

PHYSICS

Radio Waves Cook Egg From the Inside Out

PROF. Jellinek, French scientist, placed a raw egg between two condenser plates connected to a short wave radio transmitter. The power applied was 1000 watts, the wavelength three meters. After five minutes exposure, the yolk of the egg was found to be cooked hard and solid, but the white was scarcely affected, being only of the consistency of a jelly. Thus the egg was cooked from the inside out. Yet the temperature of the yolk at the end of the cooking was only 140 degrees Fahrenheit, while that of the white was 176.

This experiment was not performed as a stunt, but as part of a serious and extensive research on the effect of short radio waves on different organic tissues, which Prof. Jellinek recently reported to the Paris Academy of Sciences.

The eye of an ox was similarly experimented upon, and it was found that while the crystalline lens was little affected, other parts of the eye were greatly affected.

It is important to study this selective action of the waves, and their different heating effects on different tissues, Prof. Jellinek said, because of the recent use of short waves for therapeutic purposes.

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METEOROLOGY

Heavy Rains in Southwest Encourage Fall Plowing

HEAVY RAINS over the whole of Oklahoma during the week ending Saturday, Aug. 25, together with other extensive rain areas over Missouri, southeastern Iowa, Illinois and on up the Ohio Valley, have put many hundreds of thousands of acres into condition for fall plowing and seeding. This relieves some of the anxiety that has been felt over next year's wheat crop prospects; for the success of winter wheat depends to a large extent in getting it into the ground early enough to give it a good fall growth, ready to be snowed under and thus protected when winter comes.

The cutting through of the southern part of the drought-afflicted area by a zone of solid rain raises anew hopes that the grip of the general aridity may at last be breaking. The rains that fell in the West during July and early Au-

gust came for the most part in the northern part of the area. The attack of the northwesterly storms was only a "nibbling" at the entrenched front of the drought; now has come a genuine "break through."

However, in spite of the relief that the recent rains have brought to anxious watchers of the agricultural situation, they are under no illusions that the drought has been forced into full retreat. Many more fall rains must come, and much long-lying winter snow, before there is enough water on the land to make up for serious seasonal deficits that run back as far as 1930. Subsoil as well as surface is depleted of moisture, and several whole years of excess precipitation will be needed to restore the land to normal condition.

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CHEMISTRY

Gallium, Rare Element, Found in Siberia

GALLIUM, rare chemical element, has been extracted from minerals found in the Altai Mountains of Siberia, Prof. V. E. Zviagintzev, of the Russian Academy of Sciences, has revealed.

Gallium is a metal which melts in hot weather at 30 degrees Centigrade or 86 degrees Fahrenheit, becoming liquid like mercury. Its boiling point is greater than 1600 degrees Centigrade (nearly 3,000 degrees Fahrenheit) which is higher than that of mercury's 356.9 degrees Centigrade, or 675 degrees Fahrenheit. It is therefore more useful than mercury in the manufacture of thermometers for use at high temperatures. Gallium is also used in medicine.

The existence of gallium was predicted in 1869 by the Russian Mendeleeff, who developed the periodic table of chemical elements. It was discovered two years later by the French chemist, Lecoq de Boisbaudran. So far only relatively small quantities of gallium have been available, extracted mainly in Germany and in the United States.

In 1931, Prof. Grinberg of the Institute of Platinum of Leningrad suggested that the zinc ores of the Ridder deposits in the Altai might contain the rare element, as do the Canadian deposits. The Institute of Rare Metals of Moscow took up the suggestion. Spectroscopic analysis of the Ridder zinc ores showed the presence of gallium, and treatment of zinc concentrated yielded a small amount of gallium oxide.

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IN SCIEN

PHYSICS

"Inside-Out" Particle Suggested by Germans

EVER increasing in number are the suggestions that the neutral atomic building block—the neutron—may consist of a central negatively charged core and positively-charged electron. Latest of the scientific prophets of the neutron's composition are Dr. Schuler and Dr. Th. Schmidt of the Astrophysical Institute of Potsdam.

The negative proton suggested as the central part of the neutron has been put forward by many scientists in the last year.

Since the usual view of a neutron's makeup is that it consists of a positively-charged nucleus—a proton—plus a negatively charged electron, the new reverse picture would make the neutron an "inside-out" particle.

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ORNITHOLOGY

"Hay-Wire" Construction Suits South African Crows

"HAY-WIRE" architecture has been used with satisfactory results (to themselves) by South African crows. This is well attested by a wire nest weighing twenty pounds, taken off a high steel transmission-line tower near Colenso, Natal, and now in the Museum at Pietermaritzburg.

The transmission line runs through a nearly treeless district, and the crows have taken kindly to the lofty towers as nesting sites. Brushwood sticks, their usual nest material, would be difficult to fix in position on the slippery metal.

Whether the crows definitely realize this or not, they have at least taken to the use of odd scraps of wire, bending them around the iron framework so securely that it was difficult to dislodge the nest taken for the Museum.

The nest contained a considerable variety of wire pieces, including hard-drawn copper, galvanized iron in two gauges, barbed wire and baling wire.

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CE FIELDS

OCEANOGRAPHY

Bottle Drifts Seven Years On Long Sea Wanderings

DRIFTING a distance probably more than a third of the earth's circumference, a sealed bottle tossed from the bridge of the American steamer *Hahira* more than seven years ago was finally washed ashore on the coast of Texas, states a report to the Hydrographic Office of the U. S. Navy.

The paper in the bottle showed that it had been launched by Second Officer A. C. Barstow of the *Hahira* on April 20, 1927, in latitude 30 degrees 24 minutes north, longitude 79 degrees 35 minutes west. This is between the Bermudas and the southern Atlantic coast of the United States. The ocean currents, however, flow in a direction that would preclude its drifting directly to the point where it was found. More probably it made the entire circuit of the North Atlantic, through the Caribbean and into the Gulf of Mexico, covering an estimated distance of 8,800 miles on its long and lonely voyage.

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PHYSICS-BOTANY

Toxicity of Ultraviolet Varies With Wavelength

ULTRAVIOLET rays kill plants in shorter or longer time, and with greater or less expenditure of energy, according to the particular wavelengths used. Researches bearing on this point have been conducted at the Smithsonian Institution by Dr. Florence E. Meier, and are discussed in a new Smithsonian Institution publication.

Dr. Meier's method was to coat a glass plate with a film of living one-celled algae, microscopic water-plants, and then to project on it a band of ultraviolet radiation which had been split up into its component wavelengths by means of a prism, just as white light can be split into a spectrum or artificial rainbow.

Studying the killing effects of eight different wavelengths in the ultraviolet, Dr. Meier discovered that each had its own specific "radiotoxic spectral sensi-

tivity"; that is, its minimum quantity that would sooner or later result in death. Each wavelength also had a specific "radiotoxic virulence"; that is, the measure of time required to produce the killing effect.

The two qualities do not necessarily go together. Some of the wavelengths would kill the algae with a very small dose, but required a long time to do it. Other wavelengths had to be applied in larger doses, but killed more quickly.

To illustrate her point, Dr. Meier used the analogy of poison-effects on human beings. Radium in watch-face paint will kill in extremely small doses, but may take years to finish off its victim. A considerably larger quantity of rattlesnake venom is required to kill, but if that quantity is used, death is a matter of a few hours at most.

The wavelengths of ultraviolet radiation studied by Dr. Meier ranged between 3022 and 2536 Angstrom units. An Angstrom unit is a ten-millionth of a millimeter, and a millimeter is approximately a twenty-fifth of an inch.

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PHYSICS

Shooting Neutrons at Zinc Makes Radioactive Copper

BOMBARDMENT of the metal zinc with the nonelectrical particles known as neutrons has turned it into radioactive copper, report Drs. C. A. Westcott and T. Bjerger of Cavendish Laboratory of Cambridge University in *Nature*.

Radioactive copper disintegrates like all the other similar elements produced artificially in the laboratory, but the atomic breaking-down process continues for hours, so that copper is a record-holder in this respect.

The Cavendish investigators report that its half period is six hours, i.e., in six hours the disintegration is only half as intense as at the start. Most elements made to undergo radioactivity by artificial means last, at the most, only a few minutes.

Some naturally radioactive elements like radium take years, even thousands and millions of them, to decrease to half the original amount.

Some, on the other hand, last only a few seconds or minutes like the artificially-produced kind. The six-hour half-period for copper is a duration record in its class.

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AVIATION

Early Wright Airplane To Franklin Institute

AFTER gathering dust in a barn near Manoa, Pa., for 21 years, one of the early airplanes of the Wright Brothers will soon be moved to The Franklin Institute of Philadelphia.

The plane is powered with a Wright four-cylinder motor, and is of the "pusher" variety with twin propellers mounted behind the pilot. A chain drive connects motor and propellers. This was the first plane to make a non-stop flight from Philadelphia to Atlantic City, which was accredited as being one of the greatest flights in its day.

The now-antiquated aircraft is being rebuilt under the immediate advice of Dr. Orville Wright by Townsend Ludington and Arthur E. Arrowsmith.

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MEDICINE

Rheumatism Treated With "Electric Fever"

FEVER induced by high frequency electric currents is now being used with some success in treating chronic infectious arthritis, popularly known as rheumatism.

This treatment, results and limitations, were reported to the Illinois State Medical Society at Peoria by Dr. D. E. Markson, Northwestern University School of Medicine. Dr. Markson's report was based on two years' experience, during which time 180 treatments were given and 28 patients were treated.

Of particular interest is the fact that 10 patients of this group had received treatment ranging from 2 to 24 months previous to the fever treatment and the duration of the arthritis ranged from 1 to 5 years. In other words, these patients showed improvement under this treatment, while their conditions were considered intractable in the regular arthritis clinic.

The method consists of raising the general body temperature to 104 degrees Fahrenheit by means of high frequency currents. The patient is carefully insulated against heat loss, and this high temperature is maintained for eight hours. The method is safe because the treatment may be terminated very easily in the event that the patient reacts unfavorably.

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