

RADIO

Static-Free Short Waves Planned to Aid Aviation

PPOINTING the way toward eventual adoption of ultra short wave radio communication by the air transport industry, month-long tests on a skyliner between New York and Pittsburgh have shown the practicability and freedom from static of ultra high frequency radio waves, the Western Electric Company has announced.

Radio waves of a frequency of 125 megacycles were almost entirely free of static in tests which covered a wide variety of test conditions, it is reported. Elimination of static has been one of the major problems of aviation communication systems and is particularly important during winter operations when storms are more frequent.

Tests were conducted on a regular Transcontinental and Western Air transport plane, which carried its full complement of regular radio equipment while the tests were being conducted. The chief handicap to ultra short waves is the fact that they do not travel beyond the horizon, thus limiting their effective range.

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PLANT PHYSIOLOGY

Death of Cells in Roots Makes Ventilation Spaces

CELLS dying that other cells may live furnish the explanation of the air spaces found in the roots of plants like waterlilies, cattails, and other forms that grow in un-aerated soil and yet must have oxygen to sustain life. Air from above passes down through these spaces, and carbon dioxide waste presumably goes out through the same channels.

But the death of cells in such root tissues is not a nobly self-sacrificing piece of altruism. They just can't help it. They happen to be the ones that suffocate first when the oxygen is cut off, and their breakdown leaves air passages open, so that the rest don't need to die. And thus the roots, and the whole plant, are enabled to survive.

The story of the formation of these ventilation shafts through living root tissues has been studied by Dr. D. C. McPherson of the University of Toronto.

Dr. McPherson used in his experiments only plants that do not normally need or have air passages through their roots, principally corn. When corn plants were grown with their roots de-

prived of oxygen, groups of cells died and degenerated, leaving spaces open, through which the remaining tissues obtained the necessary air. Parallel plantings with plenty of oxygen in the soil did not form air passages.

Some other plants, like peas and beans, proved unable to form air passages even though oxygen starvation killed cells in their roots. This was because a hard chemical compound, calcium pectate, formed in the cell walls, preventing them from breaking down when they died. Corn cell walls, made of softer stuff, can and do disintegrate.

Dr. McPherson considers that water-dwelling plants that normally have air spaces originally had none, but developed them in response to physiological need as they came to grow in un-aerated soils. But now they are so accustomed to having these ventilation passages that if they are forcibly prevented from forming them they will die.

Science News Letter, August 27, 1938

ASTRONOMY

Small Telescope Makes Important Discovery

YOU RIGHTLY hear much about the giant telescopes having 100-inch and 200-inch diameter mirrors, and the wonders of the heavens they show and will reveal. But it should not be overlooked, as is sometimes done, that excellent and important work is being performed with small equipment.

The discovery of the brightest stellar object ever observed—having a luminosity equal to 400,000,000 suns—which was recently announced by Prof. Fritz Zwicky of California Institute of Technology, is a splendid example of a major discovery made with a small telescope.

Using an eighteen-inch Schmidt type telescope, Prof. Zwicky has been photographing the sky for over a year at Mt. Palomar, on the site of the great future observatory which will house the still-to-be-completed 200-inch telescope.

With this Schmidt astronomical camera, having an extremely wide field of view, Prof. Zwicky has obtained some 600 good photographs of distant nebulae.

Three super-nova stars were found, giving complete confirmation for the previous suspicion of the existence of two types of temporary stars; novae and super-novae.

One of the super-novae, known as I. C. 4182, has turned out to be the brightest stellar object ever discovered, according to calculation by Prof. W. Baade, who is Prof. Zwicky's colleague.

Science News Letter, August 27, 1938

IN SCIENCE

PHYSICS

Meet Exciton and Phonon, New Words in Physics

YOU CAN add two new words to your vocabulary, introduced by Dr. Edward Teller of George Washington University in Washington, D. C.

Listening to a new explanation of the old phenomenon of phosphorescence, scientists attending a Stanford University summer conference on photochemistry, heard the words "exciton" and "phonon" as new descriptive terms applied to subatomic particles whose behavior under certain conditions produces phosphorescence.

Light may excite two kinds of energy when it strikes a solid body, Dr. Teller believes. It may excite electronic energy, the moving particle thus resulting from the impact of the light being defined by the scientists as an "exciton." A particle vibrating from the other type of excitation for which he holds light responsible Dr. Teller calls a "phonon."

Science News Letter, August 27, 1938

GEOLOGY

Oil Flows From Well Bored Beneath Mississippi River

DRILLED in utmost secrecy and with the application of several novel methods, the first oil well ever drilled inside the levee of the Mississippi River has begun to produce oil from a deposit more than 6,000 feet below America's mightiest stream. More than 200 barrels of oil a day are coming in.

Digging of other wells on river bottom land inside the walls that protect the countryside and systematic tapping of the pool below the river is expected as a result of the success of the discovery well. Forty-foot pilings had to be driven into the river bottom land to support the drilling rig and a plank road had to be laid over the mud to transport tools and supplies.

The well is producing through tubing perforated from 6,358 to 6,364 feet. More than 4,100,000 cubic feet of natural gas are also being produced daily.

Science News Letter, August 27, 1938

E FIELDS

ECONOMICS

War Makes It Hot for Japanese Office Workers

OWNERS of air-conditioned buildings in Japan are having difficulty in securing supplies of refrigerants to keep their plants running and their buildings cool, the American Commercial Attache in Tokyo reports. Blame for the situation is fixed on the current war.

Ammonia, widely used as a refrigerant, is being used for military purposes, considered by the authorities more important than mere cooling of buildings. Methyl chloride, another agent used, must be imported. But control of foreign exchange has made impossible purchases of the substance.

Science News Letter, August 27, 1938

BIOCHEMISTRY

Coal, Water and Air May Make Meat for Germany

GERMANY, already enduring economic siege conditions, and apprehensive of the sterner blockade of war, looks increasingly to her chemists to make her internally self-sufficient. Newest among projects that would smack of magic if they were not based on well-determined scientific principles is one to make coal, water and air the ultimate sources of a meat supply.

The key to this biochemical paradox is the yeast cell. Yeast produced in great masses and fed on cheap carbon-containing foods, plus nitrogen-containing mineral salts, will yield about half its dry weight in crude protein, the stuff lean meat is made of. This yeast protein is not suitable for direct human consumption, but it can be fed to livestock and thus transformed into meat and milk.

During the World War, yeast was raised in considerable quantities, on beet-sugar molasses, waste liquor from starch factories, and similar low-grade carbohydrate sources. The nitrogen part of the diet was synthesized out of the air.

After the armistice, mass production of yeast feed became unprofitable, due to the competition of imported meat and

cattle feeds. However, experiments have continued, with the objective of making yeast production cheaper. Promising materials have been surplus potatoes, and sugar made from wood.

Now, according to Dr. K. R. Dietrich, chemist of Berlin-Dahlem, strains of yeast have been isolated that do not need sugar but can thrive perfectly well on such carbon-containing compounds as lactic acid, acetic acid, glycerin, and even ethyl alcohol, plus of course the usual ration of nitrogen captured from the air.

But some of these compounds can now be produced from coal and lignite, by new synthetic processes. Hence the prospect that some day German steers may be making beefsteak out of coal, air and water, via the humble yeast cell.

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GARDENING

New Lawn Plants Free Slaves of Lawnmower

THERE should be a new radical hymn themed to: Arise, Slaves of the Lawnmower! Much as everyone admires a sweeping, velvety spread of beautiful grass, it is true that good lawns do enslave their creators.

Two inventions helped man become thus enslaved to lawns. One was the lawnmower and the other the rubber garden hose. With these two devices, plus plenty of work, you can grow a lawn that rivals the putting greens of the golf courses in quality.

But what kinds of lawns were there before the days of the lawnmower and garden hose? There were some mighty good ones, and some of them, in England for example, have been growing for generations without the lawn slavery which the more modern, delicate lawn grasses require.

Camomile lawns are a favorite for bowling greens in England because they are very resilient and stand well the wear of walking feet. A few plants spread out in a lawn will drive grass out, so vigorous is camomile's growth. Thyme occasionally has been used as a lawn plant and yarrow likewise. In California *Lippia* is sometimes used.

But the lawn plant *par excellence* is the small turfing daisy, *Matricaria tchihatchewi*, which ought to make life easier for the man of the house. This plant gives a thick green foliage never more than two inches high. It does not need watering, will grow almost anywhere except in deep shade or very sandy soil and requires no more than one cutting a year.

Science News Letter, August 27, 1938

ETHNOLOGY

Indian Place Names Often Unflattering to Neighbors

BECAUSE Southwest Indians dubbed the neighbors Utes, meaning hillbillies, we have a state named Utah.

And when Sioux Indians yelled "Cheyenne!" at another tribe, they didn't smile. They meant barbarian, or "doesn't speak our language," and they resented the foreign Indians being in the "Cheyenne" valley.

To such long-buried origins in American prehistory, Dr. John P. Harrington of the Smithsonian Institution is tracing our Indian place names.

Ute Indians did not call themselves by that name, Dr. Harrington has determined. Apaches and Navajos dubbed them Utes, meaning in their speech, highlanders or upper people.

Tacoma got into our geography by a double mistake, he finds. The word Ta-ko-bed was Puget Sound Indian language for any snowy mountain in sight. But early settlers mistook this word for the specific native name for Mount Rainier, and then mispronounced it besides.

As for Seattle, Dr. Harrington links it with the name of an influential Indian, Seh-Ahl, but what Seh-Ahl means, if anything, is yet to be found out.

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PALEONTOLOGY

Old Mongolian "Bear-Cat" Had Astonishing Skull

ASIA WAS a land of giants, early in the Age of Mammals. Already we know about the mountain-sized rhinoceros, the Baluchitherium. Now Dr. Walter Granger of the American Museum of Natural History describes an enormous flesh-eater skull brought home by Dr. A. Z. Garber, surgeon on one of the museum's expeditions.

The creature belonged to the group known as the creodonts. They have no living relatives, and can be only remotely described as something like bears and something like clumsy wildcats.

The giant creodont now described by Dr. Granger had a head that must have been all of two feet long in life, for the skull is about twenty inches long. It was approximately fifteen inches wide, and the eye teeth projected over two inches from the jaws.

He has been given the scientific title *Sarkastodon mongoliensis*.

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