For the purpose of diminishing the effects of erosion at the edge of the banks of the maritime canal, and of the swells caused by the passage of vessels, there has been planted at the water's edge a reed of unusual dimensions, the Arundo gigantea, which speads its roots rapidly in the water and quickly attains a height of from ten to twenty feet. Farther back, on the slopes of the banks, there is employed with success several varieties of tamarisks (T. gallica, T. nilotica, T. articulata), whose branches take root when the sand hills just cover them, and which are intermingled with herbaceous plants like the orach (Atriplex halium) and the alfa (Stipa tenax).

In addition to the foregoing precautions it was necessary to protect the canals from the encroachment of the desert sands driven by the wind. To accomplish this there has been established, at about 350 feet from the water's edge, hedges formed of arborescent species, and 170 feet long. The filao, with horsetail leaves (Casuarina equisitifolia), an Australian tree quite well naturalized in Egypt, the acacia of the Nile (A. nilotica), the eucalyptus globulus et robusta; the cypress of Lambert; the caoutchouc and Bengal fig trees (Ficus elastica, F. bengalensis); poplars, mulberry trees and even the sycamore generally thrive well on these plantations, especially in silicious soils; this, however, is due to artificial irrigation obtained by cutting ditches from the fresh water canals derived from the Nile for the sustenance of the inhabitants.

Vegetation is more rebellious where the soil is found to be argillaceous, compact or too solid. In order to overcome this the lime-bearing waters of the Nile have been brought down, after much labor, and now a number of tamarisks, willows, orachs and other trees thrive well.

On the banks where the swells of passing vessels would endanger the young plantations of reeds, they are sheltered, for the first few years, by hurdles which are taken elsewhere when the plants thus protected have acquired sufficient strength.

THE HEAVENS IN APRIL.

BY HENRY NORRIS RUSSELL, PH D.

Although Mars is now some time past opposition and more than eighty million miles distant, he is still the most interesting object in our evening skies; and this not so much for what we know about him, as what we imagine.

The belief in his habitability, rather strengthened than diminished by the discoveries of recent years, but as yet incapable of proof or disproof, finds its most appealing presentation to the public mind in the idea of possible signaling between men and the inhabitants of the planet.

Let us for the present assume that such intelligent inhabitants exist, and that the Martian canals are their work. We may then go on to consider what signaling to them involves, and whether it would be mechanically possible.

At the outset we are limited to two ways of signaling—by means of light, and by the electric waves of the same nature but enormously longer period used in wireless telegraphy, since these alone, of all earthly means of communication, can pass through interplanetary space. Of these two, light is by far the most promising, as the unaided eye can detect a far smaller amount of energy in that form than the most delicate instruments can in the form of electric waves.

When Mars is nearest us, the earth is almost directly between him and the sun. In consequence we can only see Mars at night, and his sunlit side is turned toward us. From Mars, on the contrary, only the dark side of the earth can be seen, and that in the Martian daytime. Therefore signals from the earth to Mars would have to be made by artificial light, while those in the reverse direction might be made with reflected sunshine. Moreover, our signals would be obscured by the glare of the Martian sky close to the sun; while theirs would have only the light of the planet and stars to interfere with them. For both these reasons it is much easier for the Martians to signal to us than for us to reply, and therefore we will first calculate on the supposition that they are flashing to us with reflected sunlight.

It is surprising how small a mirror will suffice to produce signals visible at a considerable distance in broad daylight. One three inches in diameter gives flashes which are conspicuous to the naked eye ten miles away. Indeed, this is the system of heliographing messages of which we have heard so much from South Africa. The writer has no available data as to the minimum size of mirror which can be used. It is, however, probably safe to allow an inch of diameter of the mirror for each ten miles of distance if the signals are to be clearly read by the naked eye, and we will use this ratio in our work.

In the case of Mars the signals would be observed with large telescopes transmitting perhaps 10,000 times as much light as enters the naked eye from the same object. In consequence the Martians' mirror need have only 1-10,000 of the area or 1-100 of the diameter that our heliograph rule would require. We need make no extra allowance for the fact that the Martian signals are to be observed at night, since they would be seen against the bright background of the planet's disk, just as the terrestrial flashes are seen against sunlit sky or hills.

Our final ratio is then one inch of mirror diameter for each thousand miles of distance. Now the least possible distance of Mars is 35,000,000 miles. The mirror with which its inhabitants signaled to us would therefore have to be at least 35,000 inches or nearly 3,000 feet in diameter. To produce such a piece of glass is clearly far beyond the present resources of human engineering. It seems possible, however, that beings who could construct the Martian canals could also make such a mirror, but once made its mounting would present still greater trouble. It would have to be set up so that its plane was equally inclined to the directions of the earth and sun, and moved by some sort of gigantic clockwork, to counteract the planet's rotation just as telescopes have to be moved on earth. To make flashes by covering up the whole enormous structure, or by tilting it, seems hardly possible; but this end could be attained by a mirror composed of parallel strips, like the slats of a window blind, which could all be turned out of their plane at once, and later brought back to place by relatively simple mechanism; the whole to be mounted in a great frame moved by the clockwork spoken of above. No firm on earth would take the contract for such an apparatus; but it does not seem impossible that the human engineering of a few centuries hence might be equal to the task. So we reach the interesting conclusion that it is not inconceivable that men residing on Mars might be able to heliograph messages to us; and we cannot deny the same ability to the Martians, however unlike us they may be.

How hopeless the task of signaling to them would be we can now see. What gigantic conflagration, what combination of all the searchlights of the world, could produce a ray equal in intensity to a solid beam of sunlight a thousand yards across? How could we point them all correctly? And how interrupt their light at will? Remembering that these are the conditions for sending a message from Mars and that it is much more difficult to signal in the reverse direction, we may give up once for all the idea of any regular communication between the two planets.

THE HEAVENS.

As we once more watch the heavens at 9 o'clock on the evenings of the middle of the month, we see that we must soon bid good-bye to many of our old friends among the stars.

Canis Major, Orion, Taurus, and Perseus are all close to the horizon, and before another month has passed we shall lose them all. Cassiopeia, in the far north, escapes a similar fate only because her diurnal circle about the pole does not quite dip below our horizon. Auriga, Gemini, and Canis Minor are higher in the western sky, and we shall not lose them for some time yet.

Ursa Major and Leo are at their highest, fairly on the meridian. Lower down on the east is Virgo, with the brilliant Spica, and the arc of fairly bright stars between it and Leo. Below this is the little but conspicuous quadrilateral of Corvus, the Crow, who is perched on the back of Hydra, whose whole length can now be seen stretching from Canis Minor to Libra.

Arcturus is well up in the east, and Vega has just risen. Between them are the graceful circlet of Corona Borealis, and the extensive constellation Hercules, and below are parts of Ophiuchus and Serpius.

THE PLANETS.

Mercury is morning star all the month. His greatest elongation occurs on the 3d, when he is unusually far from the sun, but as he is also south of him, he rises only about an hour before sunrise.

Venus is morning star till the last day of the month, when she passes through inferior conjunction and resumes the rôle of evening star. She is too close to the sun throughout the month to be well seen.

Mars is still in Leo, moving westward till the 4th, then slowly eastward. He comes to the meridian about 8 P. M., and does not set till nearly three in the morning.

Jupiter is in quadrature with the sun on the first; that is, he is 90 degrees west of him and on the meridian at 6 A. M. Saturn comes to a similar position on the 5th. The two planets are getting quite close together in the constellation Sagittarius and will remain so for some months.

Uranus is farther west, in Scorpio, and rises about 11 P. M. on the 15th. Neptune is in Taurus, nearly opposite the planet last named.

THE MOON.

Full moon occurs on the evening of the 3d, last quarter on that of the 11th, new moon on the afternoon of the 18th, and first quarter on the forenoon of the 25th. The moon is nearest the earth on the 18th, and most remote on the 4th.

She is in conjunction with Uranus on the night of the 8th, Saturn on the morning of the 11th, and Jupiter on the afternoon of the same day; with Mercury on the morning of the 17th, Venus on the afternoon of the 18th, Neptune on that of the 23d, and Mars on the morning of the 27th.

AUTOMOBILES IN NEW YORK.

The above was the title of an address by G. Herbert Condict, before the New York Electrical Society, on March 27, at the new station of the Electric Vehicle Transportation Company, corner of Forty-ninth Street and Eighth Avenue, in this city. Before a very large audience, standing in an electric runabout for a platform, Mr. Condict related briefly a few facts concerning the rise and growth of electric transportation. He remarked that there were at the present time four hundred and fifty automobile vehicles in New York, as compared with about four thousand horse-drawn. In the next twenty years it was a possibility that no horse-drawn vehicles would be permitted in the streets, and so the vast expense of keeping the latter clean would be saved.

It was during seasons of snow and ice, when the smooth pavements were slippery, that the demand for electric vehicles was the greatest, and frequently overtaxed the facilities of the company. At these times, on one occasion, as many as four hundred calls an hour had been received. The company, of which Mr. Condict is the chief engineer, decided in the spring of 1900 to secure larger quarters, and began the work in August of last year of transforming half of the great building on Eighth Avenue, between Forty-ninth and Fiftieth Streets, formerly used as the Eighth Avenue car stables, where over 1,500 horses were accommodated, into an enlarged station covering three acres, equipped with motor current transformers, which take the Edison alternating current at 3,200 volts and deliver direct current at 110 volts; a special switchboard, which controls the current supply to six hundred separate sets of batteries, with room to spare for controlling one thousand batteries at a time; electric motor automatic water pumps for supplying the roof tank which produces the hydraulic pressure for elevating the sets of batteries and transferring them to and from the vehicles; an immense battery room, ventilated by two large electrically-operated fans in the roof; two great electrically-propelled cranes spanning the room, arranged with separate motors, for lifting and lowering individual sets of batteries from or to the charging fingers on the floor; a battery repair room, a well-equipped machine shop on an upper floor, a motor room for repairing and adjusting motors and parts to vehicles, a blacksmith shop, a paint shop, and adjoining the machine shop a long room having a double trolley wire overhead, on which runs a trolley carriage, and from it the current is conveyed by a flexible wire to a cab for testing the motors and the running of the vehicle without a battery.

When a vehicle comes in for the day the battery is transferred to the charging room, and the vehicle is washed and sent up stairs. There it is carefully inspected, the rubbed plate battery connections are brightened with sandpaper, the motors are cleaned, the vehicle trimmings examined, and the tires blown up. It is then ready for the next day's business.

So complete are all the arrangements that it was stated within fifteen seconds of the receipt of a telephone call a cab is started on the way to answer it.

The station and the system is regarded as the largest in the world, and is the most unique and perfect in all its appointments for the rapid handling of individual batteries and inserting and withdrawing them from vehicles. It represents the possibilities of the practical use and application of electricity on a large scale as applied to transportation. This system was illustrated in the SCIENTIFIC AMERICAN, March 25, 1899.

METHOD OF DETECTING HYPO IN PHOTOGRAPHIC WORK.

The importance of thoroughly eliminating the hypo from negatives or prints in photographic work is so well recognized that it need not be insisted upon, and it will therefore be useful to give a method which has been brought out in the Belgian Photographic Bulletin for detecting small traces of hypo in the washing water and thus observing when the operation is finished. Into a deep tray is poured a small quantity of the water or solution in question and a few pieces of granulated zinc are thrown in, after which add a few drops of hydrochloric acid. Place above the tray a filter paper wet with a solution of acetate of lead. If the least trace of hyposulphite remains in the solution the paper will become brown, and afterward assume a black metallic appearance. This action is due to the formation of hydrogen sulphide, which escapes to the surface and colors the paper by forming lead sulphide. In this way it is always easy to determine when the washing is finished or to examine a solution suspected of containing hypo.