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### MOUNTAINS FLOAT LIKE ICEBERGS IN A FLOWING EARTH

(By Science Service)

Washington, October -- Mountains float. Cubic yard for cubic yard mountains weigh less, not more, than the valleys. The mountains are held up by the lighter material of the earth's crust flowing under them. This has been proved by researches conducted by the Division of Geodesy of the Coast and Geodetic Survey, under the direction of Dr. William Bowie, chief of the division, and his predecessor, Professor John F. Hayford, now with Northwestern University.

It has been found that the earth's crust is about 60 miles in thickness and near that depth, probably below, the material of the earth is yielding to forces which act for long times.

The earth's crust floats on this yielding material. If the earth's crust were cut into blocks by vertical planes, with the base of each block at a depth of 60 miles below sea-level, and the area of the bases of the blocks were the same and as large as 100 miles square, these blocks would have the same mass, that is, they would weigh the same.

By means of the geodetic observations by the U. S. Coast and Geodetic Survey, the weight of these blocks have been found to be approximately equal. This result had been suspected for decades, but Drs. Bowie and Hayford have proved it.

Geological science will be profoundly changed by this discovery for now we know the mountain masses are due to the presence of lighter material in the earth's crust under them, and that the ocean bottoms are low because the material under them is denser or heavier than the average.

Dr. Bowie concludes that there is no tendency for the mountain masses to break down through the earth's crust as they are not extra loads. They are like the portions of icebergs projecting out of the water which are held up by the ice which is below or in the water. The iceberg floats and so does the mountain.

Dr. Bowie also holds that, as mountain systems are in areas which were once very low in elevation, mountains are caused by a swelling of the material in the earth's crust under them. A lessening of the density of three per cent in a column 60 miles long will elevate the area about 9000 feet. Such a change in density, due to physical or chemical changes, is within reasonable limits.

As the mountains, plateaus, valleys, and the ocean areas are in equilibrium, there must have been a transference of material from the column of the earth's crust under an area where sediments are deposited, back to the area from which the material was eroded by water and wind. Dr. Bowie believes that the flow of material takes place just below the crust, that is somewhat below 60 miles. The exact depth at which the flow from one column to another takes place may never be discovered.



Dr. Bowie states that, as material is eroded from a mountain area, the new material pushed in at the bottom will tend to keep the average elevation of the mountain system approximately constant. When material is pushed into the column under a mountain system to counter-balance the eroded matter, every particle of the column is carried upward into a colder zone. Under areas of heavy sedimentation, the material of the earth's crust is pushed down into hotter regions. A piece of material may thus be raised up or carried down as much as six miles and, at times, more. The great changes in temperature are probably the cause of the uplift of a mountain system in an area of sedimentation, and of the sinking of the surface where erosion has been great.

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## BEER YIELDS TO BREAD

(By Science Service)

Chicago, October -- Another stronghold has changed hands. The school which for a generation has led American schools in the training of master brewers is soon to become a school for master bakers.

Some thirty years ago a school of fermentology was founded here. It grew slowly but steadily and after a time found larger quarters. In 1905 an important institute was built providing laboratories for the study of yeasts and the development of new varieties, for chemistry and the other studies important to brewers. Then there was a miniature brewery complete in all details. The graduates of this institute had a wide geographical distribution.

Two years ago the progressives in the American Association of the Baking Industry organized the American Institute of Baking having for its purpose the application of known science to the making of breads, the research necessary to establish new facts and principles and the education of men in or about to enter the baking industry. The accomplishments in the two years have had to do particularly with educating the members to the need and value of science in their industry, one of the very oldest on this earth. But enough has been done to show the wonderful possibilities and just now a forward step of importance is being taken.

The association has changed its name to the American Bakers Association, committed itself to a national campaign of cleanliness and education and provided ways for adequately supporting this work as well as research. In casting about for a central location and for facilities the brewing school now hard pressed for students came into view and has been purchased.

The study of yeasts will continue but their mission in life will be to raise breads and not that which goes with the stein. The study of chemistry, of physics, of grains, is to go on but with a different direction to the work. The miniature brewery will give way to a model bakery and may be some day advertisements will have for their theme the biggest loaf for a nickel in place of the biggest schooner for that convenient coin.

The master brewer is to give place to the master baker who is to go out equipped with technical training to apply the laws of hygiene to his work shop, intent upon national nutrition problems and leaning upon the research being steadily pursued back at the institute.

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## NEWS OF THE STARS

### The Sun's Motion Through Space.

By Isabel M. Lewis,  
of the U. S. Naval Observatory.

(Science Service)

The sun is speeding through space carrying its planet family with it at the rate of twelve miles per second, one million miles a day or four astronomical units a year. And the astronomical unit is the distance from the earth to the sun. In the past 15,500 years it has traveled as far as light travels in one year. It would cover the distance that separates our solar system from Alpha Centauri, the nearest star, in 68,250 years. Light comes to us from Alpha Centauri in four and one-third years.



Since the solar system first came into existence the sun with its family has probably traveled many hundreds of light years through the universe, the light year being equivalent to about 63,000 astronomical units or 63,000 times the distance from the earth to the sun. Old constellations, or star groups, have faded away and new ones have gradually taken their place, though since the dawn of recorded history the constellations have changed but little in form.

It is evidence of the grandeur of the scale upon which the universe is fashioned that, according to the testimony of the geologists, no destructive catastrophe has overtaken this world of ours for many millions of years, at least, while we have advanced far through the universe. It is apparently a law of the universe that, in general, the stars shall pursue their diverse ways for long eons of time without interfering with one another, experiencing collision or serious catastrophe of any kind.

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FIND PREHISTORIC BONE  
ENGRAVING OF MASTODON

(By Science Service)

Pineville, Missouri, October .- Ancient bones, engraved with figures that resemble prehistoric animals, have been discovered in Jacob's Cavern, a prehistoric rock-shelter, located near here, by Jay L. B. Taylor and Vance Randolph.

One of these bones is ornamented with what appears to be a mammoth or mastodon. Another is believed to represent some member of the deer family.

Bone and horn awls, flint implements of stone, engraved and polished implements of stone, and shaft straighteners and smoothers were also found in this cave, as were portions of an adult human skeleton, accompanied by an engraved sandstone pipe.

The ornamented bones when first exhumed seemed to be perfectly firm and sound, but shortly after they began to disintegrate. Before this occurred, however, it was possible to make pen drawings of the designs and some of the most important of the bones were treated with a preservative.

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GIANT SQUID WAS  
LEGENDARY SEA MONSTER

( By Science Service )

For many centuries Norway has had its legends that recited frightful tales of the kraken, a great and mysterious marine creature, that was a danger to sailors on the high seas.

Now scientists have found that the localities in which these folk-tales flourish are the habitat of giant squids or "cuttle fish", of the genus Architeuthis, that have frequently been cast up upon sea beaches.

According to Dr. James Ritchie, of the Royal Scottish Museum, the largest of these on record had tentacles that have a span close to 30 feet. It was 9 feet 9 inches long from the tip of its tail to the tip of its short arms, but its tentacular arms were each 14 feet long. The tentacles were armed with some 1200 toothed suckers, which must have rendered the creature a formidable enemy.

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FIND FURNACE REFUSE  
IS ONE-FIFTH COAL

( By Science Service )

One-fifth of the boiler furnace refuse or ashes of power plants using low-priced bituminous coal screenings is unburned fuel and can be reclaimed by washing on a table such as used in the coal producing plants. In many cases, tests made at the University of Illinois indicate that the reclaiming of the coal can be done for much less cost than the freight on the coal.

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JEWELERS AND WATCHMAKERS  
TO FORM NATIONAL INSTITUTE

(By Science Service)

Washington, October -- Organization of a Horological Institute of America will be accomplished at a conference of representative jewelers and watchmakers here called by the National Research Council for October 20 and 21. It is proposed that this institute grant graded certificates of proficiency in watchmaking and thus raise the standard and aid in the elimination of the shortage of expert watchmakers.

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DISCOVER LARGE COAL  
DEPOSITS IN LORRAINE

(By Science Service)

Washington, October -- Large deposits of coal have been discovered in Lorraine, according to information received here. These are near the Saar Basin and surveys show that they contain approximately 5,000,000,000 tons of coal, from which it is said that the French could extract about 10,000,000 tons a year. Stocks of coal in France at the end of July were estimated to be nearly 4,500,000 tons.

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(Editors: People are interested in science and they like to know where they can easily learn more about it. These 100 books for readability and authenticity make a list that your subscribers will clip and keep.)

ONE HUNDRED POPULAR  
BOOKS IN SCIENCE

(By Science Service)

The general reader interested in science is often puzzled to know what books to ask for at the local library. The most readable books are sometimes unreliable and the most authoritative books are often too technical.

The Washington Academy of Sciences at the request of Dr. George F. Bowerman, librarian of the Public Library of the District of Columbia, has compiled this tentative list of a hundred popular but authentic books in science. The author is given first, then title, and then the publisher.

Anthropology and physiology:

- MASON, O. T. The origins of invention. Walter Scott, London.  
MASON, O. T. Woman's share in primitive culture. Appleton.  
OSBORN, Henry Fairfield, Men of the Old Stone Age, their environment, life and art. Scribner's.  
HADDON, A. C. The study of man. Putnam's.  
KIDD, Dudley. Savage childhood, a study of Kafir children. Adam and Charles Black, London.  
HOUGH, Walter. The Hopi Indians. Torch Press, Cedar Rapids, Iowa.  
MCCOLLUM, E. V. The newer knowledge of nutrition. Macmillan.  
SHERMAN, H. C. Food Products. Macmillan.

Heredity:

- DARWIN, Charles. The origin of species. Appleton.  
EAST, E. M., and JONES, D. F. Inbreeding and outbreeding. Lippincott.  
CASTLE, W. E., COULTER, J. M., DAVENPORT, C. B., EAST, E. M., and TOWER, W. L. -- Heredity and eugenics. Chicago University Press.  
MORGAN, T. H. A critique of the theory of evolution. Princeton University Press.  
CONKLIN, E. G. Heredity and environment. Princeton University Press.  
GALTON, Francis. Hereditary genius. Appleton.  
POPENOE, Paul, and JOHNSON, R. H. Applied eugenics. Macmillan.

Life:

- THOMSON, John Arthur. The wonder of life. Melrose, Ltd., London.  
HEADLEY, F. W. Problems of evolution. Crowell and Co.  
LOTSY, J. P. Evolution by means of hybridization. M. Nijhoff, The Hague.



Zoology:

- BUCKLEY, A. B. Life and her children. Appleton.  
BUCKLEY, A. B. The winners in life's race. Appleton.

BOTANY:

- GANONG, W. F. The living plant: a description and interpretation of its functions and structure. Holt.  
OSTERHOUT, W. J. V. Experiments with plants. Macmillan.  
SORAUER, Paul. A popular treatise on the physiology of plants for the use of gardeners or for students of horticulture and agriculture. Longmans, Green & Co., London.

- LUEBOCK, John (Lord AVEBURY). Flowers, fruits and leaves. Macmillan.  
HARDY, Marcel E. The geography of plants. Clarendon Press, Oxford.

- DARWIN, Charles. Insectivorous plants. Appleton.

- TOWNSEND, C. W. Sand dunes and salt marshes.

ANIMALS, BIRDS, AND INSECTS:

- STONE, Witmer, and CRAM, W. E. American animals. A popular guide to the mammals of North America north of Mexico. Doubleday, Page and Co.

- ROOSEVELT, Theodore. African game trails. Scribner's.

- BEEBE, C. Jungle peace. Holt.

- CHAPMAN, Frank M. Camps and cruises of an ornithologist. Appleton.

- HERRICK, F. H. The home life of wild birds. Putnam's.

- FABRE, J. H. Social life in the insect world. Century.

- PECKHAM, S. W., and PECKHAM, E. G. Wasps, social and solitary. Houghton Mifflin.

- MAETERLINCK, Maurice. The life of the bee. Dodd, Mead and Co.

- DARWIN, Charles. The formation of vegetable mould through the action of worms. - Appleton.

- BLATCHLEY, W. S. Gleanings from nature. Nature Publishing Co., Indianapolis.

- ABBOTT, Charles C. Upland and meadow. Harper.

- MAYER, Alfred G. Sea-shore life. A. S. Barnes and Co., New York.

- LUCAS, F. A. Animals of the past. McClure, Phillips and Co., New York.

- HUTCHINSON, H. N. Extinct monsters and creatures of other days: a popular account of some of the larger forms of ancient animal life. Chapman and Hall, London.

GEOLOGY:

- DWERRYHOUSE, Arthur R. Geology. T. C. and E. C. Jack, London and Edinburgh.

- SEELY, H. G. The story of the Earth in past ages. Appleton.

- COLE, Grenville A. J. The changeful Earth. Macmillan and Co., Ltd., London.

- LULL, R. S., and others. The evolution of the Earth and its inhabitants. - Yale University Press.

- BALL, Robert S. Time and tide. Society for Promoting Christian Knowledge.

- SPURR, J. E., Editor. Political and commercial geology and the world's natural resources. McGraw-Hill Book Co.

- BRIGHAM, Albert P. Geographic influences in American History. Chautauqua Press, Chautauqua, New York.

- BONNEY, T. G. The work of rains and rivers. Cambridge University Press, England.

- CORNISH, Vaughan. Waves of the sea and other water waves. Open Court Publishing Co., Chicago.

- BONNEY, T. G. Volcanoes, their structure and significance. Putnam's.

- RUSSELL, Israel C. Volcanoes of North America. Macmillan.

Meteorology:

- HARRINGTON, Mark W. About the weather. Appleton.

- DICKSON, H. N. Climate and weather. Williams and Norgate, London.

- LEMPEERT, R. G. K. Weather science. T. C. and E. J. Jack, London.

- WARD, R. de C. Climate, considered especially in relation to Man. Putnam's.

- TALMAN, C. F. Realm of the air. P. F. Collier and Son.

- MURRAY, John. The ocean. Holt.

MINERALS:

- COLE, Grenville A. J. Rocks and their origins. Cambridge University Press, England.

- BENNETT, Lee F. Rocks and minerals. Bogarte Book Co., Valparaiso, Indiana.

- GRATACAP, Louis P. A popular guide to minerals. D. VanNostrand Co.



Astronomy:

- ABBOT, Charles G. The Sun. Appleton.  
BALL, Robert S. The story of the heavens. Cassell and Co., London.  
DYSON, F. W. Astronomy. Dutton.  
HALE, George E. The study of stellar evolution. University of Chicago Press.  
LEWIS, Isabel M. Splendors of the sky. Duffield and Co.  
MCKREADY, Kelvin. A beginner's star book. Putnam's.  
TURNER, H. H. A voyage through space. Society for Promoting Christian Knowledge.  
THE ADOLPHO STAHL LECTURES IN ASTRONOMY, Stanford University Press.

Chemistry:

- SLOSSON, E. E. Creative chemistry. Century.  
HENDRICK, Ellwood. Everyman's chemistry. Harper.  
DUNCAN, Robert Kennedy. The chemistry of commerce. Harper.  
MARTIN, Geoffrey. Modern chemistry and its wonders. Van Nostrand Co.

Physics:

- SODDY, Frederick. Matter and energy. Holt.  
TYNDALL, John. Fragments of science. Appleton.  
EINSTEIN, Albert. Relativity. Methuen, London.  
WHETHAM, W.C.D. The recent development of physical science. Blakiston's.  
AMES, Joseph S. The constitution of matter. Houghton, Mifflin and Co.  
FLEMING, J. A. Waves and ripples in water, air, and aether. Society for Promoting Christian Knowledge, London.  
PERRY, John. Spinning tops. Society for Promoting Christian Knowledge.  
MILLER, Dayton C. The science of musical sounds. Macmillan Co.  
BRAGG, William. The world of sound. Bell and Co., London.  
MICHELSON, A. A. Light waves and their uses. University of Chicago Press.  
ABNEY, W. de W. Colour measurement and mixture. Society for Promoting Christian Knowledge, London.  
BOYS, C. V. Soap bubbles: their colours and the forces which mould them. - Society for Promoting Christian Knowledge, London.  
SODDY, Frederick. The interpretation of radium. Putnam's.

MATHEMATICS:

- CONANT, Levi Leonard. The number concept, its origin and development. Macmillan.  
WHITEHEAD, A. N. Introduction to mathematics. Holt.  
YOUNG, John Wesley. Lectures on the fundamental concepts of algebra and geometry. Macmillan Co.  
SHAW, James Byrnie. Lectures on the philosophy of mathematics. Open Court Publishing Co., Chicago.  
DE MORGAN, Augustus. On the study and difficulties of mathematics. Open Court Publishing Co., Chicago.

History of Science:

- LIBBY, Walter. An introduction to the history of science. Houghton Mifflin Co.  
SEDGWICK, W. T., and TYLER, H. W. A short history of science. Macmillan.  
WHITE, Andrew D. A history of the warfare of science with theology in Christendom. Appleton.  
SMITH, David Eugene. Number stories of long ago. Ginn and Co.  
BERRY, Arthur. A short history of astronomy. Scribner's.  
THORPE, Edward. History of chemistry. Putnam's.  
GEIKIE, Archibald. The founders of geology. Macmillan.  
MERRILL, George P. Contributions to the history of American geology. Report of U. S. National Museum for 1904.  
LOCY, William A. Biology, and its makers. Holt.
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(Editors: These groups of "shorts" will make a daily feature, or they will come in handy as fillers.)

DO YOU KNOW THAT -

Large maps of the moon show more than 30,000 craters.

The total stress of the wires in a Steinway piano is equivalent to a weight of 72,000 pounds.

In a study of the smoke nuisance at Salt Lake City an aeroplane was used to collect samples of air at different levels.

The town of Butte, Montana, is a vast mining camp, combined with a modern city. The Butte district has produced more than a billion dollars' worth of metals; copper heading the list. This is the most productive metal-bearing area of its size in the world.

DO YOU KNOW THAT -

Certain minute crustacea sometimes gives sea water a blood-red color.

Gas that is practically incombustible is yielded by some of the wells drilled for natural gas in Oklahoma.

During the war several whales were bombed from the air by Allied aircraft under the supposition that they were German submarines.

One of the big expenses of a coal mine is the continual pumping of water to keep it dry. In the average anthracite mine 18 tons of water is hoisted from the mine for every ton of coal mined, and in some mines it runs up to 27 tons.

DO YOU KNOW THAT -

At the close of last year there were 271 air ports in the United States, not including landing fields available for emergency use only. Of this number, 145 were municipal ports.

Surnames are rare in Iceland, and such as exist are mostly of foreign origin.

The rings of Saturn consist of a swarm of meteors, which travel at different speeds around the planet according to their distance from the latter. The innermost particles perform their revolution in about 5 hours, while the outermost require 137 hours.

Ang-khak, or red rice, used in China for coloring food products, owes its color to a species of mold which is cultivated with the rice by special treatment. The red rice is reduced to a fine, soft, red powder before used.



DO YOU KNOW THAT -

The geophone, an instrument developed during the war for locating underground sounds, has been successfully applied to determining the location of leaks in water-mains.

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According to Archibald Little, monks constitute one-third of the total male population of Tibet.

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Young kangaroos, while living in the maternal pouch, do not suck milk from the mother's breast, but it is pumped down their throats by the action of the muscles of the mother.

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The time of the whole of the United States east of the Rockies is regulated by three standard clocks kept in an underground vault at the Naval Observatory in Washington. These clocks are wound by electricity, and their beats are transmitted electrically throughout the observatory; the vault is never entered except in cases of emergency.

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DO YOU KNOW THAT -

India produces nearly the entire world's supply of jute. Lack of cheap labor and of suitable machines for separating the fiber have prevented its successful cultivation in the United States.

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All the lakes in the world are estimated to contain only 2,000 cubic miles of water, as compared with 324,000,000 cubic miles of water in the oceans.

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Kites with thermometers attached were sent aloft to measure the temperature of the upper air by Dr. Alexander Wilson in 1749, three years before Benjamin Franklin's famous kite-flying experiment.

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Nowhere on dry land are there such vast flat plains as occur at the bottom of the oceans. The success of the submarine telegraphic cables is due in part to the flatness of the ocean bottom. Steep slopes are rare, and it is in such places that breaks in the scale usually occur.

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DO YOU KNOW THAT -

Throughout the world about 4,000 earthquakes strong enough to be perceptible to the human senses occur annually on an average.

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The fall of temperature in 24 hours constituting a "cold wave" is variously defined by the Weather Bureau, according to the part of the country affected and the season of the year.

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The German wireless station at Nauzen sends out news of important astronomical events, such as the discovery of comets, new stars, etc., for the benefit of observatories within range of transmission.

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The adoption of the goldenrod as the national flower of this country has been opposed on the ground that the pollen of this plant is a cause of hay-fever, and hence nothing ought to be done to encourage its prevalence. Medical experts, however, say "Not guilty."

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