps

Leg 25 sites: New clues, questions.

complete supply of scientific surprises.

The expedition, led by E. S. W. Simpson of the University of Cape Town, South Africa, and Roland Schlich of France's Geophysical Observatory, drilled at 11 sites in the southwest Indian Ocean. The 55-day cruise began July 28 at the island of Mauritius and ended Aug. 22 at Durban, South Africa. Among the findings issued last week:

- Sediments spanning "vast intervals of geologic time"—as much as 50 million years—are completely missing from many areas of the Indian Ocean. In seven of the eight deepest holes, there was a gap in the sediments between 40 million and 20 million years old. A gap of about the same age and duration had been found by Leg 21 scientists off the east coast of Australia. "Why these accumulations are missing is at present a mystery," report Simpson and Schlich. There may have been changes in oceanic circulation that scoured away existing sediments or prevented new sediments from being deposited. Or there may have been changes in temperature or decreases in the amount of nutrients in the water that caused a decline in the population of the tiny animals whose skeletons comprise much of ocean sediments.
- The large amounts of gravel, sand and silt deposited in Indian Ocean basins over the past 15 million years indicate that during that period there has been intensive erosion of Africa and Madagascar, probably related to uplifts of large parts of these land masses. Madagascar Ridge, a submarine extension of the island, has subsided more than a mile over the past 20 million years.
- In the Mascarene Basin east of Madagascar, paleontologists on the cruise got a big surprise. They found shells of foraminifera more than 60 million years old that are very similar to those found in rocks of the same age on the west coasts of South and Central America, but are different from foraminifera from that period off Madagascar. The find generated a good deal of excitement, but no one is yet willing to venture an explanation. □

Showing in the lab how molecules form in space

Radioastronomers have discovered several dozen chemical compounds in the gas and dust clouds of interstellar space. Theorists trying to figure out how the compounds were made have generally ruled out any suggestion that individual atoms of the different elements might have simply collided with each other and formed the compounds. The densities are much too low.

The usual theory makes use of an intermediary, the dust particles. The dust is believed to be carbon, mostly in the graphite form, and the theory supposes that when gas atoms collide with the dust, they stick. The dust acts as a collector of atoms and facilitates their combination.

Laboratory experiments that would check this theory are hampered because the conditions of interstellar space are difficult if not impossible to reproduce in the laboratory. The temperatures can be reproduced, however, and experiments done by Kenrick L. Day at Ohio State University show that under the supposed temperature regime of interstellar space the combination of hydrogen atoms into hydrogen molecules (H + H yields H_2) can occur using graphite as an intermediary. (The work was done in furtherance of Day's doctoral dissertation; since receiving his degree, he has moved to the University of Arizona.)

The temperature differences between the gases and the graphite dust in interstellar space have been one of the serious questions in the theory. The gas is typically at about 100 degrees K.; the graphite dust around 10 degress K. At 100 degrees hydrogen atoms are too hot to combine with each other. Astronomers have assumed that collision with dust grains cools the gas atoms sufficiently to allow them to stick to the dust and combine. If enough molecular hydrogen is made this way, it could solve the universe's missing mass problem (SN: 2/26/72, p. 140).

Day's experiment used a supercooled graphite rod in a vacuum chamber. Atomic hydrogen was introduced at various temperatures. He found that hydrogen atoms would combine on the graphite rod at a temperature no higher than 11.6 degrees K., if the initial temperature of the atomic hydrogen were 100 degrees. In space, says Day,

OSU

Day inspects his vacuum chamber.

the graphite would radiate the heat it absorbed from the molecules as infrared radiation and thus maintain its own temperature equilibrium and preserve itself as a heat sink for the gases.

Other substances might form in a similar fashion, Day says, especially methane, oxygen and carbon dioxide. Day has measured the efficiency of the graphite in absorbing heat for some other gases: methane (80 percent), carbon dioxide (90 percent), molecular oxygen (95 percent). Thus it appears that graphite grains in interstellar space could collect a variety of atoms and compounds, and that they can indeed serve as the chemical factories they are supposed to be. □

Learning to read syllables before letters

Learning to speak comes naturally. Learning to read does not. This, says psychologist Paul Rozin of the University of Pennsylvania, is because humans developed the ability to speak much earlier in their evolution than the ability to read. The ability to pronounce phonemes (the basic sounds of letters of the alphabet) is a capacity evolution has made available in learning to speak but not in learning to read. Children, for example, can pronounce strings of phonemes easily as part of normal speech but they have difficulty in explicitly recognizing these individual sounds in spoken words.

Even so, in most reading systems, children are taught to sound out the phonemes of a word rather than the syllables or the entire word. This may be a mistake, says Rozin, because some children may never be able to grasp the essential fact that sound is involved in reading.

To demonstrate that sound reproduction is the difficult step in learning