

## PHYSICS

**2,000 Volts to Produce Million Volt Ions**

**A** NEW method of producing million volt ions, of the same immense speeds as found in radium alpha-rays has been devised by Drs. E. O. Lawrence and M. S. Livingston at the University of California, and announced by them to the meeting of the American Physical Society in Washington last week.

The high speed hydrogen particles are produced without the use of high voltages such as have previously been necessary in making artificial radium radiations. An ingenious method of multiplying the voltage has produced 80,000 volt hydrogen molecule ions in these experiments although only 2,000 volt oscillations were employed.

The charged hydrogen atoms spiral around inside two hollow semi-circular plates in a vacuum. Great magnets placed outside the plates cause the particles to follow the curved paths, and the particles resonate in tune with the oscillations of the applied voltage.

Each time the particles pass from the interior of one plate to that of the other they gain energy by the same constant amount determined by the voltage applied. At each revolution then the speed is increased.

Dr. Lawrence stated that there are no difficulties in the way of producing one million volt particles in this manner. A larger magnet is at present under construction at the University of California for this purpose.

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## PHYSICS

**Physicists Learn to Focus Stream of Electrons**

**H**OW TO FOCUS streams of electrons as though they were rays of light was told the National Academy of Sciences last week by Dr. C. J. Davisson and C. J. Calbick of the Bell Telephone Laboratories.

The infinitesimal bits of electricity, which with their opposite twins, the protons, are the building blocks of all matter, are shot out in straight lines from hot wires and similar objects, and streams of them are very useful laboratory weapons in unlocking the secrets of the atom. But hitherto they have insisted in traveling in straight lines. The most they would do was bend aside a little when exposed to an electrical

field. They could not be focussed and brought to a point, like light passing through a lens.

Dr. Davisson and Mr. Calbick enclosed an electron-radiating wire in a cylinder, electrically charged. In the wall of the cylinder was an opening. Electron streams that came through this opening were spread outward, like light passing through a concave lens. They were "negatively focussed"; the beam was made wider.

But for most experimental purposes one wants a narrower rather than a wider beam or ray. The focus must be brought to a point. To accomplish this, the two physicists enclosed the first cylinder inside a second, with a higher electrical charge. This caused the fan-shaped electron stream to close up again, getting narrow and coming to a point wherever the experimenters desired.

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## ARCHAEOLOGY

**New Kind of Old Art Found in European Church**

**S**OMETHING new under the sun, something a thousand years old, is the picture of a saint wrought in colored marble inlay which has been unearthed in the church of St. Mary the Immaculate in Istanbul, by the Turkish National Museum.

The technique of this tenth century icon is pronounced heretofore unknown to modern science. The icon is a full-length portrait of St. Eudokia, about two feet tall. The entire picture is made of small pieces of colored marble fitted into place against a background of white marble. The face and hands are pink, with features marked in. The long dress is purple and green, elaborately trimmed in designs of bright colors, all worked out in the marble mosaic. A halo back of the saint's head is yellow.

The church in which this Byzantine icon was found has had a checkered history. Ruins of the early structure which stood on the site in the sixth century A. D. were unearthed, with the notable discovery of rare sculptures representing the apostles. In the tenth century, and later, elaborate reconstructions were made in the building, and in the fifteenth century the church became a mosque.

Several other pieces of the remarkable marble inlay work, similar to the figure of St. Eudokia, were found buried among rubbish at the site.

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**IN SCIEN**

## OPTICS

**Contact Eyeglasses Beautify Dull Eyes**

**"W**OMEN who have pale grey or blue eyes can have them darkened to any desired degree by contact glasses," Prof. Leopold Heine of the University of Kiel has reported to the *Lancet*, British medical journal. Contact glasses are thin shells of optical glass which can be worn under the eyelids in contact with the eyeball. They cannot be distinguished, which gives them a cosmetic value very pleasing to women and to actors.

Prof. Heine, who has been studying their uses to correct different kinds of visual disturbances and eye diseases, reports that they are indicated in certain occupations and should be tried by architects, seamen, pilots, chemists, actors, engineers, sportsmen, bicyclists, swimmers, motorists, gymnasts, sailors, tennis players and those who hunt.

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## ARCHAEOLOGY

**Archaeologists to Dig At Promising Site**

**T**HE University of Illinois has obtained a permit to excavate the Indian cemetery near East St. Louis, where a contractor has reported uncovering four skeletons in good condition, and traces of other skeletons remaining in place.

Excavation at the site will begin at once, Dr. A. R. Kelly, archaeologist of the University of Illinois, stated.

The graves are on bluffs overlooking French Village near East St. Louis, Dr. Kelly said. Men who have dug and carted dirt away from the locality in the past two or three years have occasionally found human bones. How much of the cemetery remains is not known.

It is hoped that scientific excavation of the site will give new information of the type of culture possessed by the bluff dwellers as compared with the culture of valley tribes. The cemetery is expected to add to the information regarding the famous Cahokia mound-building group.

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# CE FIELDS

## AERONAUTICS

## Improved Wind Tunnel For Testing Canadian Planes

**I**NCREASED efficiency in wind tunnels for testing model airplanes, and findings important to the science of heating and ventilating have been realized through a research project conducted by the National Research Council of Canada.

In constructing a new wind tunnel to assist in the design and construction of airplanes in Canada, J. H. Parkin, assistant director of the Division of Physics in charge of aeronautics, took advantage of the recent discovery that tunnels with square corners, when fitted with vanes, offer less resistance to air currents than do rounded corners. By simplifying the vanes, the staff of experimenters appointed to the work constructed a tunnel which is more economical and efficient than the ordinary tunnel.

The experiments were conducted by George J. Klein, K. F. Tupper and Dr. J. J. Green. While the object of the research was primarily to perfect methods for testing the effect of air currents on high speed craft, the new data on air flow has been seized upon by manufacturers of equipment for heating and ventilation.

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## SEISMOLOGY

## Eight Quakes in April Bring Year's Total to Forty-Four

**W**ITH a series of eight earthquakes, culminating in the destructive Caucasus shocks at the end of the month, April has maintained the high earthquake record of the first quarter of 1931, and has followed the example of the preceding month, which ended with the wrecking of Managua on March 31. The total of major earthquakes for the year, up to May 2, now stands at 44.

Last month's quakes occurred on April 4, 6, 15, 19, 20, 22, 24, and 27. The last date was that of the destructive quake in the Caucasus region; though the telegraphic reports of it did

not come out from Moscow until the twenty-ninth. None of the other seven quakes, fortunately, caused any notable damage to life or property. One, a very mild one, rattled dishes and doors and cracked a few ceilings in the Hudson and Mohawk valleys in New York State. This was on the twentieth. The second and third quakes of the month, on the sixth and fifteenth respectively, were midocean earthquakes on opposite sides of the earth. The first agitated the Pacific ocean bottom almost on the equator, in the neighborhood of the Caroline islands, and the second occurred in the Atlantic, a little west of the Azores.

The first earthquake in May was reported on Saturday, the second. Its epicenter was located in interior Venezuela.

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## ORNITHOLOGY

## Sea Eagle Eats Mice But Disdains Fish

**A** SEA EAGLE that does not eat fish is the anomaly reported by Prof. I. Aharoni of the Hebrew University in Palestine, in a communication received by the New York office of the University.

Prof. Aharoni captured several specimens of this eagle on a recent zoological collecting trip to the Lake of Antioch in Syria, a body of water known from antiquity but little explored by scientists. On examining their stomach contents he found the bones of mice and birds in considerable quantity, but no traces of fish, in spite of the fact that this species is never found far from large bodies of water.

Another very peculiar bird found on this trip was the Syrian darter, known locally as the oustalet. This is a waterfowl, nesting among the tremendously high reeds that cover the wide lake flats. Its nesting season is governed by the height of the lake, for it cannot build until the water has got low enough for it to break down the reeds. Then it piles up a criss-cross structure of stems with their sharp ends pointing outward, forming a formidable defense against many of its enemies.

On this collecting trip around the Lake of Antioch, and from Mount Scopus itself, where the university is located, Prof. Aharoni gathered a large number of specimens for the museum of the University of Jerusalem. Some of these are quite new to science, while others are of classical interest.

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## NUTRITION

## Setting-Up Exercises Are Poor Weight Reducers

**O**NE FIFTIETH of a teaspoon of sugar or other carbohydrate, approximately, is required to furnish the energy used by a man in doing ten times the "push-up" exercise familiar to daily dozen addicts. Women need even less sugar to do the same exercise.

Studies of what it costs in energy to do this familiar gymnastic routine were reported to the Federation of American Societies for Experimental Biology by Dr. H. E. Hamlin of Ohio State University. Each push-up for the men is equivalent to the energy required to lift 18 pounds 100 feet high. For the women the energy is equivalent to lifting 12.5 pounds 100 feet high.

Figured on the basis of push-up per pound of body weight, the energy cost for the men was 0.0040 Calorie and for the women 0.0033 Calorie. In calories the ten push-ups cost the men 5.9 Calories and the women 4.1 Calories. The men would therefore consume the energy equivalent of 1/325 pound of sugar in doing the ten push-ups, and the women 1/450 pound. The conclusion is that "reducing" by setting-up exercises alone is almost impossible.

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## PHYSICS

## Tube Length Measured For New Light Speed Test

**T**HE MILE-LONG tube at Pasadena, Calif., to be used by Dr. Albert A. Michelson of the University of Chicago for his new determination of the velocity of light, has had its length measured to an accuracy of one part in a million.

The result was announced to the meeting of the American Geophysical Union in Washington, last week, by Dr. William Bowie, chief of the division of geodesy of the U. S. Coast and Geodetic Survey. The measurement was made by Clem L. Garner, assistant chief of the same division.

The tube is approximately 1,594 meters in length, said Dr. Bowie. The 50-meter tapes used in the measurement were made of invar, a metal which changes its length very little with changes in the temperature. They were standardized in Washington.

The air will be removed from the tube for the speed measurement.

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