Project Mohole Aims at Earth's Mantle

WASHINGTON—A new test drilling is under way in Project Mohole—the extraordinary effort to pierce the earth's crust for the first time.

A thousand-foot shaft was started in October 1962 on the west coast of Puerto Rico. The test is intended to provide more information about the earth's crust and give drillers an idea of problems they may encounter in boring Mohole itself.

The Puerto Rican test is on land, but the Mohole will be drilled at sea where the crust is thinnest—possibly off the coast of Puerto Rico or near Hawaii.

The crust's depth varies from 3 to 6 miles below the ocean floor but 18 to 30 miles below land surfaces, the National Geographic Society says. Underneath the crust is the mantle, a mysterious 1,800-mile-deep layer that forms five-sixths of the earth's volume. Below the mantle is the outer core, some 1,300 miles thick, and then the inner core, about 850 miles deep.

First steps toward drilling Mohole were taken by the National Academy of Sciences and the National Science Foundation early in 1961.

In a few years, a specially equipped ship will drive a nine-inch drill far below the surface of the sea to the irregular boundary between crust and mantle. This is called the Mohorovicic discontinuity, or "Moho." It is named for Andrija Mohorovicic, a Yugoslav seismologist who first detected the line between crust and mantle in 1909.

In a National Geographic article on the Mohole, Samuel W. Matthews commented: "Should Project Mohole succeed, it will stand as one of the 20th century's most significant scientific achievements. It will offer geologists their first direct contact with the earth's mantle; it will shed new light upon the history of our planet, perhaps even upon the beginnings of life itself."

The history of the earth may be read from layers of sediment deposited over millions of years in the deep oceans. They contain the record of the slow, ceaseless fall of shells of sea creatures, of silts and sands brought from the land by streams, surf, winds or volcanic upheaval.

Paleontologists have been unable to span the gap between the remains of simple pre-Cambrian life and the relatively complex organisms appearing at the beginning of the Paleozoic era. Traces of this gap may lie in rocks deep below the seas and come to light in Mohole drill cores.

The Mohole also may provide new data on the age of the oceans, the possible drift of continents across the underlying mantle, and radical shifts of the magnetic poles. It may reveal whether the earth is cooling or still generating heat from inner radioactive fuels.

The ultimate goal is the mysterious and elusive mantle. Geologists are reasonably sure the mantle is solid rock, but until a drill penetrates the mantle and brings up a piece of it, they can only guess. The substance could be a form of dunite or peridotite, igneous rocks similar to stony meteorites.

Project Mohole has unnecessarily worried some laymen. They fear that the hole will drain all the water from the oceans, or blow up the world like a pricked balloon. The commonest worry is that the Mohole will release a volcano. Scientists say that such dire results are simply not possible.

After all, didn't the fictional Rover Boys safely explore the center of the earth with a mechanical mole?

Ask Andy

Gas Chilled to Make Liquid Oxygen

Andy sends a complete, 20-volume set of the World Book Encyclopedia to Paul Cairns, 11, of Stratford, Conn., for his question:

What is liquid oxygen?

Of all the elements in our world, oxygen is the most important. All the living plants and animals on our luxury planet depend upon oxygen in its many different forms. Luckily it is the most plentiful of all our elements. It combines with hydrogen to form water. It combines with other elements to form most of the solid rocks of the earth's crust. Gaseous oxygen makes up 21 per cent of the air.

The chemist does not count water as the liquid form of oxygen or rocks as the solid forms of oxygen. These liquids and solids are compounds and compounds are made from bundles of assorted atoms. A particle of liquid water contains an atom of hydrogen bound together with two atoms of oxygen. A particle of silca rock contains an atom of silicon bound with two atoms of oxygen. Liquid oxygen is pure oxygen chilled to its liquid state. Chilled still farther, liquid oxygen reaches a frozen solid state.

We are used to the idea that chilly water freezes solid at 0 degrees centigrade. At 100 degrees centigrade it boils and becomes gassy vapor. Free oxygen, when not combined with other elements, boils to its gaseous form at ordinary temperatures. But when it chills to minus 183 degrees it becomes a clear, bluish liquid. At the bitterly cold temperature of minus 218 degrees, liquid oxygen freezes into a blue solid.

What kind of a refrigerator do we use to chill oxygen gas 183 degrees colder than ordinary ice? The answer is we use a different trick for chilling oxygen.

When a gas is compressed or squeezed, it loses heat. When the compressed gas is then allowed to escape through a tiny hole, it expands in a hurry and in so doing it loses still more of its heat.

The oxygen gas is squeezed under a pressure of 49.7 atmospheres—which is about two and a half tons of weight crushing down on every square inch. The gassy molecules are jammed into a very small space. Then the chilly substance is released through a small opening and it comes dripping out as pale bluish liquid oxygen.

Oxygen is, of course, a fuel element necessary to fire, rust and other forms of combustion. It is one of the fuels used to take our rockets up into space. Someday our rockets will be powered by nuclear energy but at present we must use fuels such as liquid or solid oxygen plus other chemicals.

Andy sends a Hammond's Library World Atlas to Darryl Schlautman, 11, of Howells, Neb., for his question:

How big is a dwarf star?

A giant star is big enough to swallow about half of our Solar System. A dwarf star may be no bigger than a planet. But planets, of course, come in different sizes. The volume occupied by Jupiter is big enough to swallow the earth more than 1,300 times and the earth, if it were hollow, could swallow little Mars almost seven times.

Dwarf stars also come in different sizes. Some are as large or larger than the earth and a few may be smaller. But weight is another matter. An earth-sized dwarf star would weigh many, many thousands of times more than our world.

Andy awards each day a full set of the World Book Encyclopedia for the first question he selects to answer. When a second question is answered a large world globe or atlas is awarded. Questions are accepted from teen age or less-than-teen-age readers. They should be addressed to the Register-Guard, 975 High St., Eugene. Andy prefers that questions be written on postcards, rather than in letter form.

To Your Good Health

Child's Symptoms Common

By DR. JOSEPH G. MOLNER

Dear Dr. Molner: When my daughter was a young child, she had occasional stomach upsets and would run a fairly high temperature. At such times her eyes would roll up until not much but the whites would show. She never had a convulsion or anything like that.

She outgrew this, is now in high school and as far as I can see, a perfectly normal teenager. However, a "good friend" who remembers her eye-rolling days warns me that I can expect mental trouble sooner or later . . . —MRS. M. H.

Glad you put quotes around "good friend." Her prediction is ridiculous, without foundation and without any element of human kindness, either. Lots of small children will roll their eyes like that when ill, especially when vomiting, or suffering from a high fever.

They may also have convulsions with a fever, but this has no bearing on seizures later in life, nor on their mental equilibrium.

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Dear Joe: I read your column every day and think it's the best of its kind—and I've read them all. I find I have to read them to keep up with the things patients throw at me every day!

Ordinarily your dermatological answers are excellent, but for the one attached, a more plausible answer would be so-called "lingua geographica," or "geographic tongue." Kindest personal regards and keep up the good work.—J.R.

This note from a skin specialist I know is typical of the letters I get from kind colleagues. However some of the correspondence is complicated and even includes copies of technical papers.

The original question involved a mother's worry over "peculiar lesions" that appeared from time to time on the tongue of her three-year-old son. They would disappear and then return in a different spot.

I suggested that it might be from a food allergy, but it could, indeed, be a "geographic tongue" which, in some instances, has been defined as "eczema of the tongue."

This is usually a mild and transient thing, and ordinarily requires no attention beyond keeping the general health in good shape.

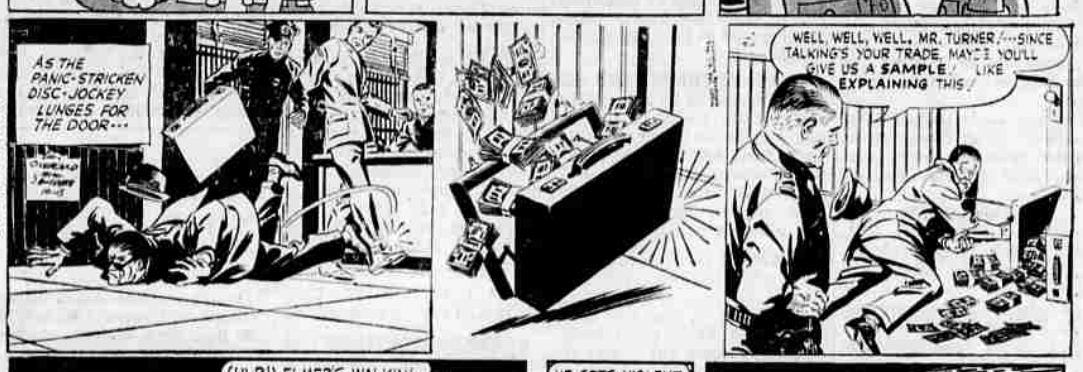
BLONDIE

GASOLINE ALLEY

REX MORGAN

BEETLE BAILEY

STEVE ROPER



BUGS BUNNY

ALLEY OOP

BUZ SAWYER

STEVE CANYON

LI'L ABNER

SHORT RIBS

SAM'S STRIP

OUT OUR WAY

MAJOR HOOPLE