SCIENCE TURNS ITS X-RAY ON THE EARTH

Geologists, Reading the Planet's Heart, Evolve a New Theory of How the World Got Its Shape And Present Structure and Open Up Speculations Concerning Its Future Development



"When the Moon Broke Away From the Earth."

and finished, our globe in reality is in the mysterious interior of the mobile and restless and is continu- earth. That interior is forever ining in the process of evolving on a visible to human eyes. Man has planetary scale. Below the familiar barely succeeded in penetrating by great pontoons do on water. Ac- the planet's core. of symmetry.

major catastrophe caused the ejec- barren and ore-bearing rock. celestial drams have helped to of science, believed that "no one damage.

capped Himalayas, arose. ister MacDonald are busy pulling revealed by this new method un world are in this way raised and When at the Scopes trial in 192 shores. America and Europe nearer togeth fold a dramatic explanation of the lowered many times a year, though a geologist testified that "the crus" "This startling similarity geological control of the crus evidence pointing to the conclusion tained its present shape and struc physical gulf between the two con to its future development.

Dr. Reginald A. Daly of Har tronomer has opened up new visia We must now look upon the eartle istence at all and what have been Professor Wegener received only

By H. GORDON GARBEDIAN vard University, Dr. Alfred Wege- of a million universes like our own as consisting of a series of shells the processes of its evolution? The

gaseous mass of its parent sun. large number of delicate adjust- can now infer something of the renheit. Apparently so solid, stable, inert ments of powerful physical forces structure of the earth by analyzing These shells are relatively homo- gases of the sun. A long, long

noes and new mountain ranges all with nature's mocking forces to I rocks of the earth's crust have depth of 1,600 miles rest upon the gas broke up into spheres, which owe their origin to landslides of obtain more knowledge of the been and are being strained actual core, consisting of a mate-went spinning dizzily through the wabbly earth to correct its lack baffling subterranean region. It is Every day, somewhere, they are rial not unlike the metallic iron of space. Cooling and becoming the interior of the globe which snapping and sending out elastic the meteorites. Our earth at one time consisted holds the secret of the deep Pacific waves from many centres. For the "Our planet's shelled character ually solidified and evolved a crustof only one gigantic mass of land and the lofty Mount Everest, of the whole earth the average number of and the natural inference that its ed surface. Today they revolve ing the planet's eventful infancy a fire," the riddle of the plains, of about 9,000, or about one every candescent glass is the outstanding

President Hoover and Prime Min of our planet. The results alread; Tokio and all the other cities in the man and organic life in general." ilarity in the form of the opposite

These are some of the startling sun with the aid of a spectroscope explores the deep inside of the hu vast expanses of the heavens. conceptions by such noted scientist science discovered helium. The as man body with the X-rays.

bone and nerves of the arms.

WR earth, instead of being ner, the famous German geologist; scattered in the spacious firma-surrounding a core which at its explanation offered by geologists what most of us learned to Professor Emile Argand, Sir Oliver ment by examining the light and centre bears the tremendous pres- follows the thoughts of Dr. Harold picture it at school, is a dis- Lodge, Dr. Rudolf Staub and others, heat rays emanating from the sure of 50,000,000 pounds a square Jeffreys, Dr. A. S. Eddington and torted, warped planet which who present to us a new picture of twinkling stars; and the chemist is inch, or 1,000 times the pressure in- Sir James Jeans of England and analyzing the infinitesimal atom side a cannon at the instant of dis- Dr. Thomas C. Chamberlin, Dr. deformities undergone since the Human life, in fact all organic by the same process. The geologist charge, and has a temperature per- Harlow Shapley and Dr. Forest R. dim past when it was flung off the life, depends for existence on a has adopted a similar method and haps exceeding 90,000 degrees Fah- Moulton in the United States.

the waves set in motion through geneous in character, the outer time ago-a long time even as the body of the globe by the mighty shell, forming the crust of the scientists measure time—there was hammer of an earthquake or other earth, being about thirty miles almost a collision between Old Sol deep. The commonest rock of this and another star. The visiting star Take a stick between your hands. outer continental shell is some va- in its cosmic travels approached our thick earth shell of hot liquid gas low sunlight—a mere pin-prick on Bend it until it breaks. The sudden riety of granite, that of the under- sun so closely that the surface of on which the continents float as the earth's crust, 4,000 miles from snap sends vibrations along muscle, lying layer is a heavier, dark-col- Old Sol was disrupted. Masses of ored basait, similar to some of the gaseous matter, drawn by the atvolcanic lavas. Beneath that are traction of the visitor, were thrown restrial events, earthquakes, volca- for many years vainly struggled TN a somewhat similar way the still denser materials, which at the off the sun, and these filaments of

and one huge body of water. Dur- earthquake and the "temple of shocks registered every year is interior consists of very hot, in- about the sun as the eight planets. hour. A worldshaking of the first discovery of geology of recent THE young earth early in its intion from the earth of a mass of So unsuccessful have been the ef- magnitude occurs every eighteen times, and it suggests that the globe I fancy experienced a momentous matter, which later cooled to be- forts of leading geologists in the days or thereabout. Fortunately, was once fluid and stratified itself— accident. Either because of come the moon. Powerful forces past, that Professor Silliman of most of these originate under the by gravity," Dr. Daly asserts. "The gigantic tidal waves or because of owing their origin to that great Yale, himself a distinguished man ocean and do comparatively little heavier materials sank toward the excessive speed of rotation, perhaps centre, the lighter materials rose aided by explosion, the earth ejected break up the original single con- will object to ascribing most of the These earth waves, traveling great toward the surface, and the whole a mass which later became the tinent into several continents, which earth's surface features to the distances around the earth, meas- mass finally arranged itself as lay moon. To that event Dr. Daly ure from twenty to forty miles be- ers of shells. It is for this reason speculatively refers the origin of war between gravity and other Now, science is "X-raying" the tween crests, and, as they pass, a that the continents float on the the one primitive continent and the forces in the earth's body put s earth. The geologist has hit on s whole mountain range, a vast plain earth's body. They are pressed up one primitive ocean-basin, of which new face on the earth, and in place new way of attacking the perplex or an entire city rises and falls like by the surrounding, heavy, solid the existing Pacific Ocean is the of flat surfaces, majestic chains of ing problems of the earth's interior parts of a raft on an ocean swell. basalt, much as icebergs are somewhat diminished remnant. mountains, including the Rockies and with his highly sensitive sels. The swing is usually so slight that pressed up by the denser water of Compare the opposite coasts of

the Andes, the Alps and the snow mographs he feels confident that only special instruments can feel the sea. That is why we have dry South America and Africa. You at last he is able to read the hear it. New York, Paris, Calcutta land, with its endless importance for cannot fail to be struck by the sim-

er spiritually; but there is some processes by which our earth at not enough to be felt by man. of the earth is at least 1,000,000,000 gists now believe is not due to any The geologist is now using these years old" the crowded court room accident," Dr. Daly said. "It is that nature slowly is widening the ture and open up speculations a waves to add to the knowledge of tittered. Yet, in principle, the esti there because the continents in the the earth's invisible interior in the mate has its supporters, although past ages have broken away from Studying the light waves from the same sort of way that the surgeon our earth is "a mere child" in the each other and have drifted horizontally over the surface of the

How did our earth come into ex earth."

ridicule for his pains when he first | tread, the grotesquely toothed birds, advanced the theory of the migra- the early, small timid mammals of tion of continents, but many men those distant times conscious of the of science today have veered to his "cataclysm"? Probably not. For recent years by several sciences, ceedingly slow, much too slow for including geophysics, geology, paleontology, astronomy and geodesy, As the opening between the West have contributed to its support.

one-time neighbor. America. Some Ocean. States Senators began to wrangle up the rocks along the front of about entangling alliances with Eu- each moving continental block, hypothesis of the migration of con- Andes, the Rockies and the Himaone continent. Australia and New unequal operation of gravity at the Guinea and the whole chain of earth's surface, with a tendency the truncated tail of Asia.

covered the remains of marine ani- underlie the rocky crust of the earth

For marine remains in rocks in tion, says: the northern parts of Newfound-i "When the moon broke away

ern Hemisphere and Europe and Africa slowly widened, water welled ODAY a Prime Minister of into the fissure. This opening, Great Britain has to travel grown in width to about 3,000 miles, 3,000 miles to reach England's we know today as the Atlantic

millions of years before United The propelling forces crumpled rope there was, according to the forming mountain chains like the tinents, a physical entangling alli- layas. According to Dr. Daly's ance. New York was close up hypothesis, these blocks moved unagainst Belgium. North America der simple gravity. He supposes and South America were joined the previous distortions of the figwith Africa, Asia and Europe in ure of the earth to have caused the islands to the north were united to to pull the rigid continental sheets in certain directions, causing them Leonardo da Vinci heard thun- to "slide downhill" over the weak der from the Vatican when he dis- glassy layer which is believed to

mals on the top of an Italian! There is some disagreement, even mountain. Fossils which have been among those scientists who hold collected in many parts of Europe that the theory of continental mi by scientists sent abroad by Prince- gration has now been well substan ton University and the Smithsonian tiated, as to the cause leading to Institution show that as recently the break-up of the one continent as 25,000,000 years ago some sort that originally covered our globe of a land "bridge" must have ex- Sir Oliver Lodge, explaining that isted connecting Europe and Amer- the ejection of the moon from the earth is held to be the best explana-



"Man Is Learning to Harness for His Inquiring Use the Very Wrath of the Earth."

of observation of longitudes of matic story.

piled one on another, to settle into water. A shallow sea stretching of a frozen world. a state of equilibrium. Along the from Texas to Yukon cut the conti- The geologist, busy at his inzone of the mountain chains over nental plateau of North America in genious task of decoding the history the world the rocks are still break- two. The whole of the flat plain of the rocks under our feet, is no ing, snapping, slipping on the from New Jersey to Florida was longer alone in his keen interest planes or fractures or faults. Each covered with sea water. At one regarding the interior of the earth. time the strained crust suddenly time the ocean surf broke on the More and more are the other breaks, one block moving feet or old Appalachian Mountains where sciences besides geology turning ininches past its neighbor, an earth- the southeastern part of the moun- quiring eyes in the direction of the

The earth's crust in California, sea. for example, had undergone a progressive strain for many years prequake of 1906. Geological forces while another broad strip of the the United States. a long time resisted these two ten- the water? The answer geologists drama" which, if we could underdencies. At last, at a certain mo- offer tends to explain the cause of stand better, would enable us to

Sometimes fractures are developed clear through the solid crust of the earth. Hence lava rises from the substratum along these fissures,

Proteus, had the power of constantthe jungles of South America and ance. There would be a tendency ly changing his looks. Since the world began, neither land nor water has worn exactly the same face. The mighty forces of nature, working through rushing rivers. restless glaciers, roaring winds and pounding oceans, carve out new and gloriously impressive features dinosaurs with their thunderous al committee of scientists to answer battling, a lined face, a few scars moderate thickening of Antarctic will not loom so large.

quake jars the body of the earth. | tain structure had sunk below the secrets hidden inside our globe:

THIS part became covered with microscopes to the astronomer vious to the San Francisco earth- a layer of sand and mud thick- probing gigantic celestial systems were tending to shear the State in- mass of marine sediment was then now know that their task would to two parts. A broad strip of land uplifted and cut into by rivers, be easier if they were not so unintended to move to the southeast, giving the Atlantic coastal plain of formed concerning the earth's in-

ment in the year 1906 the two con- glaciers. During the glacial period, comprehend more clearly all the trary forces reached the elastic a few tens of thousands of years various phases that go to make up limit of the earth's crust, and the ago, the sea level fell everywhere the whole cosmic picture. ed from the ocean to build glaciers, standpoint of human civilization since melted away. The resulting some years hence, a more vital world-wide emergence of the question is entwined in our study have reached as much as 300 feet, power are rapidly diminishing. The formation of even that residual Modern civilization is built on of the Ice Age, the ice cap on Ant- power. How is it to go on when arctica, has lowered sea level every- our supply of oil and coal runs where on the globe by something out, as it will in the not too distant The Sea-God of Greek mythology, like 100 feet.

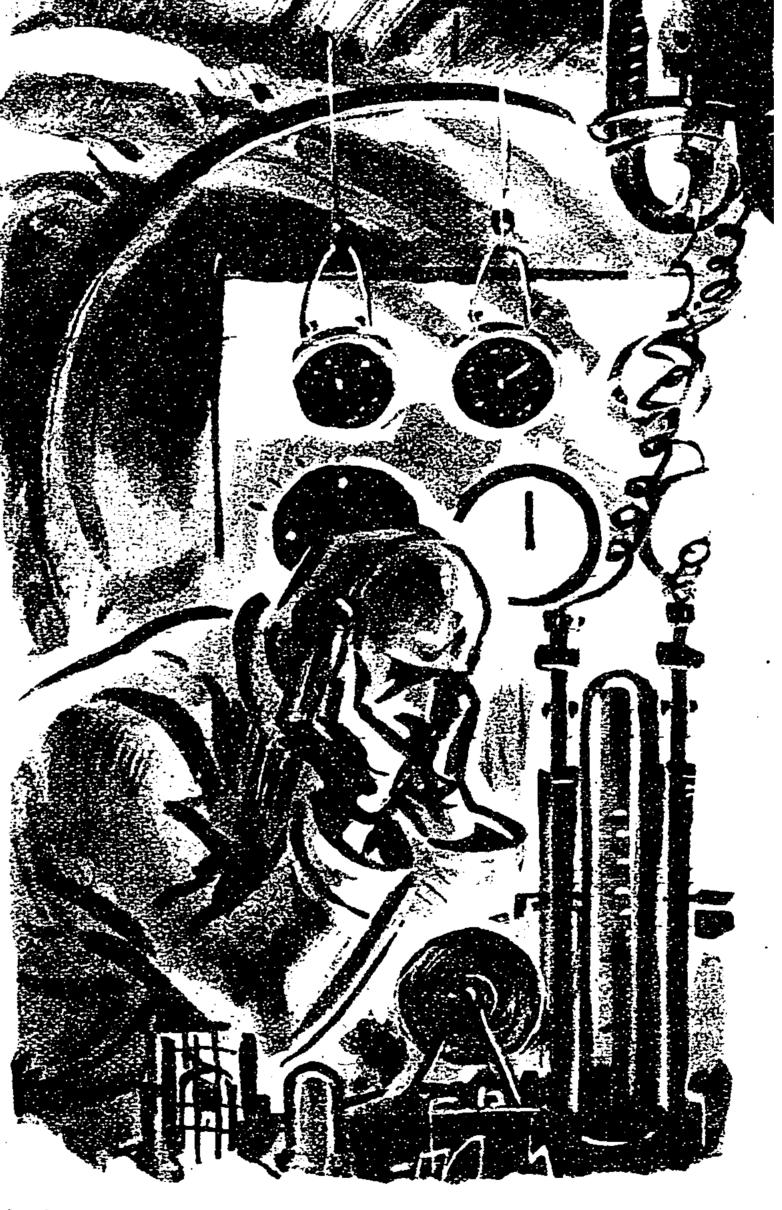
Sea level has changed again within Inside our earth is something recent years. Various parcels of more valuable than limited deposits land previously submerged in dif- of gold, diamonds, oil and gas. It ferent parts of the globe, but espelis an inexhaustible source of heat. cially in Samoa, have lifted their By going down several miles into heads unexpectedly on the body of the bowels of the earth we can tan the sea. Field studies along islands this unlimited reservoir of energy and continental shores in all of the and power. The problems to be ocean basins show that there has surmounted now appear too great. been a world-wide sinking of the But there is the promise that as

the question by a ten-year program, or some wrinkles tracing the dra-, ice. The withdrawal of water from the ocean to cause this fifteen-foot fixed points in America and Eu- |. Picture the American scene before drop in sea-level, despite its great physical changes had transformed quantity, would account for but a It has taken much time for the it. Not so long ago, in a geological fraction of the Antarctic ice cap crustal blocks of the earth, so sense, New York, Boston. Chicago. facing Rear Admiral Byrd and his tumultuously jammed together and St. Louis and Miami were under expedition in the great white silence

From the biologist examining minute matter with test tubes and ening seaward. The wedge-like far, far away-all men of science terior. For that region of the Why did that strip of land along planet has served and is now servwest. The strength of the crust for the Atlantic Coast emerge out of ing as the stage for "a gripbing because much water was evaporat- A more immediate, and from the

"drowned" coasts is estimated to of the earth's interior. Sources of future?

our knowledge of the earth's in-



tand were found to be identical; from the earth there was no liquid with fossils of the same age in water or reasonable atmosphere Wales, Scotland, Norway and Den- and the planet had no semblance of hell," where medieval philosomark. Those geologists who ad- of what it is now. But long after here to the belief that the earth the moon departed the scar left once consisted of one immense by it would be deep and all the piece of land point to the similarity water would accumulate there. between plant and animal life in when water could make its appearin the wilderness of Africa, and for solid matter to fall and move evidence of a relationship between so as to fill up the cavity. More-Australia is not lacking.

When mighty interior forces be- drift away from the rest."

animal life in Southern Asia and over, a great floating mass of land might break up and a part of it gan to rend the single continent and Are our continents still drifting make its giant fragments move apart? If such a movement is still horizontally to other parts of the going on, the longitude of the conti- on the face of the earth. And our world, did the animals of the time nents must be changing. A plan earth, having lived through so sea of about fifteen feet. appreciate the drama? Were the has been devised by an internation- many wars in the past, is still The cause is best sought in a terior increases, those problems