

Ask Andy

Geologists Probe Quakes

Andy sends a complete, 20-volume set of the World Book Encyclopedia to Rusty Mims, age 13, of Nashville, Tenn., and Gwendolyn Hinson, age 13, of Cleveland, Ohio, for their question:

What causes earthquakes?
Geologists are taking a deeper look for the causes of earthquakes and other upheavals. A new theory suggests that the crustal unrest which causes earthquakes may be caused by upsets from deeper within the earth. Project Mohole, that bold plan to drill down to the earth's mantle, may help prove this new theory right or wrong.

The restless upheaval of growing mountains, accompanied by volcanoes and earthquakes, is called diastrophism. And more than 80 per cent of this activity occurs in the huge rim of stresses and cracks in the earth's crust around the Pacific Coast. Earthquakes are caused by faults where two layers of the earth's crust are moving, at maybe a few inches a year, in different directions.

At the fault, the two edges of the crustal blocks cling together by friction for days or years. They bend under the strain like coiled springs. At last the springs uncoil with a shuddering earthquake. The two sides of the fault may slide 20 feet in different directions, pop up or down to form a ridge of cliffs and the huge crustal blocks unbend—all in a few moments. A few earthquakes are

caused by volcanic eruptions and minor tremors may be caused by landslides, cave-ins, deltas, or shifting glaciers. In the past, geologists looked no deeper than the earth's crust to explain diastrophism. A deep fault between layers moving in different directions explains earthquake activity and most earthquakes are no deeper than 40 miles, which is within or near the limits of the crustal layer.

But a few earthquakes on record were 200, 300, and 435 miles deep, which is down in the dense mantle layer below the crust. Maybe the upheavals of crustal diastrophism are caused by activity in the dense, hot mantle which reaches down 1,800 miles.

One theory suggests that convection cells, like gigantic pots of boiling soup may occur throughout the mantle. In such a cell, hot, rising convection currents could push up some areas of the crust while other

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.

areas were sucked down by cooler, descending currents. If across the vast oceans of space, this idea is correct, it could explain the heaving crustal activity and the overall patterns of the earth's diastrophism. In any case, several interlocking causes play a part in these dramatic events.

We can still say that most earthquakes are caused by fractures and the crustal movements of diastrophism. But these crustal upheavals may well be caused by activity in the mantle. We need to know of the nature of this deep, dense layer and maybe Project Mohole will supply the missing clues.

Andy sends a Hammond's International World Globe to Stewart Moser, age 9, of Houston, Texas, for his question:

Why do stars give off radio waves?

The sun and the stars pour out seething atomic energy in all directions. We can see their light and the sun is close enough for us to feel its heat. But these seething furnaces also radiate other kinds of energy, such as the electromagnetic energy we call radio waves.

The radio telescope is a giant receiving set which traps the invisible radio waves coming from the starry nuclear furnaces. It is a new invention for probing the distant skies and almost every day it reveals surprising new information from

To Your Health

Angina Pain A Signal Of Trouble

By JOSEPH G. MOLNER

Dear Dr. Molner: Your recent article on the heart has been a blessing to me.

I have angina pectoris and take nitroglycerine tablets quite often for pain.

Prior to reading your article, I had never known about taking the pills before the pain starts. I have been doing it now and it helps me in making my bed, going up and down stairs, running the vacuum sweeper and many other things that cause pain. Thank you! —MRS. I.L.M.

And thank you, and others who have written.

The pain of angina pectoris comes when the heart is subjected to more strain than it can comfortably meet. The pain, in a very real sense, is nature's warning, so we cannot altogether object to it. It does us a service.

However, when a patient has learned to know the amount of effort which is going to cause an attack, but still has that necessary activity to perform, a pill in advance wards off the pain, or at least makes it milder.

The nitroglycerine is not a "pain killer." It relieves, or avoids, the discomfort by permitting a temporary extra surge of circulation in the heart muscle, and this removes, for the moment, the condition which causes nature to sound its alarm.

It takes patients a bit of time and experience to know how much work their hearts can do without this painful protest. Once they realize the amount, it is possible to take the pill in advance.

This might lead (indeed it has) to a question as to why patients couldn't swallow the pills all the time, and thus avoid pain completely.

For one thing, it would be a dreadful waste of money, because the pills are effective only at these moments of overload.

You can't "save up" their effect, any more than you can give up breathing right now just because you breathed twice as often 10 minutes ago.

Anyone who mistakenly supposed that taking twice as many pills would let him overtax his heart twice as much would, of course, be sadly in error. Nitroglycerine is a wonderfully helpful drug, but it can do only so much. Or to put it still another way, two aspirins yesterday don't help today's headache. But one aspirin, just as the headache is starting, is better than two later on.

That's the simple secret of getting the most good from nitroglycerine. It takes some experience, it takes the knack of knowing one's limitations, to make the best use of nitroglycerine.

But at that point the patient's knowledge adds immeasurably to his own daily comfort.

No, nitroglycerine is not habit-forming, and it does not lose its effect from repeated use.

Mecca Pilgrimage Becoming Less Rigorous

WASHINGTON — Though a pilgrimage to Mecca still tests Moslem's faith and endurance, it is gradually becoming less rigorous.

Most of the devout Moslems who attended the recent annual rites at the sacred center of Islam have now returned—or are on their way back—to homes ranging from north west Africa to Southeast Asia.

As they enjoy the satisfaction of having fulfilled the Koran's injunction to visit the birthplace of the prophet Mohammed, they can also remember such novel comforts there as air conditioning and running ice water.

Oil Buys Improvements

In the last decade the King of Saudi Arabia has poured millions of dollars from oil revenues into improvements for the holy places under his official protection, says the National Geographic Society.

The 45-mile road to Mecca from the Red Sea port of Jidda has been paved. Trees are being planted to shade travelers from the sun's blistering rays.

Arriving in Jidda by sea or air, pilgrims no longer are forced to trudge or jog by camelback over rough desert trails. They can go by bus or, if affluent enough, hire a limousine.

A public light-and-power system was installed at Mecca in the early 1950s. The Great Mosque has been vastly en-

larged. Hundreds of thousands of worshippers can stand together in its open court before the holy of holies—the cube-shaped Kaaba that Moslems believe was built by Abraham at the bidding of God.

To make room for the mosque's expansion, the surrounding jumble of shops is being torn down under a multi-million-dollar building program. A huge air-conditioned pilgrim shelter rises at the site.

Pipes carry cold water from a refrigerating plant to the nearby village of Mina to bring relief to the thirsty crowds who camp out there for the three-day ritual of animal sacrifice.

Even more important are the modern health regulations. Epidemics of cholera, smallpox, and typhoid once traveled with the pilgrims. Today, vaccination controls contagious diseases. Hospitals and mobile first-aid units tend the sick; food chilling and sanitation help keep others well.

Hardships Inevitable

Yet despite the ameliorations, the great hadj, or pilgrimage, is by its very nature an ordeal. Many participants spend meager life savings to get to Mecca, leaving little for later needs.

Some are elderly and ailing. All face overcrowding and lack of facilities in a city whose permanent population of less than 150,000 is suddenly multiplied many times. In recent

years, when Islam's lunar calendar put the annual pilgrimage in hot summer months, hundreds of people died from sunstroke and the infirmities of the aged.

The required rituals—held under the blazing Arabian sun—are exacting and exhausting. Worshippers must circle the Kaaba seven times on three separate occasions, and run another seven laps between the neighboring hills of Safa and Marwa. They stand bareheaded for hours, praying before the Mount of Mercy. At Mina, they stone a white pillar representing the Devil, and slaughter goats, sheep, and camels on the Field of Sacrifice.

To strict Moslems, however, the greater the hardship, the more merit acquired. Returning home, they welcome the prestige of being a hadji. Some hope to die in the sacred city of Mecca, for they believe death there will entitle them to a special place of honor in heaven.

Better Medium Found

The Old Masters used raw eggs in mixing their paints. Technicians restoring Renaissance paintings have found that a modern synthetic—polyvinyl acetate—mixed with dry pigments is likely to stand the test of time far better than the traditional egg medium, the National Geographic Magazine says.

