

ENGINEERING

Frequency Modulation Applied to Telegraph

TELEGRAPH lines now use the trick of the new FM radio, putting more messages over one circuit with less interference.

Western Union has announced the first use of frequency modulation or FM on its wire network to combat the troubles caused by sharp weather changes that sometimes throw sensitive carrier currents out of balance.

FM radio (contrasted with the conventional AM or amplitude modulation of most broadcasting stations) invented by Maj. Edwin H. Armstrong is coming into use extensively in radio broadcasting stations of a new breed. FM gives radio signals that cannot be mused up by static. Static is not a trouble in wire telegraphic circuits but there are other difficulties that FM does take care of.

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AERONAUTICS

Japs Copy Nazi And U. S. A. Planes

JAPANESE secrecy has effectually prevented American Army and Navy officers from obtaining dependable knowledge about the latest types of Japanese airplanes, as well as about the numbers of them possessed by the island empire.

"To get any real information about them we'll have to wait until we shoot down a few of them," an Army Air Force officer confessed.

Articles in the standard reference works on military and naval planes and in recent numbers of aviation journals, disclose exceedingly little. The known types of planes built in Japan show no originality in design whatever. In this they differ sharply from ship design in the Japanese Navy, some of which are original to the point of freakishness. Known Japanese planes are mostly copies of foreign models, mainly German, Italian and American, and none of them are particularly new. The same is true of the engines with which they are powered.

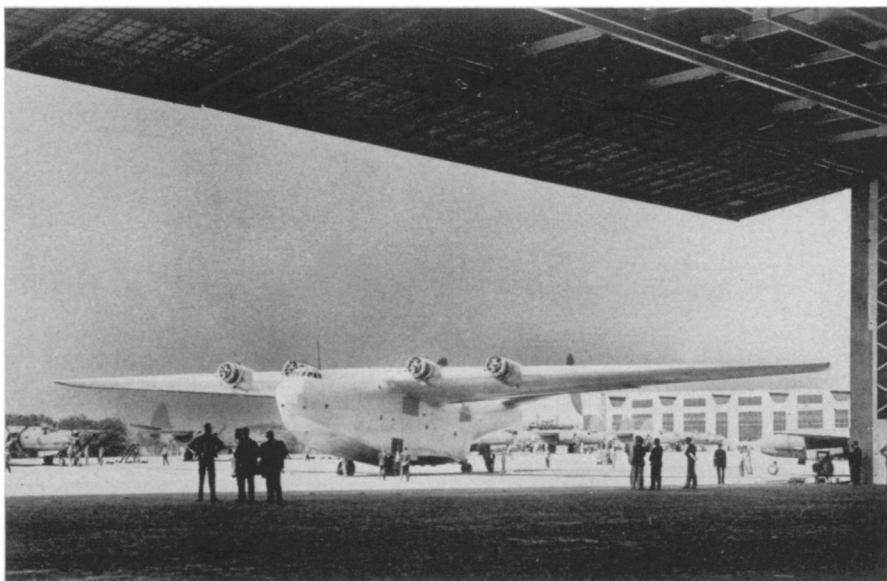
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covered in 1940 reached naked eye brilliance at the beginning of 1941.

Periodic comets resighted were: Encke, first Schwassmann-Wachmann, second Schwassmann-Wachmann (1929I).

The first Schwassmann-Wachmann comet experienced a remarkable temporary increase in brightness.



LARGEST FLYING BOAT

The Mars, giant four-engined flying boat, is designed to be able to fly across the Atlantic and back without stop. She was launched on November 8 with full naval ceremonies. This is an official U. S. Navy photograph.

BIOLOGICAL SCIENCES

Radioactive Carbon Atoms Trace Nutrition Cycle

Radioactive "tagged" carbon atoms made it possible to follow food substances through a plant's whole nutrition cycle.

Plant tumor tissue, free of the bacteria that originally accompanied its growth, was grafted into healthy plants and grew there.

Seeds buried in bottles 60 years ago were resurrected and found still viable.

Seedless watermelons were produced by treating unpollinated flowers with growth hormones.

The international treaty for the protection of the Pribilof island fur seal herd expired, and because of the action of Japan was not renewed.

There was a very large increase in waterfowl population.

The U. S. bird population was estimated as at least five billion.

A natural growth-promoting substance, more powerful than synthetic chemicals, was found in ripening pollen.

Colchicine injected into incubating eggs produced chickens with double-sized combs.

Sulfanilamide was found to have somewhat the same effects as colchicine, in speeding evolutionary changes in plants.

Hormone modification of sex after birth was accomplished in experiments on opossums.

Week-old mouse embryos grew successfully when grafted on three-day-old chick embryos.

Success in transplantation of eyes of tailed amphibians with return of vision was announced.

Vitamin B₁ was found concentrated in tree buds.

Wax from a green-linted cotton variety was investigated as a possible ingredient for polishes.

A new species of white blackberry was discovered in Florida.

It was demonstrated that tobacco plants produce nicotine in their roots.

Pressures on the order of 5,000 pounds per square inch were found to have a paralyzing effect on protoplasmic movement.

Fly larvae that, like spiders, catch other insects in webs, were discovered in the Southern Appalachians.

The parasitic dodder vine was proved capable of carrying disease viruses from plant to plant.

A new disease of cotton was reported from China.

A one-dose vaccine for hog cholera was announced.

Arsenic was found to be a good antidote for selenium poisoning in animals.

Effective contact sprays were discovered for combating Japanese beetle, and distribution of the "milky disease" bacteria that kill their larvae was undertaken on a large scale.

Chloropicrin, tear-gas of World War I fame, was found a good preventive of eelworm damage to several crops.

Prof. D. R. Hoagland and Dr. D. I. Arnon, University of California, were awarded the \$1,000 prize of the American Association for the Advancement of Science for revolutionary discoveries regarding plant nutrition.

CHEMISTRY AND PHYSICS

Organic Molecules May Have Been Photographed

American commercially built electron microscopes, magnifying 10,000 to 125,000 diameters, were used to probe minute structural secrets of rubber, plastics, industrial dust, smoke, rouge, face powder, radio tube filaments, and even biological tissues, cells, bacteria, viruses; it is believed organic molecules have actually been photographed.