PHYSICS

New Electron Tube Makes Magnetism Visible

See Front Cover

➤ A PHOTOGRAPH of the paths taken by magnetic lines of force with the aid of a new electron tube developed by Prof. Samuel G. Lutz and S. J. Tetenbaum, a graduate student, at the New York University College of Engineering, is shown on the cover of this week's SCIENCE NEWS LETTER.

When electricity is sent through the tube, technically called a mercury vapor diode with a perforated anode, a ball-shaped bluish glow is visible. When the lighted tube is brought near a magnet the glow changes into a spiral and finally into a group of intense blue lines of illumination, curved or straight, to conform with the magnetic field.

Dr. Lutz said that the new tube will be useful as a demonstration device and as a means for observing unusual magnetic fields. The photographic technique employed is not difficult, involving a series of exposures made in a darkened room on one film. The tube is held in a number of positions for a set length of time in order to record the shape of the field being investigated. When the film is developed, these successive exposures appear superimposed as distinct white lines.

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CHEMISTRY

Steam Rather than Steel Makes Safe Fire Resistant

➤ STEAM, not steel, makes an approved safe fire resistant.

Edwin H. Mosler, Jr., of the Mosler Safe Company in Hamilton, Ohio, explains that vaporizing of moisture in chemically combined form in the insulation actually does the trick. During a fire, the moisture becomes steam at 212 degrees Fahrenheit. Great amounts of heat are dissipated in the transformation, thus keeping the inside safe temperature well below the danger point of 350 degrees Fahrenheit at which paper and records are likely to begin igniting.

Fusible plugs in the outside plate melt at a low temperature to provide minute vents through which the steam harmlessly escapes.

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NUTRITION

B Vitamins Now Number 12 Or More; Food Best Source

➤ AT LEAST a dozen different B vitamins exist. Ten of them can be obtained in pure crystalline form. But there are probably more B vitamins awaiting discovery.

The 10 that have been obtained in pure form, as summarized by Dr. C. A. Elvehjem of the University of Wisconsin in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 27) are: thiamine, riboflavin, nicotinic acid (niacin), vitamin B_6, pantothenic acid, choline, biotin, inositol, para-aminobenzoic acid, and folic acid.

"The common foods still remain the best source of these vitamins in practical nutrition," Dr. Elvehjem states.

One reason is that foods supply all the unknown ones along with the known ones.

The B vitamins occur in different proportions in different foods, and also in different commercial vitamin concentrates. Oatmeal, for example, contains more than twice the amount of thiamin that liver does, but only one-twentieth the amount of riboflavin that is in liver.

Commercial concentrates are valuable for treating specific deficiencies of one or another of the B vitamins. But unless properly used, they give no greater security of supplying all the B vitamins one needs than the proper combination of natural foods.

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BIOCHEMISTRY

New Insecticide Can Cause Hereditary Plant Changes

➤ GAMMEXANE, or 666, the new and highly potent insecticide, is capable of causing the plants it protects to produce changeling offspring unless another chemical is used along with it to prevent this undesirable action. At certain concentrations its effects are like those of colchicine, checking cell division in mid-career and thus artificially doubling the number of chromosomes. This results in sudden hereditary changes, often causing the production of giants in following generations—and giants are not always desired by plant growers and breeders.

Another effect, more immediate, is the growth of tumors and other deformities in the immediate generation on which it is used.

Discovery of a compound that will neutralize this effect of Gammexane is announced in the journal, SCIENCE (Nov. 19), by a three-man research team who have been working on the problem at Columbia University and the U. S. Department of Agriculture's experiment station at Beltsville, Md. The compound is a member of the vitamin B group, known technically as meso-inositol. It is found in both animal and plant tissues, and its tumor-preventing properties were already known.

The research team consists of Drs. Erwin Chargaff, Robert N. Stewart and Boris Magasanik.

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IN SCIEN

DENDROLOGY

Scattered Tree Cousins Once Lived Close Together

➤ FOUR RELATED kinds of trees that are now widely scattered strangers, though all of them are members of the same plant family, grew as near neighbors a few tens of millions of years ago, Dr. Ralph W. Chaney of the University of California told the National Academy of Sciences meeting in Berkeley, Calif.

The trees in question are the bald cypress of our southeastern states, the sequoias of California, the China cypress or glyptostrobus of southern China, and the recently discovered "dawn redwood" of interior China. The two Chinese genera are now the nearest neighbors, and even they are separated by hundreds of miles.

Yet in Miocene geologic time, some 20,000,000 years ago, all four genera grew in a limited area in interior Oregon. They had got there from their points of origin in Alaska and elsewhere in the Far North, taking about 20,000,000 years for the trip. Now their fossil remains are all found together within a 60-mile distance, in a geologist's paradise known as the John Day Basin.

Though their fossils are found in this basin, the trees themselves have long since disappeared from it, and their present widely separated habitats differ sharply from each other in both topography and climate.

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GEOLOGY-PALEONTOLOGY

Millions of Years Added To Rocks by Shark Spines

➤ ANCIENT shark spines, discovered in South America by a University of Cincinnati scientist, have set back the age of some rock formations by at least 100,000,000 years.

Dr. Kenneth E. Caster, paleontologist, just returned from an exchange professorship at Sao Paulo, Brazil, explained that the shark spines and associated fossils were the first of their type ever to be found in Devonian rocks of the Paleozoic age. Rock formations thought to be 200,000,000 to 250,000,000 years old are now believed to be 350,000,000 to 400,000,000 years old, because of the new discoveries.

First fossils of giant sea scorpions ever found in the southern hemisphere were also identified by Dr. Caster. The scorpion remains occur in great abundance in the Brazilian state, Piaui, but they had been previously identified as plant fossils, the scientist said.

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CE FIELDS

ACOUSTICS

You Can "Get Het Up" If Noises Become too Noisy

➤ THERE IS DANGER in a very intensely noisy world of temporary loss of hearing, getting hot due to sound absorption and even interference with moving of muscles properly.

Two Air Force scientists told the Acoustical Society of America in Cleveland how jet engines roaring in confined space and powerful sirens produce physiological effects in human beings and animals. Temporary hearing losses of as much as 70 decibels (about enough to make it difficult to hear ordinary street noise) were recorded immediately following exposure of men to the siren sound, even when conventional ear defenders were worn.

Rats and guinea pigs exposed were found to convert to heat enough sound energy to raise their body temperatures 20 to 30 degrees Fahrenheit and produce death in as little time as 10 minutes. The scientists found that a lethal sound field might be only one to three decibels more intense than one which will not kill.

The researches were done by Lieut. Donald H. Eldredge and Dr. Horace O. Parrack of the Biophysics Branch, Aero Medical Laboratory, Air Materiel Command, Wright Field, Dayton, Ohio.

Fur increases the absorption of sound as the frequency increases, that is, the sound gets shriller. Dr. H. E. von Gierke of the same laboratory reported that shaved skin absorbed less and less sound energy as the frequency increased above a thousand cycles per second, whereas furred skin absorbed more and more.

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ENGINEERING

Gas Produced Economically From Oil by New Process

➤ HOUSEHOLD GAS from low-cost oil can be made by a new economical process, it was revealed in New York by the American Gas Association. The process utilizes troublesome coke deposits in present methods as fuel for heat to gasify heavy oil.

Present oil gas processes are unable to use the cheaper, heavier oils successfully because their large carbon content forms excessive quantities of petroleum coke within the gas generator. This makes it necessary to remove the generator from service from time to time so that the equipment can be purged with air currents to burn out the coke.

In the new process, an invention by Edwin L. Hall, director of the American Gas Association laboratories at Cleveland, Ohio, the coke deposit is burned off during the gas-making period and supplies a good portion of the heat necessary for gasifying the heavy oil without requiring any additional time.

The process, tested for a year in a commercial installation, makes possible a reduction of 30% or more in the cost of gas-making materials, the association states, and an increase of about 35% in thermal capacity of existing gas-making apparatus.

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NUTRITION

High School Boys Eat Better than Girls

➤ HIGH SCHOOL boys are better eaters than girls, not only in quantity but in quality, Dr. Frederick J. Stare of Harvard found in a survey of New York State school children. And the grade school youngsters know their vitamins better, as shown by what they eat, than their older brothers and sisters. City children fared better than rural children, those in academic schools ate better, nutritionally speaking, than those in vocational schools, and, as might be expected, children of parents at higher income levels had better diets than those whose parents were not so well off. Dr. Stare's findings were presented to the American School Health Association meeting in Boston.

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AERONAUTICS

Altitude Record Set by Signal Corps Balloon

➤ A NEW balloon altitude record of 140,000 feet was established recently in weather forecasting and rocket launching experiments at the Evans Signal Laboratory, Belmar, N. J.

Lt. Col. A. F. Cassevant, Evans Signal Laboratory director, who announced that the record was set on Sept. 28, pointed out that the greatest height ever attained by a balloon carrying human beings was 72,395 feet. That was accomplished in 1935 by Captains Albert W. Stevens and Orvil A. Anderson. The balloon that rose 140,000 feet carried only meteorological instruments.

The record-breaking balloon is made of neoprene latex and is approximately 17 feet in diameter at the time of release. It is only partially inflated when it leaves the ground and first becomes spherical at an altitude of about 35,000 feet.

The balloon expands as it continues its ascent, reaching a maximum diameter of approximately 75 feet, when it bursts.

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ARCHAELOGY-GEOLOGY

Discover Stone Age Tools On Former African Beaches

➤ EARLY Stone Age tools, used by prehistoric man, have been found at the former sites of beaches in Mozambique, Portuguese East Africa, indicating that the ocean may have receded 40 to 50 miles and dropped its level by 150 feet since Stone Age man first inhabited the continent.

Discovery of this geographical change was made recently by a group of University of California African Expedition scientists, including Prof. Gelal Awad of Farouk University, Alexandria, Egypt, and Dr. H. B. S. Cooke, South African geologist. The group was invited to Mozambique by the Portuguese government.

Expedition scientists, under the direction of Wendell Phillips, also found a number of new types of fossil marine shells, some of them laid down on the beds of dried-up seas for as long as 80,000,000 years.

Importance of the discovery of sea level changes in the area is that it will yield valuable geographical information for future studies of the relation between man and his physical environment on this part of the continent.

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AERONAUTICS

Berlin Airlift Will Be Aided by Krypton Lights

➤ THE BERLIN airlift, bringing food to the city's population, will soon be aided by krypton gas approach lights at seven airports, it was revealed by Westinghouse, developer of this type of light which is visible through a thousand feet of dense fog.

A six-light system will be installed at each of these seven landing fields, which include the Berlin Tempelhof Airdrome. The first two sets of six lights each will be delivered to the Air Force within 60 days.

Each of the new lights, containing the rare gas krypton found in the atmosphere, will have a brilliance of more than 3,000,000,000 beam candlepower. The six lights in each system will flash one after another in the wink of an eye and appear to a pilot as a flash of lightning. This European installation is intended primarily to help pilots locate the landing fields in spite of bad weather.

Westinghouse krypton lights were given their first airport test on a Cleveland field. The first commercial installation is the system at New York's new International Airport. A system including 35 of these krypton lights is already undergoing testing at the Landing Aids Experiment Station, Arcata, Calif., said to be the foggiest spot in the nation.

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