when Mount Katmai in Alaska blew its top off a quarter of a century ago. The famous cliff of petrified trees in Yellowstone National Park shows on its face a dozen such eruption-whelmed forests, each growing above its predecessor's graveyard.

Wood thus buried decays very slowly indeed—molecule by molecule. And as each bit drops away the woody stuff is replaced, molecule by molecule, with mineral from the waters that trickle through the ash.

Thus even the minutest detail of inner structure is replaced in exact duplicate by stone of flinty hardness and often great beauty of color. It is ideal material for the petrographer's grinding apparatus.

Reduced to transparent flakes, these petrified woods can be identified by the microscopic details, just as wood from living trees can be identified by timber experts, without the aid of leaf or flower or fruit.

It is easy, for example, to tell whether these trees that lived when dinosaurs still trod the earth were related to pines and spruces and other evergreens, or whether their next of kin were broad-leaved trees like oaks and elms and maples. The distinguishing mark of the evergreen or conifer series are the curiously constructed openings from one long wood-cell into another, called border-pits. These are never found in the wood of broad-leaved trees.

Botanists hesitate to call exceedingly ancient petrified wood pine even though it looks like pine. So they compromise by calling the genus *Pinoxylon,* which is Greek for "pine-wood" or "pine-like-wood." There are quite a number of these extinct species which have been given names ending in the Greek *xylon,* meaning wood. But the scientist who named *Callixylon* must have seen something especially fine through his microscope, for that name means "beautiful wood."

Science News Letter, June 19, 1937

BIOPHYSICS

Molecules of Visual Purple Measured at Columbia

VISUAL purple, the chemical compound that enables us to see, has had its molecules measured for the first time, in the biophysical laboratory of Prof. Selig Hecht of Columbia University. (*Science,* June 11). Working with Prof. Hecht in the research were Drs. Aurin M. Chase and Simon Shlaer.

Indirect physical methods and mathematical inferences had to be used in the measurements, because the molecules of visual purple are far too small to see with any possible microscope. They have a most probable diameter of a little less than a hundred-thousandth of a millimeter. (A millimeter is approximately a twenty-fifth of an inch, or about the thickness of the lead in a pencil.)

At that, the molecules of visual purple are very large—for molecules. Their molecular weight is calculated at something like 800,000, as contrasted with weights of a few hundreds or even under 100, for most common substances. In both size and weight, the molecules of visual purple resemble protein molecules.

Visual purple is a reddish-purple liquid found in very small quantities in the finer structure of the retina, or light-sensitive film that lines the eye and is the essential organ of vision. Visual purple fades to colorlessness when exposed to light and recovers its color in the dark. Recently Prof. Hecht published a method for extracting visual purple from the eyes of frogs, and accomplished the color reversals outside the living eye, in a glass tube.

Science News Letter, June 19, 1937

SEISMOLOGY

Watch Great Dam for Quakes; Lake's Weight May Bend Rock

WILL the 41,518,125,000 tons of water backed up into Lake Mead by Boulder Dam cause earthquakes?

This question was raised before a meeting of the Seismological Society of America in St. Louis by R. R. Bodle of the U. S. Coast and Geodetic Survey.

The Colorado River in its lower course flows through a region where many violent earthquakes have occurred in the past, some of them comparatively recently. Scientists have wondered whether the vast weight of water that will be concentrated along the 115 miles of Lake Mead will put sufficient additional strain on the crustal rock layers to set off disturbances.

Mr. Bodle has devoted considerable study to the question, but stated that the data available are not sufficient to justify a positive answer one way or the other. He suggested that several seismograph stations be set up in the region, so that a better informed watch may be maintained over the earth's slow movements at this important place.

Machine-made indoor earthquakes were used at the Massachusetts Institute of Technology to test instruments intended for use in earthquake regions, called accelerometers. They are so designed that they remain "asleep" until a strong earthquake wakes them up. Then they go into action and write a curve that records what happens.

The accelerometers were tested on a "shaking table," which is a platform so mounted that it can be moved back and forth in any horizontal direction, giving a very fair imitation of an earthquake. The tests were made by H. E. McComb of the U. S. Coast and Geodetic Survey and A. C. Ruge of the Institute staff. The records thus obtained will be useful for comparison with records made by the same instruments when they go through a real earthquake.

A Restless Deity

Indians in one earthquake-tortured part of the Republic of Colombia used to believe that the disturbances were caused by a great god who slept under the Andes. When he turned over in his bed, the earth shook.

This early theory of the cause of earth-

●RADIO

June 29, 4:15 p.m., E.S.T.

SCIENCE TESTS MATERIALS—C. L. Warwick, Secretary of the American Society for Testing Materials, and A. C. Fieldner of the U. S. Bureau of Mines.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

quakes was mentioned by Rev. J. Emilio Ramirez, S. J., of St. Louis University, in his discussion of the actively seismic region in the Departmento de Narino, on the southwest Pacific coast of Colombia. Ever since the days of the Spanish conquest there have been records of frequent earthquakes there, and the Indians had traditions of terrible earthshakings before the white men came.

This uneasy region is about the size of Belgium, Father Ramirez said, and it has half a million population. Since the region is very mountainous, calamitous landslides, floods, and mudslides sometimes lend additional horror to the more direct effects of the quakes.

Insurance Trouble

Earthquake science, or seismology, has a number of practical aspects, and research in it must be pursued without letup because of the importance of certain unsolved problems.

This was indicated in an address by Captain N. H. Heck of the U. S. Coast and Geodetic Survey.

Some companies refuse to write insurance in regions with an earthquake history, said Capt. Heck. Insurance rates are always calculated on the statistical chances of a certain type of trouble happening at a given definite place within a unit time period. But although it is possible to say that earthquakes are likely to happen in a given general region, say the Andes or southern Italy, it is impossible to pin them to a definite locality, say Lima or Naples. And guessing at time is even worse; it is absolutely impossible to make an honest and accurate time-forecast of an earthquake.

Nevertheless, the data accumulated by earthquake research even now have considerable value in practical affairs. Knowledge that a region is "seismic" that sooner or later a severe earthquake is likely to occur, enables government officers and Red Cross workers to concentrate staple relief supplies at strategic transportation centers and to formulate "plans of battle" to go into effect when the attack comes.

Study of instruments and of skyscraper models set up on "shaking tables" in engineering laboratories have enabled architects to correct certain weaknesses in specifications for buildings to be erected in earthquake regions. These researches are still in active progress, so that further advances may be expected.

Science News Letter, June 19, 1937

ZOOLOGY

Records of "Gibbonese" Made in Jungles of Siam

FIRST phonograph records of the "language" of the gibbon, key animal in the evolution of man, have been made this spring in the mountain forests of northern Siam by an expedition from Harvard University, the Johns Hopkins University, and Bard College.

They are expected to constitute one of the more important aspects of the expedition's pioneering first-hand study of the natural behavior and physical character of the Asiatic anthropoids. From the expedition as a whole the group hopes to glean important new clues to man's early development and the jungle origins of his social systems that will aid in unraveling some of the more puzzling problems of human evolution.

To this end the seven American scientists comprising the party are applying modern psychology, sociology and anatomy to their examination of the gibbon's home life, testing primarily the position of the gibbon on the family tree of the anthropoid apes and even of man.

Similar to man physically, the gibbon is gregarious and monogamous as well, facts that lead scientists to believe that in his natural habitat they may find traces of the origins of man's most firmly established institutions, his family and group life.

Despite numerous difficulties, including a brush fire that nearly wiped out the base camp on Mt. Angka, the expedition's investigations have thus far been very successful, declares Harold J. Coolidge, Jr., of the Harvard Museum of Comparative Zoology, leader of the group. It left this country in January and has been in the field since March.

Judicious use of blinds and screens have enabled the scientists to approach within close range of the animals without disturbing them. Detailed photographs of their activities have been obtained in addition to the pioneer phonograph records.

These records are usually clear and are so accurate that when they were played back to the gibbons, the animals responded immediately, varying their reactions as each new call came from the loudspeaker. The expedition hopes to continue these valuable recordings until a complete catalogue of all the major vocal patterns of the gibbon is obtained.

Dr. C. R. Carpenter of Bard College, who made the recordings, has also conducted detailed observation of 16 family groups of wild gibbons as well as a dozen captive animals in the expedition's camp.

Other members of the party, assisted by native hunters, have collected a series of gibbons for study of anatomical and