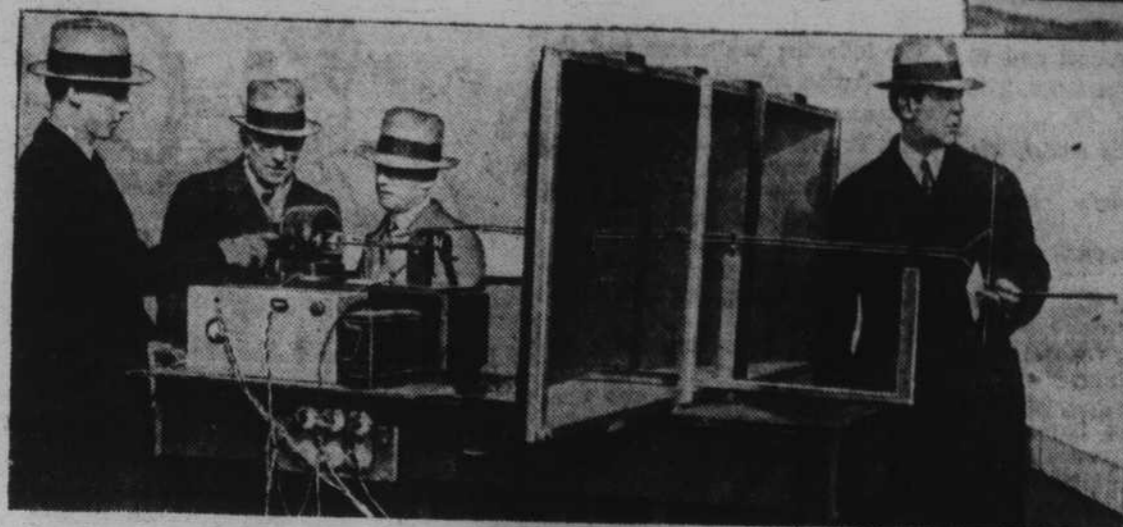


How Radio Signals Now May Be Sent to Mars

Ultra Short Waves of the Beam Type to Penetrate Outer Space and Explore the Heavens.

INTERPLANETARY communication, long a dream of scientists, now appears to be a possibility. Radio apparatus has been developed to transmit ultra short waves that will penetrate the earth's atmosphere and reach into outer space. Research engineers already have demonstrated that forty-two centimeter radio waves of the beam type of sufficient power to be heard from a loud-speaker can be economically transmitted.

In giving this idea practical application, I. E. Mourousteff, who was in charge of the development work done in the laboratories of the Westinghouse Electric and Manufacturing Company, points out that the difference between radio waves and light waves is quantitative, not qualitative. In other words, they are identical in every characteristic except wave length. Mr. Mourousteff says that there is more difference between long and short radio waves than there is between short radio waves and long light waves. To illustrate this, he explains that the longest radio wave in use is 100,000,000 times as long as the shortest radio wave ever produced, whereas the shortest radio wave is only 1,000 times as long as



The Device for Producing an Ultra Short Radio Wave of the Beam Type Only 42 Centimeters Long and Believed to Be Capable of Piercing the Earth's Atmosphere and Shooting Through Outer Space 35 Million Miles to Mars.

the longest visible light ray. Hence he concludes, radio waves are merely "dark light."

Visible light waves, those between the long red and the short violet, constitute a very small percentage of the total range, just as audible sounds are a small fraction of all existing noises. Many of these have wave lengths or frequencies much too high or too low to set up corresponding vibrations in the human ear drum, the scientist explains.

"Nature has been kind to impose these limitations on our eyes and ears," says Mr. Mourousteff. "Certainly all would be chaos and confusion if we could see and hear everything. On the other hand, science would be seriously handicapped if it had not perfected instruments and apparatus to detect the invisible and inaudible."

"At different times certain people have interested themselves in the possibilities of communication with possible inhabitants of Mars. If anything of this sort is ever to be accomplished, it will probably have to be done by means of ultra short radio waves."

Some 25 years ago certain known facts of radio communication convinced Dr. A. E. Kennelly, professor of electrical engineering at Harvard, and Professor Oliver Heaviside, English scientist, that there must be a sort of cushion or atmospheric layer 100 or more miles from the earth's surface. This has since been known as the Kennelly-Heaviside layer.

"Of course, it is a theory just as atoms and electrons were created by theory to explain certain phenomena," resumes Mr. Mourousteff, "but we are certain that not only heat and light waves can penetrate something like the Heaviside layer, but that all radio,



or 'dark light' waves less than seven meters long will penetrate that layer and leave the earth.

"It is conceivable that the power we have succeeded in getting into our 42-centimeter beam is sufficient to pierce the Heaviside layer and travel the 35,000,000 miles to Mars. It is possible that such small power may carry to such great distances, because of the fact that practically all of the intervening space is really a high vacuum and does not, therefore, absorb the waves, once they get through the earth's atmosphere."

Today Westinghouse engineers are talking on such a beam from a radio station on top of the company's research building, to the roof of the

engineering laboratory, more than a mile away, where a parabolic metal mirror gathers the waves and passes them through a special detector tube to an ordinary little radio receiving set where they are amplified and made audible.

Radio beams are identical with light beams except that they are of different frequencies or wave lengths and invisible, according to the engineers. In actual service, communication on the radio-optical waves is dependable and almost immune to theft, interruption and interference. Its operation cannot easily be "jammed" or crippled by an enemy, the beam must be found before its message can be detected and by means of reflecting surfaces, it can be sent long distances.

In a searchlight, the rays originate at one point, reflect from a parabolic surface and pass out in a narrow beam. In the newest achievement, the waves reverse this process by striking the parabolic mirror where they are reflected to a short antenna and detector tube located at the focal point corresponding to the source of light in a searchlight. Since intervening hills or

A Lemon That Is Pink

THE discovery of a striking fruit with color characteristics that are apparently new and that have a startling appearance is a matter of general interest. An illustration of this fact is presented in the Journal of Heredity by A. D. Shamel, physiologist of the United States Department of Agriculture, who describes a pink-fruited lemon.

These pink lemons are oblong in shape, of medium size, rough or ridged in texture and have thin rinds. The rag is tender, and the juice is abundant, but usually lacking somewhat in acidity.

The lemons have a striped appearance, usually with alternate green and white areas. This appearance is correlated with a ridged condition, the ridges being usually green in color while the depressed spaces are white.

The very thin rinds and rough appearance of the fruits as well as the relatively low yields of the trees makes this strain of very doubtful commercial value, but it is rather widely planted in some citrus growing areas of the Southwest solely for ornamental purposes.

Last year Mr. Shamel noticed a typical variegated lemon among a collection of citrus fruit sports that was presented as a feature of a general exhibit of California fruits. Upon examination this variegated lemon was found to have a pink-appearing rind and flesh.

The parent tree from which this pink lemon was picked was located in a small planting of citrus trees in the grounds of the Winter home of Mr. D. W. Field, at Burbank, California.

buildings absorb both types of beams, the engineers found a way to reflect the ultra short radio waves so this handicap could be overcome.

It is believed that the ultra short wave will be adapted to many practical uses in the next few years and that it will prove of commercial value by supplementing radio and other present forms of communication.

The Fad for Match Labels

QUEEREST of all recent fads is the newest hobby of collecting the labels of match boxes. This pastime is now being followed as seriously by some persons as that of collecting postage stamps.

The label portion of the match box desired by a collector is first immersed in boiling water to remove the wood and paper adhering to the back. When dry, the label is hinged, like a postage stamp, and mounted in an album, on a card, or on a loose sheet, either alphabetically or according to subject or country. Some labels now fetch as much as twenty-five cents apiece and prices are rising.

These labels, despite the fact that the legends on them are mostly printed in English, come from all over the world. One of the rarest sets is the Swedish variety known to collectors as the "Nurseryland" series. Each of these labels bears the verses (translated), and an illustration of some popular English nursery rhyme. A Swedish match company employs a staff of art-

ists, who are constantly inventing new designs for these labels, to attract match buyers and label collectors.

One of the first match-label exchange clubs to be organized is at Southampton, England. Today it has a membership of fifty and it circulates about 20,000 labels a year.

The largest collection in the world, it is claimed, is that of a British manufacturing company, who possess in their museum about 15,000 specimens. The largest private collection, the property of an enthusiast at Brighton, England, numbers about 12,000 labels.



A Grotesque Label Taken from the Top of a Japanese Match Box. The Hobby of Collecting Match Box Labels Is Now Being Followed Very Seriously.

The Smallest Real House



A Complete Three-Story House of Six Rooms Built on a Lot Only Ten Feet Wide.

THE house shown in the accompanying illustration may not be the most diminutive dwelling in the world, but it bases its claim to fame on being, according to the owners, the smallest real and most complete home in the world for its size.

This three-story house of six rooms which was recently built in Long Beach, California, stands on a lot 10 feet wide and 50 feet long. The living room, which is nine feet wide and 19 feet long, occupies the lower floor of the house. This room has elaborately decorated walls and a paneled ceiling.

A stairway at the rear of the living room leads to a hall which opens into a completely equipped kitchen nine feet wide and 11 feet long. On the second floor there is also a bedroom, nine by 13 feet, a full-size bathroom and a nursery.

From the second floor another flight of stairs leads to the laundry room and a sunroom. There is also space on the third floor for a little roof garden and the clotheslines.

Alcohol as a Cure for Poison Ivy

RELIEF of poison-ivy irritations may be had from an easy and simple method which is described in Popular Mechanics by a scientist of Johns Hopkins University.

Ivy poison, it is explained, is in the form of an oil and that the dissolving and removal of the oil before it can be absorbed into the skin is the most effective cure.

The method is to prepare a hundred or so pinches of absorbent cotton; fill a saucer with alcohol, of seventy-five per cent or greater strength; dip the cotton into the alcohol and sop up the poisonous oil, throwing each pinch away as soon as used and being careful not to allow the alcohol to dry on the skin.

The alcohol should be frequently changed. About fifty applications are usually sufficient for a small patch of poison.

The first thirty applications should not be rubbed, merely sopped. After that, it is well to rub with the wet cotton each time. At last, rub vigorously to bring the dissolved poison out of the pores, and to break any small blisters that already may have formed. The more extensive the poison patch, the more swabs will be needed, and the more treatments with relatively varying degrees of pressure are necessary. Fifty swabs are sufficient for a patch the size of a silver dollar.

A Spray Gun for Painting Fenders

A SPRAY gun for use by car owners in retouching scratches and worn spots on automobile fenders uses the tire as a source of air pressure. It is made especially for use with a retouching enamel sold in a small can equipped with an unusual type of nozzle. The gun is equipped with a cap that exactly fits this nozzle making it possible to attach the gun and spray directly from the can. The enamel requires no thinning or other treatment, and dries with a glossy

Making Music by Electricity

THE realm of musical production is now being entered by new instruments which are dependent on electricity for their tonal effects. German inventors seem to have taken the lead in this field.

Among these electrical instruments for producing music is a device perfected by Dr. Trautwein, the Berlin scientist. It resembles no existing instrument and can produce only one tone at a time, but the possibilities are held to be considerable. It can play by electric production and megaphone any desired tone or interval, and besides can evolve new timbres that differ from those of any known instrument. Moreover, it can imitate existing instruments.

Another electric instrument produces sounds of more novel, curious, and grotesque character. The octave is divided into ten parts, and strange intervals arise.

Two systems of electric pianofortes also have been devised. The plan of Oskar Vierling is to transform the customary tone-production of a pianoforte into an electric production. To accomplish this Mr. Vierling has removed the heavy metal resonating board of the pianoforte and placed magnets near the strings, designed to transform the mechanical vibrations of the strings into electric vibrations, from which the modified and purified tone reaches the megaphone, which finally makes it audible. This system enables the inventor to give new possibilities to the instrument. He can also assimilate the pianoforte tone to that of the organ, string, or wind-instruments.

Another type of electric pianoforte is represented by two systems, the Vierling and the Nernst, the latter being the invention of the celebrated

physicist of the University of Berlin. The new instrument adds to the tonal effect of the pianoforte the faculty of prolonging a tone and of making a crescendo or diminuendo. Moreover, the instrument can at the same time perform the services of a phonograph and of a radio, and the effect is extraordinary and surprising. Doubts, however, have arisen whether the Nernst pianoforte would be equally fit for playing music that depended upon color effects, refinement of touch and pedal work.

Fine Feathers for "Painting" Perfect Pictures

FEATHER painting is a very ancient art, still pursued in Mexico, where the early Spanish conquerors found it in use and much to be admired.

An application of the idea is the subject of an invention newly patented by Frederick M. Harrison, of Far Rock-

away, New York, and is designed for the instruction and amusement of children. They are provided with a picture of a bird, printed in colors on a sheet of paper, and are required to copy it by weaving feathers of suitable tints into a "work sheet" of fine-mesh mosquito netting, the latter having marked on it the outlines of the bird.

For this purpose the quill of each feather is thrust in and out through the meshes of the netting, somewhat in the manner of a needle. Thereby the feather is held firmly in position, resting flat against the work sheet.

The feathers, as they are thus woven into the netting, are so arranged as to conceal the quills. Large and stiff ones are used for the bird's tail. The feathers, natural or dyed, may be supplied to the children in bunches, sorted for colors. To represent the beak and feet of the bird, as well as the perch on which it stands, "cut-outs" of suitably-colored fabric may be glued upon the netting. The eye may be the black head of a large pin, which, thrust back and forth through the work sheet, will hold itself in place, the stem of the pin being hidden by feathers.

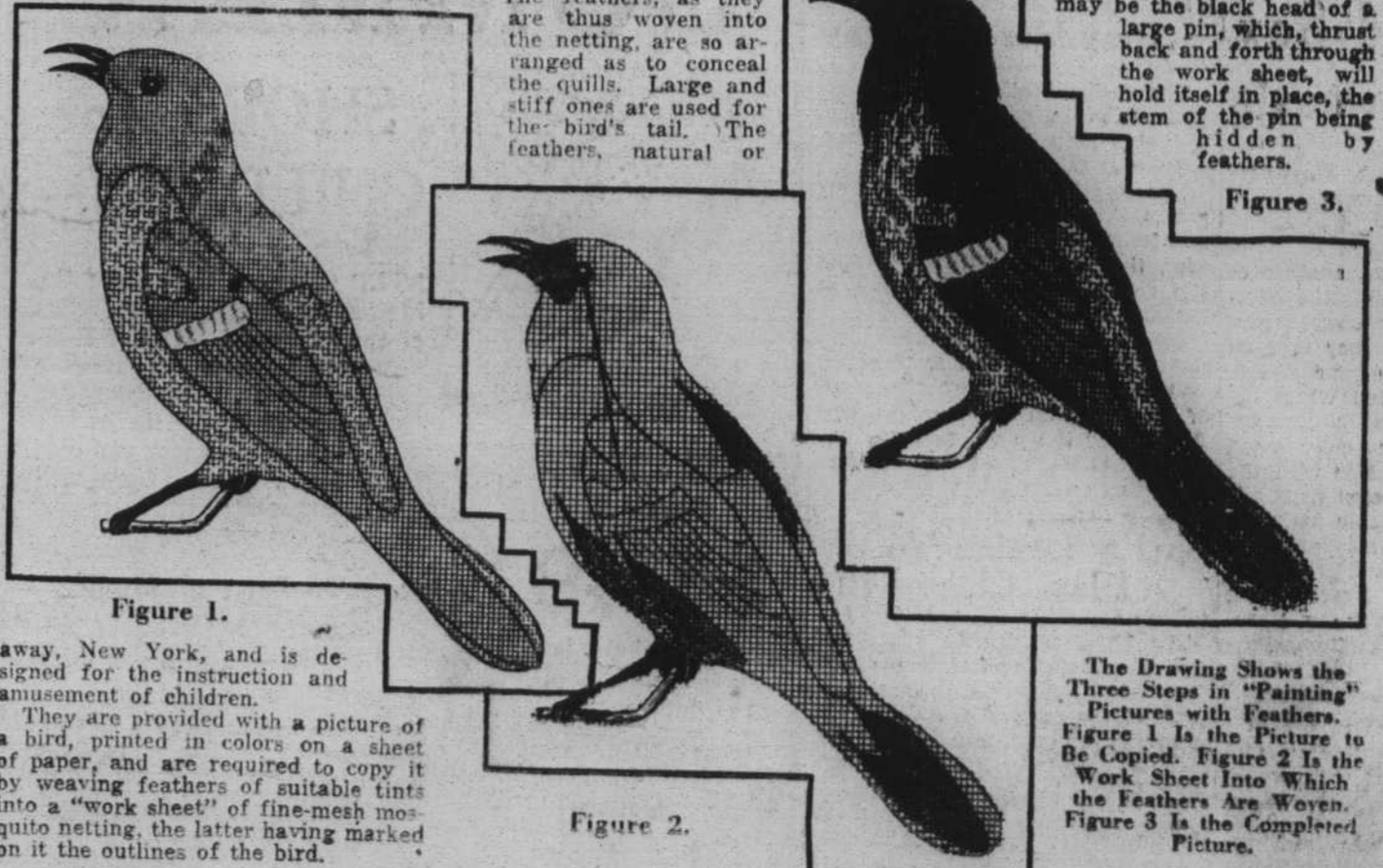


Figure 1. The Drawing Shows the Three Steps in "Painting" Pictures with Feathers. Figure 1 is the Picture to Be Copied. Figure 2 is the Work Sheet into Which the Feathers Are Woven. Figure 3 is the Completed Picture.

Figure 2. Figure 3.