

Talking Across 34,000,000 Miles to Mars

How can the President congratulate some Martian Republic on the celebration of its Fourth of July?

By A. J. Lorraine

MARCONI, pioneer of radio communication, believes that it is possible to communicate with inhabited planets—if the newspapers report him correctly. Mysterious disturbances are recorded by sensitive radio receivers. Are messages coming from Martians frantically trying to communicate with us? Perhaps. At any rate, Marconi predicts the possibility of sending out electric waves to the planets. And if a great radio engineer believes in communication between worlds the matter is not to be lightly dismissed.

It is older than radio-telegraphy, this idea of talking to the stars. Before Marconi sent his first wireless message, it was suggested that we might flash signals into space or draw geometric designs on large surfaces in electric lights. Flammarion, Schiaparelli, Lowell, all of whom passed a life-time in studying Mars, have sponsored the scheme.

How Much Power Would It Take?

Now, the electromagnetic waves used in radio-telegraphy have this advantage over light waves: Atmospheric dust and clouds, both of which obscure light, offer no obstacles to the long waves that Marconi uses. What about the electric eyes, the receivers, that see these radio waves? The human eye is probably more sensitive—about ten times as sensitive, according to recent measurements. But the receiving area exposed to the incoming waves can be adjusted within wide limits, unlike the pupil of the eye, the size of which is fixed by nature.

Suppose, then, we try to send a radio signal to Mars. How much power would it take?

We ask the engineers who designed the radio stations used on the earth. About 400 kilowatts (540 horsepower) are required, they tell us, to communicate under normal conditions over 4,000 miles. Greater ranges are obtained when the conditions are favorable.

It looks black for wireless telegraphy. Still, Mr. Marconi may have reason for optimism. He may see possibilities in the use of directed waves, possibilities that are not obvious to others not so well informed.



Perhaps we shall have to fall back on light, after all. We shall have to establish a code based on the use of electric lamps or searchlights. But how?

One suggestion is that we should make a huge diagram in some cloudless part of the earth of a well known theorem in geometry. "The square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides."

That might be a good one to begin with. Every school-boy knows it; an educated Martian ought to recognize the diagram at once. To show that they understood, the Martians might reply by drawing in light some equally well known Euclidean proposition. Picture would follow picture, until at last perhaps some kind of a code would be established. Or, more simply perhaps, something like the Morse system could be applied to flash signals of long and short duration.

What can be seen on Mars? More than you probably suspect. A circular or round spot fifty miles in diameter can be distinguished with a good tel-

escape under favorable conditions—a spot, for example, as big as London.

A dark line three quarters of a mile in width would also be visible. Bright points of light at night, or a line of lights, might be seen, even if narrower than three quarters of a mile. Searchlights have been made for which a brilliancy three times greater than that of an ordinary carbon electric arc lamp is claimed. They are about two thirds as bright as the sun. One of these installations is described as having a total of 1,200,000,000 candle-power. How blindingly dazzling it must be! How far into space it must penetrate! Yes; but Mars at its nearest is 34,000,000 miles away.

Talking by Light Flashes

Talking to Mars by flashes or by lines of light would at best be expensive. Generally speaking, only about two or three per cent of the energy that drives the dynamo by which the light is produced appears in the form of visible radiations. Seven per cent, it is true, is claimed for the mercury vapor lamp and the flaming arc. But how pitifully small is even that seven per cent! Again, the eye, marvelous though it may be, has its limitations.

It is true that even without a telescope you could, in absolute darkness, see a light of one candle-power at a distance of sixteen miles, according to some recent and very accurate measurements that have been made—but only just see it and no more. If energy thus received could be utilized to heat a pound of water, it would require about 267,000,000,000 years to raise its temperature one degree Fahrenheit. But this extreme sensitiveness is needed

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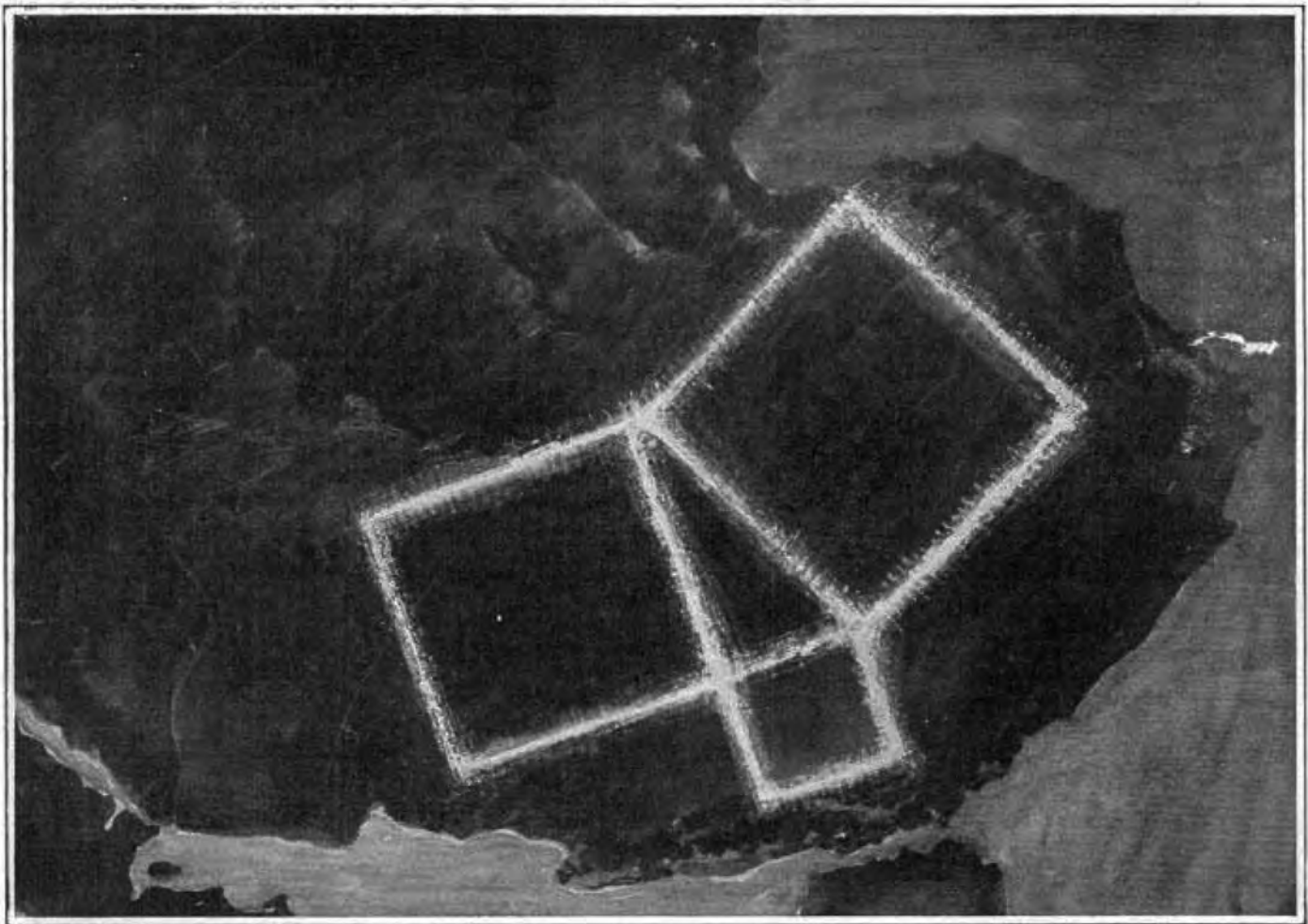
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Would, perhaps, some enterprising Martian with an eye to business establish an interstellar correspondence school, and patronizingly announce "Elementary Courses" in mysterious subjects for Earthmen and other undeveloped intellects?



If the Martians are superior beings, as Professor Lowell has argued, what shall we say to them? Something simple, something fundamental, to begin with. Thus we might present to them in electric lights strung in the desert of Sahara, as we have shown here, the proposition that

"the square on the hypotenuse of a right-angled triangle equals the sum of the squares on the other two sides." The Martians ought to recognize that Euclidian theorem, and reply with another. Picture would follow picture, until at last some kind of interstellar code would be established

because the eye has very serious limitations in another way: The pupil, even when widely dilated, measures only about one tenth of a square inch in area. It therefore catches only a very small part of the light sent out by a distant object. A telescope helps, for it is a light-gatherer.

But suppose that we could send signals of some kind to Mars. What about the Martians? How could we make them understand? Lowell tells us that Mars is very much older than the earth. Therefore, one might reason, the Martians have had time to evolve into creatures intellectually far superior to ourselves.

The Superior Martians

How can we talk to this superior being? Difficult as it would be to establish a basis of common understanding, the obstacles are not insuperable. Helen Keller, blind, deaf, and dumb, has learned how to communicate with her fellow beings. How do we know whether a Martian has eyes? We do not know. But, at least, we can make some deductions based on what we know about nature.

The human organism is not a mere accident. It is the result of a definite set of circumstances. The sun sends out light: so we have developed eyes to see. Sounds are transmitted by the atmosphere: therefore we have ears to hear. Heat is sent to us by the sun: we are equipped to feel it. All this applies to innumerable species of animals. So, too, are ears common to many creatures.

The conditions on Mars are different from the conditions on the earth. But it receives light and heat from the sun, just as we do. Therefore the Martians, we may well suppose, are able to see light and to feel heat. Mars has an atmosphere that carries sound; therefore the Martians have ears. In other words, if under the conditions described many kinds of creatures on the earth have developed eyes, ears, and other senses, it is reasonable to conclude that the Martians have developed senses like ours if their planetary conditions are similar enough to ours.

Now, if the Martians are superior beings, as Lowell has argued, what shall we say to them? In the beginning, something simple, something fundamental. By way of casual conversa-

tion, let us flash to Mars the news that twice two is four. Irrelevant, you say? Not nearly so irrelevant as saying "How do you do?" to a friend on the street who is obviously doing very well. The mere fact that we of the earth have actually bridged the immense chasm that separates us from Mars ought to produce an effect so dramatic that the Martians would condescend to speak to us. Perhaps they would regard us with mingled curiosity and patronizing kindness, as if we were rather clever children.

What Would They Tell Us?

What would the Martians have to tell us? Their world is dying—dying for lack of water, Lowell tells us. Would they paint terrible pictures of the tragic end that is in store for them?

Or would they furnish us with thrilling descriptions of their marvelous achievements in science?

Would, perhaps, some enterprising Martian establish an Inter-Stellar Correspondence School for "Earthmen and other undeveloped intellects"?

Who knows? At any rate, if it amuses you, you may speculate about it.