

THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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ASTRONOMERS FIND ANOTHER UNIVERSE

The most distant object seen by man, another universe of stars, has been discovered and measured. Photographs made at the Harvard Observatory show that a faint and nameless luminous haze in the sky in the constellation of Sagittarius, the Archer, is another universe like ours, although perhaps smaller.

It takes light a million years to travel from the new universe to earth, Dr. Harlow Shapley, director of the Harvard Observatory, estimates from his photographs. So far as is known this is the most distant object ever seen by the eye of man. The most distant stars and clusters or nebulae in the universe known prior to this measurement are only about 250,000 light years away. The new universe is six quintillion miles away.

This object, known to astronomers only by its number in star catalogs, N.G.C. 6822, was first observed many years ago by the late Dr. E. E. Barnard, but only recently have pictures been made of it by the 100 inch reflecting telescope at Mt. Wilson, the largest in the world, and it is these photographs which have made possible the identification of this cloud of stars as a universe like our own. It is similar, these pictures show, as do others taken by Dr. Perrine of the Cordoba Observatory in the Argentine, to the Magellanic Clouds, faint patches of light in the sky of the Southern Hemisphere, first seen by Magellan and now recognized as great stellar systems distinct from the Milky Way and our own stellar system although much smaller than it.

The study of the photographs made at the Harvard Observatory shows that N.G.C. 6822 covers an area in the sky less than one thousandth that covered by the large Magellanic Cloud. But this difference in size, as well as the extreme faintness of N.G.C. 6822, can be accounted for by its much greater distance in space. The photographs show that its most brilliant stars are little, if any, brighter than magnitude eighteen. It is only because thousands of stars are packed closely together that the object could be seen faintly in Barnard's telescope.

The angular dimensions and the brightness of some of the nebulae that belong to the new cloud have been estimated on the Harvard photographs and compared with similar objects in the Magellanic Clouds. Estimates of the distance of N.G.C. 6822 will be made more accurately when the variable stars found at Mt. Wilson have been thoroughly studied.

But as the matter now stands, this faint glowing haze, not to be seen with the unaided eye, hardly a pin-head of light in a telescope of moderate power,

is now known to be far beyond the limits of our own universe of stars, or as astronomers call it, "our galactic system", from the fact that it is bounded by the Milky Way or Galaxy. The greatest estimate of the diameter of our universe is 350,000 light years, and N.G.C. 6822, the farthest outpost of infinity captured by the mind of man, is three times as far away.

The constellation Sagittarius, in which it is found, is now too near the sun to be visible. It can be seen during the summer, the constellation being the next to the east of Scorpio, the familiar "kite" of the southern sky in summer and containing the great red star, Antares.

READING REFERENCE - Gregory, Sir Richard. The Vault of Heaven; An Introduction to Modern Astronomy. New York, E. P. Dutton & Co., 1923.

Hale, George E. The New Heavens. New York, Charles Scribner's Sons, 1922.

SCIENCE SAVES YEARS FOR ROSE GROWERS

How to make rose seeds germinate promptly and all at once, a problem that has vexed rose growers for years, has been solved by Dr. William Crocker, director of the Boyce Thompson Institute for Plant Research at Yonkers.

Roses are ordinarily grown from cuttings, but in the case of new hybrid species and varieties the first growing must be from seed. The crossing of species to make new forms is done by transferring by hand the pollen from the anthers of one flower to the pistil of another of a different kind. It is a sort of international marriage arranged by the guardians of the contracting parties. When the pistil develops and produces its seeds, they must be planted to bring forth new rose bushes, bearing flowers which the breeders hope will be more attractive, more hardy or in some way more desirable than those which the parents would bear in the ordinary course of nature.

Under usual conditions from five to seven years must pass before all of the seeds produced by a single personally arranged marriage will germinate. Nature has had good reason for managing the germination of seeds in this way. From her point of view, with all the time in the world before her, it is a good thing to have the seeds of a given plant germinate at intervals over a space of years. No sudden catastrophe or set of unusual weather conditions can then wipe out the plants of a species in a given locality. There is always a reserve supply of seeds in the ground ready to germinate year after year, and steadily renew the species no matter what may happen to the growing plants.

That is all very well for Nature, but it does not suit man. He must get quick results. The rose breeder cannot wait five years for all the seeds resulting from his experiment in eugenics to tell their story. The growers, the florists and the lovers and debutantes eager for something new in roses are impatient. If only all the seeds from a single crossing could be made to grow within a season all would be well.

Dr. Crocker, and the scientists working in collaboration with him, have

found the way. They tell the rose breeder that if he will keep his rose seeds at a constant temperature of 10 degrees Fahrenheit, just eight degrees above freezing, all of the seeds will germinate before five months have passed. They will begin to grow in eighty days and all will have made their start within one hundred and forty.

READING REFERENCE - Ganong, W. F. The Living Plant; a description and interpretation of its functions and structure. New York, Henry Holt & Co., 1913.

RADIUM INJECTED IN BLOOD LOCATES CANCERS

By the use of radium emanation added to blood serum, Drs. A. Kotzareff and L. Weyl of Paris have been able to obtain photographs of cancers inside the body, the Paris representative of the American Medical Association reports. If confirmed, this new method gives promise of having far reaching effects on the clinical detection and treatment of cancer and other new growths, officials said today.

The new method involves withdrawing from the body a certain amount of blood. From this blood, the serum is obtained. To this blood serum, a definite dosage of radium emanation is added. The radium treated blood-serum is then injected into the body. The radium emanations tend to locate in the most rapidly growing tissues, such as tumors of a malignant character like cancer. When a photograph of the body is made, the presence of the radium emanation manifests itself on the photographic plate.

When this method was applied to a pregnant guinea pig, it was found that after a certain period of time the radium emanations located in the embryo and disappeared from the remaining tissue. In the same way, it was found the emanations tend to locate in cancer and other rapidly growing tissues.

Medical men here are awaiting the results of using this new method in a sufficiently large number of verified human cancers to confirm the favorable experiments on animals.

TEMPORARY LIGHTS TO AID WINTER MANEUVERS

As a safeguard for the fleet during the coming winter maneuvers in the Caribbean Sea, many temporary lighthouses and beacons will be established. The Bureau of Lighthouses is undertaking the work, the location of the lights and other aids to navigation having previously been determined by the Navy department, which will loan necessary material and furnish its transport. The fleet requires more aids to navigation than the vessels which usually navigate these waters, because the extensive operations of the hundreds of vessels of all types which compose it will take them into places not ordinarily visited by commercial shipping.

GOD WROTE "BOOK OF ROCKS" DECLARES NOTED SCIENTIST

Deploring all attempts from whatever source to separate science and religion, Dr. John C. Merriam, president of the Carnegie Institution of Washington, said in an address recently delivered at Washington, on "Foot-prints on the Path of Creation", that just as we read that the tables of stone given to Moses on Mount Sinai were received from the hand of God, so we have in the record of the rocks evidence concerning the history of the world prepared by the hand of the Creator and spread before us for our intelligent inspection and interpretation.

Giving a brief account of the nature of the evidence found in the "Book of the Rocks", Dr. Merriam said:

"There is in it much that is in doubt, much that is controversial; but there is much that is not controversial, that is just as close to certainty as anything in the realm of knowledge. This evidence shows that life does not remain the same. There has been continuous change and these changes have been in the direction of complication of organization, better comprehension of environment, with more highly developed nervous systems and with continually increasing intelligence."

The mid-Victorian craze for "brown-stone fronts" was largely responsible for the development of geological knowledge during the middle of the last century, Dr. Merriam said. In the rocks composing the "brown-stone" of commerce, many fossils were found and as the rock was quarried away more and more interesting discoveries were made.

Of the records of the rocks, Dr. Merriam said:

"This message means not merely a science of description but a philosophy of interpretation as well. From what does this life series come? We can only call upon a power above our comprehension to explain its origin. To what does it lead? To something better. The elements of this story are interlocked with the fundamentals of our poetry and religion so closely that these elements may not be separated; whoever attempts to pull apart science, philosophy, poetry, religion, separates the Creator from the evidences of His works and from the means available to man for their logical expression.

"So when I see the foot-prints on the trail of creation, there cannot fail to come also a vision of the long procession winding up the way through ages past and on into the future, bearing the unquenched torch of life. Those who view it have always that renewed courage and hope which arise from the evidence of progress in the panorama below, and they are stirred to the further joy of striving upward by the glory of the peaks that rise beyond. "

READING REFERENCE - White, Andrew D. A History of the Warfare of Science with Theology in Christendom. New York, D. Appleton & Co., 1896.

Lull, R. S. The Evolution of the Earth and its Inhabitants. New Haven, Yale University Press, 1918.

SCIENTIST TRANSPLANTS HEADS OF INSECTS

The expression "he has an old head on his shoulders" may acquire literal significance if the experiments recently carried out by an Austrian scientist upon insects can ever be duplicated with men. For Dr. Walter Finkler of Vienna has transplanted the heads of insects from one individual to another and the bug with the new head-piece has survived the operation. Individuality goes with the head, Dr. Finkler says.

He began his experiments with water bugs, swimming bugs, meal worms, and butterflies of the orders *Vanessa Io* and *Vanessa Urticae*. He performs the operation under an anesthetic, pulling the heads from their sockets, cutting them off with a scissors and then putting them on the neck of a similarly treated insect. Special fastenings are needless as the small amount of blood from the wound glues the head to the neck. The insects are then put into glass tubes which hold them in a fixed position until the new head is held firmly in place by new tissues. Coordinated motions return in two or three weeks and after one or two months regular functions are restored.

The results of experiments on water bugs seemed to show that sex resides in the head rather than in any organs of special function, Dr. Finkler said. He put the heads of female bugs on the bodies of male ones and vice-versa. Bugs with male bodies but female heads showed no interest in females, while one with a male head and female body showed pronounced attraction to the females.

The change of the head of butterflies seemed to change the color of their wings. Some of them did not alter at first, but did so after exposure to the direct rays of the sun, although this change in color did not occur if the eyes were first destroyed.

TO RID BRITISH EMPIRE OF LEPROSY IN 30 YEARS

The complete extirpation of leprosy in the British Empire within 30 years has been announced as the ultimate aim of the British Empire Relief Association. It is stated that there are 300,000 lepers in the empire and that while many relief organizations are at work they can reach but a small proportion of the victims.

The work of the Association in supplementing and extending these efforts will take varied forms, and it is estimated that a fund of 250,000 pounds will be needed. Through the work of Sir Leonard Rogers and others it has been demonstrated that leprosy is curable and the ridding of all British dominions of this scourge within 30 years is considered entirely practicable.

Statisticians estimate that the world uses about 4,675,650,000,000 matches a year, or an average of 7 matches a day for each individual the world over.

POTATO BEETLE INVADES EUROPE

The Colorado Potato Beetle, otherwise and more familiarly known to farmers as the potato bug, has followed in the footsteps of the A. E. F., and established himself in Europe. But, unlike the doughboys, the potato bugs have no return tickets. So firmly are they settled in France that French entomologists despair of exterminating them. "They shall not pass" might stop the Kaiser's army, but no such slogan worried the fighting Yankee bug who, arriving in France sometime during the war, proceeded, figuratively speaking, to "cut himself a piece of cake and make himself at home".

The invasion is looked on with dismay by European farmers. Potatoes form a large part of the diet of the average North European, and as historians well know, it was the abundant potato crops of the war years that helped Germany to hold out so long. Quarantines have been established against France by England and other countries in an effort to keep out the invader, and the Germans are especially on guard against this onslaught on their favorite vegetable.

But the busy bug, which has in the space of fifty years crossed the most of the North American continent and the Atlantic ocean, is hardly to be held at the Rhine. During the war it was seriously proposed by American entomologists to drop potato bugs from airplanes over the fertile fields of the Fatherland, but the project never came to fruition. Now the bugs have taken the matter into their own hands and having been colonized in France through the great volume of wartime shipments of all sorts, they are already chanting their slogan of "On to Berlin".

But if they cross the Rhine they are not likely to stop at Berlin or anywhere else, but to spread generally throughout Europe and Asia, adding another powerful hazard to the risks run by European farmers and giving another illustration of the way commerce has of not only ministering to the needs of man, but also of being of service to his enemies. The gypsy moth, the white pine blister rust, and the corn borer have been brought to America from Europe, and now the potato bug has travelled back along the ways of trade to return with interest the damage caused his native land by his distant cousins of the insect world.

READING REFERENCE - Caldwell, Otis W. and Slosson, Edwin E. Science Remaking the World, Chapter on "Our Fight Against Insects" by L. O. Howard. New York, Doubleday, Page and Company, 1923.

PUCKERLESS PERSIMMONS

Persimmons are scheduled for a rise in popularity. At last, a persimmon has been found which will not pucker the mouth no matter how green it is when eaten. It is the Fuyu persimmon which the U. S. Department of Agriculture has introduced from Japan and predicts will become one of our leading varieties. The Fuyu has a beautiful golden orange color, is ideal for shipping, and what is more to the taste, is never astringent and can be eaten with enjoyment even when still hard.

CAUSE OF MOSAIC PLANT DISEASE MAY BE FOUND

A discovery which may lead to that of the cause and remedy of the mosaic disease of tomatoes has been announced by W. F. Bewley at the Experimental and Research Station at Cheshunt, England. Microscopic "organisms" have for the first time been isolated from cultures of the virus of the disease.

These bodies are about one twenty-five-thousandth of an inch in diameter and are found firmly affixed to the glass of the culture tubes or on the surface of gelatine cultures. They are brittle and of a granular structure, the granules consisting of definitely organized bodies growing in colony formation. The experiments, which are still continuing, indicate that there may be a causal relation between these bodies and mosaic disease.

This disease, which is thought to be practically the same in tomatoes, potatoes, and other plants subjected to it, causes a vast amount of economic loss, and scientists have been busily engaged in trying to find its cause and remedy. The experiments at Cheshunt are thought to indicate the most promising lead that has yet been found.

LOCOMOTIVE ENGINEERS LIVE LONG

In spite of the risks incident to their occupation, life insurance statistics show that locomotive engineers live just as long as the average man. The death rate from accident has decreased very greatly in recent years, and the engineers have also shared in the general reduction in the death rates from infectious disease. Between the ages of 31 and 55 there has been a decline in the engineers' death rate of from 32 to 44 per cent. Fatal accidents in 1922 were at the rate of 167 per 100,000 as against 318 per 100,000 in 1912. So the expectation of life of a locomotive engineer at the age of 28 is calculated as 41 years, as compared with the average man's expectation at the same age of 40 years. Aside from chances of accident, running a locomotive seems to be a healthful occupation.

HIGH PRESSURE BOILERS

Modern engineering practice is making use of pressures in steam boilers that would have been considered out of the question not many years ago. From Berlin comes news of a German boiler designed to generate 15,500 lb. of steam per hour at a pressure of 850 lb. gage. The General Electric Co., has under construction one 2,600 kilowatt and one 4,000 kilowatt turbine designed for a steam pressure of 1,000 to 1,200 pounds, and to exhaust into other turbines at from 250 to 350 lbs. A Swedish boiler operating at 900 lbs., has been in successful use for about two years.

During the past ten years more than 100,000,000 incandescent lamps have been exported from the United States to countries in every part of the globe.

A LARGE APPETITE

Porpoises live on fish and from recent examinations of the stomachs of the porpoises it takes many fish to keep them from having that hollow feeling. A clue to the number of fish on the dietary list of an active porpoise may be had from the number of otoliths or ear bones of fish found in the stomach of the sea mammal. One porpoise has yielded enough of these to account for the consumption of 7596 fish, and since these otoliths are thought to be dissolved in the stomach in a period of no great length, the fish eating proclivities of the porpoise may be estimated.

CHANCES OF CANCER INCREASE MANY FOLD

While the risk of dying from cancer has increased from 40 to nearly 60 per cent. at varying ages for men, and from 18 to nearly 70 per cent. for women during the past ten years, as shown by tables prepared by the Metropolitan Life Insurance company, this increased risk is largely ascribed to the increased number of persons surviving to the ages at which cancer is most prevalent.

The tables show the chance of eventual death in later years from cancer among males increases from 7 in 100 at the age of five years to more than 8 in 100 at 50 years, after which the probability of death from this cause declines in old age to less than the chances in infancy. The chances among females are greater than among men at all ages, ranging from 10 in 100 in infancy to more than 11 at from 35 to 45 years. These tables do not mean that persons are exposed to that degree of risk at those ages, but that of all persons of that sex alive at that age, a certain stated proportion will eventually die of cancer, if the present mortality rates are maintained.

SULPHUR SPRING IN OCEAN SURVEYED BY U.S. EXPERTS

Bubbling up out of the ocean from a depth of 125 feet, a big spring of fresh sulphur water, two miles off the coast of Florida and eight miles south of St. Augustine was recently surveyed by experts of the U.S. Coast and Geodetic Survey. Long known to local residents and marked on charts, the spring has been the source of speculation for years.

A short time ago the government scientists anchored directly over the troubled waters of the sea spring and proceeded to investigate it. The water sampled was about the same temperature as the surrounding Atlantic but the tremendous size and force of its geyser-like upwelling was plainly apparent at the surface. The ocean floor surrounding the spring is only about fifty-five feet deep, but the spring rises from a depression which measures over 125 feet deep.

A strong odor of sulphur pervades the atmosphere around the spring and the force of the water was such that it was only with difficulty that the ship was prevented from being pushed away by the bubbling waters. Samples of the waters at various depths were secured and forwarded to the U.S. Bureau of Chemistry for analysis.

GOING, GOING, GOING, ONE DINOSAUR EGG

"What am I bid for one inosaur egg, guaranteed ten million years old?"

The auctioneer is Dr. Roy Chapman Andrews, leader of the Third Asiatic Expedition of the American Museum of Natural History. He has announced that the Museum would sell one dinosaur egg at mail auction. Bidding will start at \$5,000.

Only one outside museum is now in the running, but the contest will not close for at least a month.

The object of the sale, Dr. Andrews explained, is to finance further Asiatic explorations by the Museum.

A nest of dinosaur eggs, the first ever unearthed, was discovered by Dr. Andrews during last summer's explorations. Next summer his expedition hopes to find the remains of the ancestors of early man.

SCIENCE CONFIRMS INDIAN TRADITION

An ancient Indian tradition handed down for centuries has been confirmed by John P. Harrington of the Smithsonian Institution, as the result of archaeological explorations near Humboldt Lake, Nevada. He had heard from an old Payute chief a story of how his people, centuries ago, had driven the Saitekare tribe into a cave near the lake and then exterminated them all without mercy. Inquiry revealed the existence in the cave of quantities of bones and objects of Indian manufacture, showing that the tribe had died fighting with their belongings piled about them.

Commenting on this find and on the work of American anthropologists in establishing the unity of prehistoric human life on the American continent, Mr. Harrington says:

"The greatest triumphs of the last decades of anthropological research in this country have been the dissipating, one by one, of the earlier beliefs and theories regarding the existence of races which preceded the Indians and were distinct from them, and the slow accumulation of an overwhelming mass of evidence that all the remains of man on the American continent are Indian in origin. The Indians are a single people, an offshoot of the Mongoloid race, which held those parts of the Old World adjacent to the great island of America.

"The race of Mound Builders, accepted by our early scientists, has proved to be a phantom. James Mooney, ethnologist of the Smithsonian Institution, in 1886 and subsequently visited the primitive Eastern Cherokees who remained in their native habitat in the Southern Alleghany after the main body of the tribe had been transplanted to the Indian territory in Oklahoma. He found aged individuals who retained a knowledge of the mounds, and supplied him with elaborate details as to the method of their construction. The mounds of that region were erected by the ancestors of the Cherokees because it was the custom to do so. The mounds were used as vantage eminences for villages and for burial of the dead.

"Similarly, the spectre of the Toltecs and Mayas as a distinct people from the modern Indian, and again as having a distinct civilization severed from that of existing tribes in Mexico and Central America and related to the Egyptians or Assyrians, has been shattered by the scrutiny of recent years. Intensive work among the remaining fragments of people in that region reveals that the builders of the temples and the priests who prepared the marvelous codices and inscriptions, which offer such contrast to the dismal jungles in which they are found, were nothing more than the ancestors of the present day peons, and not so very far back either.

"In the Southwest, the great desert region of New Mexico, Arizona, Colorado, Utah and Nevada, a similar problem to that of the Mound Builder and Mexican regions, today awaits solution. The treasures of the cliff habitations, where in many cases even the houses and their furnishings are extant, remain to be connected definitely with this or that present-day Indian tribe.

"In view of the fact that these western relics, although certainly Indian, have proved so difficult to tie with definite modern tribes, the recent discovery of the material remains of the Saitekare in the very cave where Payute tradition said they fled, at the eastern end of Humboldt lake, Nevada, is gratifying."

TABLOID BOOK REVIEW

HEALTH AND HEALTH PRACTICES, by Belva Cuzzort and John W. Trask: D.G. Heath & Company, New York, 1923, 80¢

A health manual for use with children or in graded schools which has as its purpose the transmission of health information through actual exercises and examples.

 CANAL TRAFFIC LIMITS SET BY WATER SUPPLY

One quarter of the water of Gatun Lake which supplies the Panama Canal is used up during the dry season, in the operation of the great locks or lost through evaporation, Secretary Weeks of the War Department said in a radio talk recently. Traffic during the dry season would be limited under present conditions to about 50 vessels a day, because there would not be enough water in the lake to lock any more vessels through, he declared.

Approximately eleven vessels pass through the canal each day. The number in any one day having been 38. Fifty vessels one day but it is considered improbable that this number would occur every day for all days in the year, since further than half of the population of the lake would decrease the depth of water in the canal.

Secretary Weeks said that when the time came to test will not react properly the canal the additional supply could be financed. Scarlet fever patients and this fever, similar to the anti-toxins from the increased traffic. ceases.

 Hexamethylenetriperoxidamine has been used in the treatment of scarlet fever has also determine its detonating value. It is an explosive used by the U.S. Army and Dr. Francis G. with the hemolytic streptococcus armor-piercing shells.
