natural sciences

Oldest rocks

Until recently, Greenland possessed the oldest known rocks in the world. They date back 3.7 billion years (SN: 12/9/72, p. 374). Now granite and crystalline schist specimens collected in Enderby Land near the Soviet Molodezhnaya Antarctic research base suggest that the Antarctic Continent is older. These specimens date back 4 billion years, according to a report from a Soviet correspondent in the July 2 NATURE PHYSICAL SCIENCE. A team of scientists led by E. V. Sobotovich at the Institute of Geochemistry and Mineral Physics of the Ukrainian Academy of Sciences analyzed the specimens using uranium and thorium.

Predicting sea-breeze patterns

A research meteorologist at the National Oceanic and Atmospheric Administration's laboratories in Miami has linked thunderstorm cloud formation along coastal regions with converging wind zones, and the direction of large-scale prevailing winds.

Roger Pielke has developed a mathematical model of the sea breeze which shows areas of wind convergence and, by inference, rainfall patterns over Florida. According to Pielke, sea breezes create "preferred" regions for cloud formation: The direction of large-scale winds will determine where rain will fall by moving these "preferred" regions about.

Over Miami, for instance, when large-scale winds come from the southwest, clouds that develop in the morning will build into large thunderstorm complexes by the afternoon. If large-scale winds blow southeasterly, Miami will have virtually a cloudless afternoon.

Pielke's model may be helpful in weather forecasting. It may also aid the cloud-seeding program being conducted by NOAA in Miami by helping experimenters identify cloud systems and improve cloud-seeding effeciency.

"With suitable modifications," Pielke says, "such as adding topography and allowing time changes in the large-scale prevailing wind, the model can be used to predict sea-breeze patterns in any region in the world."

A fossil treasure in South Africa

The phosphate quarries at Langebaanweg, 65 miles northwest of Cape Town, South Africa, are proving to be one of the most fertile sources of late Cenozoic vertebrate and invertebrate fossils in southern Africa. They have yielded the most important collection of Pliocene (about 2 million to 5 million years ago) fossils in the area.

Fossils were first found in Langebaanweg 15 years ago. In 1968, the South African Museum set up a program for systematic recovery and investigation. Among the more outstanding findings, reported in July 6 NATURE, are a penguin and a monachine seal. The penguin is the first ever to be recorded in Africa. The monachine seal is only the second record of the genus, the other being from Argentina.

It is now being concluded from fossil and geological evidence that the mouth of a river, probably a precursor of the Great Berg River, was once in the vicinity of the quarry. This would explain the attraction of all the animal life to the area.

Though no direct evidence concerning the nature of the vegetation has been found, excavation of large and varied plant-eating animals implies that vegetation was denser in the late Pliocene than now. Giraffe remains seem to indicate that trees were present, and the high-crowned teeth of a rhinoceros and a horse suggest the presence of grassland.

environmental sciences

Methyl mercury poisoning in Iraq

Beginning in early September 1971, almost 100,000 metric tons of fungicide-treated wheat and barley, intended exclusively for seed use, were distributed to farmers of rural Iraq. Unable to read or understand printed warnings on the sacks, many villagers began to make flour and homemade bread from the grains and injested around 1.4 milligrams of methyl mercury per loaf eaten. Within a few months 6,530 cases of mercury poisoning were admitted to hospitals, where 459 of the patients died. A 13-author report in the July 20 SCIENCE relates the grim data.

When body concentration of the chemical rose to between 20 and 40 mg, first symptoms of toxicity began to appear, mainly numbness and loss of coordination. Death occurred at about 200 mg. Unborn children proved most susceptible, often having higher concentrations of mercury than their mothers at birth and suffering severe brain damage if they survived.

The authors recommend further studies, to find what can be done to help future victims and determine what levels of the much publicized mercury contamination in fish can be considered safe for human consumption. Pregnant and lactating mothers should be studied particularly carefully, they say.

'Mayday!' at Project Skywater

When frantic calls of "Mayday! Mayday!" interrupted a routine cloud-seeding experiment over the snow covered, cloud-encircled Cascade Mountains of Washington last winter, scientists of the Bureau of Reclamation's Project Skywater discovered a dramatic new use for their art.

A light aircraft with three men aboard had run out of fuel near the area where a vintage B-23 was flying with some University of Washington scientists to conduct weather modification experiments. As the disabled Beech Bonanza glided helplessly down into the cloud cover, the heavily instrumented B-23 circled overhead, tracking, relaying messages to the FAA in Seattle and giving directions that helped the small plane avoid 5,000-6,000-foot peaks to land with all crew uninjured in a timber-cleared flat space in a deep valley.

Still circling, the twin-engine research plane guided two Chinook helicopters from nearby Sand Point Naval Air Station to the rescue. But neither copter was able to find the crashed plane under the dense clouds, which quickly threatened the rescuers themselves with severe icing, and forced one copter to land.

Quickly gaining permission from skeptical FAA officials to ignore usual cloud-seeding regulations, the scientists began dumping huge quantities of dry ice on two miles of clouds just upwind from the stranded men. After spotting the wreckage through a developing break in the clouds, the B-23's pilot, Bob Spurling, turned his craft into a tight circle and the research team seeded the cloud's sidewalls.

"A fairly dramatic clearing resulted," recalls Lawrence Radke, one of the researchers. "We then guided the helicopter along the valley floor and up into our seeded hole to the downed aircraft."

The successful rescue, reported in the current issue of RECLAMATION ERA, may lead to further use of cloud seeding in such emergencies. Archie M. Kahan, chief of the Bureau's Atmospheric Water Resources division, suggests that rescue helicopters be equipped with seeding equipment and that their personnel be instructed in its use. He says in some situations even an ordinary CO_2 fire estinguisher can clear a small region of cloud.