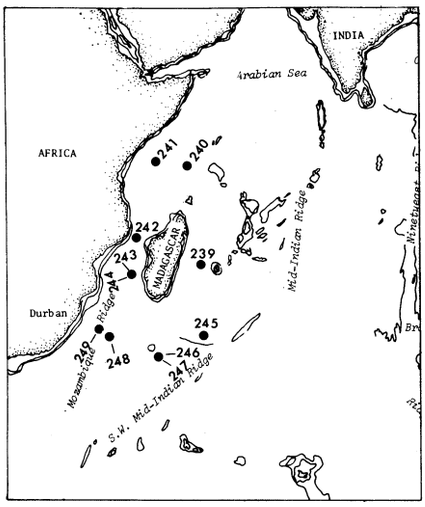


Scripps

*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, 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.

OSU

*Day inspects his vacuum chamber.*

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

## The boy who cried 'cancer cure': Raising false hopes in the news media

Strange things are happening in the frenzied search for a cancer cure. Last week and early this week reports came out of Tennessee that researchers at the Oak Ridge National Laboratory had made a significant breakthrough in the treatment of cancer. Bacillus Calmette-Guerin (BCG), it was claimed, had been 100 percent successful in destroying cancers in animals. It was further claimed that BCG had been successfully used in treating skin cancer in humans. But when hundreds of persons from the United States and several other countries began to call and even show up at the Oak Ridge laboratory, they were told that there had been a mistake.

Martin Apple, a cancer researcher at the University of California Medical Center, agreed. He said BCG has been used in France for years on leukemia patients, but its effectiveness is yet to be proved. The researchers at ORNL, he said, were raising false hopes among cancer victims. He said their reports of a 100 percent cure in animals were very misleading and were based on insufficient testing under special circumstances.

The researchers at ORNL then called a press conference to deny making any statement of a cancer breakthrough. The original report, they said, came from the National Cancer Institute and was misinterpreted in a nationally disseminated wire service story out of Tennessee and further exaggerated by the local press. The NCI, which is sponsoring an international conference on BCG next month, then released a statement saying the research had been misinterpreted and that BCG has not yet been proved to be helpful in the treatment of cancer in humans.

The NCI's original release, intended to publicize the upcoming conference, gave some information on the background and use of BCG and referred to the ongoing work at ORNL and NCI.

BCG is a strain of the organism that causes tuberculosis in cattle. It has long been used in some countries as an anti-tuberculosis vaccine. Scientists think it works by stimulating the patient's immune system. In the mid-nineteenth century a German physician reported that persons with tuberculosis rarely get cancer. Since then the use of the drug as a cancer cure has been debated but not demonstrated. More recent evidence, however, suggests that children vaccinated with BCG may be protected from leukemia.

Michael J. Hanna of ORNL and Berton Zbar and Herbert J. Rapp of NCI recently proposed a mechanism to explain how stimulation of the immune systems of animals with cancer can result in the complete disappearance of the cancer. When the white blood cells are continuously activated by BCG, they summon the histocytes that in turn destroy the cancer. The reaction has been studied in animals and in most instances the induced cancers have been destroyed. But all of the research conducted at ORNL has been done on guinea pigs and there is no mention of treating human cancers at this time. The research has been going on over a period of years and was reported in the May and June issues of the JOURNAL OF THE NATIONAL CANCER INSTITUTE.

When the research was first reported, however, it was overlooked by the general press. According to an Oak Ridge spokesman, it was not until the NCI release was sent out, and someone decided that the research could be made to seem much more interesting if a few qualifiers were left out of a news account that the misinterpretations began and grew into an unfortunate situation for all concerned. The original report mentions "animal tests as models for human therapy" and "it is hoped that the results of the experiments on animals, which are aimed at a better understanding of how BCG acts, will shed light on how to make its uses in human therapy more reliable." These statements were taken to mean that human therapy is just around the corner. Both ORNL and NCI scientists deny this. Even if it were, such work would not be done at ORNL.

The incident is now cleared up, but it has been an unfortunate one for several reasons. Such controversies often cast a shadow over the future work of the scientists involved. Such misinformation often misleads the public and gives false hope to cancer victims. But more than that, incidents like this one are becoming more commonplace and may eventually hurt the entire cancer program. Like the boy who cried "wolf," the researcher who eventually does come up with a legitimate breakthrough in cancer will probably be left out in the cold.

to read, Rozin conducted an experiment in which he attempted to teach Chinese words to inner city Philadelphia second graders who had not yet learned to read. In contrast to English, the logographs (pictorial symbols) of Chinese directly map the meaning of whole words. There is no intermediate step for reproducing sound. With the difficult step removed, the children learned 30 Chinese words within six hours.

The experiment demonstrated that a whole-word approach would be easier for children than the conventional phonics approach, says Rozin, but memorization is a problem. A child would have to memorize more and more words to enlarge his reading capacity. With the phonics approach a child has to learn only the 26 letters of the alphabet.

Between the letter and the word, however, is the syllable. The syllable has the advantage of being more easily pronounced than the phoneme and of being more easily combined than words. Rozin and linguist Lila Gleitman of Swarthmore College have developed a method teaching reading based on the syllable. Their preliminary experiments with kindergarteners indicate that children can learn to read more rapidly and easily if they are taught to pronounce syllables before they are exposed to conventional phonics.

The reading method consists of three steps. First the teacher separates a word and pronounces the syllables slowly while the child tries to guess the word. Next the child is shown pictures of objects that represent meaningful one-syllable words (can, bee, etc.). The pictures are combined with words into a sentence. The same sentence, containing words only, is printed directly beneath the sentence containing pictures. Thus, the child learns to pronounce syllables and recognize them as words. Finally, using words and pictures again, the child is taught combinations of syllables (cow-boy, fireman, etc.). Once the child is able to translate the printed word into a sound he generally knows the meaning of the word. Within seven hours the children could read simple commands.

Rozin and Gleitman say they will have to introduce the children to the phoneme eventually. Syllables alone will never be adequate to learn to read English, they say, because there are so many of them to memorize. But the researchers are convinced children will learn phonics more easily if they first learn syllables. And, they conclude, the syllabic method will give children a reading knowledge of more words sooner than if they are first introduced to the phonics approach. □