"A TRIP TO THE MOON."

This is the title of an illustrated scientific lecture presented biweekly at the Carnegie Music Hall, in this city. The Urania Astronomical Society, of Berlin, brought out this unique spectacle three years ago, since which time it has enjoyed great popularity. The managers of Music Hall—founded by Mr. Andrew Carnegie—secured not long since the scenery and apparatus for production at that hall. The lecture, since its introduction here, has been rewritten by Mr. Garrett P. Serviss, the well known astronomer and astronomical lecturer, and it is now presented in a manner which commands great interest and attention. The lecture is opened by some interesting statistics regarding distances, masses, etc., which are well calculated to astonish the unastronomical hearer. The first scene is the reproduction of a solar eclipse as it was seen from the shores of one of the Havel lakes, near Berlin, on the morning of August 19, 1887. On this morning the sun arose with the greater portion of its disk obscured by the moon. As the sun ascended, the crescent diminished, and at the moment of totality the wonderful corona flashed into view. This scene gives the listener an idea of what the astronomers mean when they attempt to describe this wonderful phenomenon. Slowly the moon passes from before the sun until the earth is fully illuminated and the sky and landscape assume their normal appearance.

Interesting as these imitations of celestial and terrestrial phenomena are, the manner in which they are effected is still more so, and our front page illustration gives a peep behind the scenes and explains the means by which the illusion is produced.

The trees and foreground are set in front of a transparent prospect upon the back of which the opaque parts are silhouetted in black, leaving the sky and water translucent.

Two optical lanterns, one of which carries the crescent and the other the corona slide, are mounted upon a box movable along the inclined side of a triangular frame by a drum and cord, and are thus enabled to imitate the appearance and course of the heavenly bodies. The screen immediately below the horizon intercepts the image of the luminary below that line.

The waves that play upon the surface of the lake are produced by a slide in a third lantern. This slide consists of clockwork, governed by a set screw, and actuating three eccentrically mounted rods moving in parallel planes and supporting glass screens upon which waves are painted. The interference of these waves permits ribbons of light of constantly varying position and width to fall upon the screen and give the effect of water ruffled by a breeze.

The play of natural variations in color and intensity of light produced by the revolution of the earth and its passage through the penumbra and umbra of the moon's shadow, and the development of full sunlight, are perfectly co-ordinated with the changing conditions of their source, the sun. This part of the illusion is effected by the management of the foot and border lights. These lights are red, white, and blue incandescent electric lamps arranged in series and controlled by a regulator permitting every possible variation, combination, gradation, and intensity of tint, and to its intelligent manipulation much of the success of the scene is due.

Our interest in this mysterious darkener of the sun is now gratified by a view from the distance of five thousand miles, showing the lunar mountains and other prominent features.

The plaster image of the moon viewed through a circular piece of gauze set in a black drop curtain is three meters in diameter. The changes of phase are produced by the light thrown from the lanterns as shown in the illustration.

The vicinage of Mounts Aristarchus and Herodotus and a view of Cape Laplace are shown from a height of two and one-half miles. These splendid scenes are a triumph of science and scenic art.

By trigonometric mensuration of the shadows and application of their values by perspective, the artist is enabled to represent the general features of the landscape with fidelity. These scenes are lighted from behind by four arc lights and a bench and foot lights, having a combined illuminating power of 8,500 candles; and well bring out the contrasts of earthly landscapes, softened and harmonized by the presence of air and life, with those of the moon, which, under a sky of eternal blackness, glitter in a jeweled panoply of death, for the moon is a dead world.

From the moon's surface the earth always seems to occupy the same place, and reflects to the moon a part of the light received from the sun. This earth light is observed when the new moon is first seen, and also when the old moon disappears.

The phenomena of earth light and sunrise on the moon is given by transparent earth painted in the sky and lit up by a lantern. The mountains on either side have a lantern each, whose light is permitted to fall on the drop by gradually lowering a screen.

A modified arc light illuminates the front of the scene and gives the earth light.

Probably the most unique of the cosmic phenomena unfolded is a solar eclipse viewed from the moon.

The earth is an opaque disk, with a red gelatine band attached to its circumference with white muslin, and suspended from two hooks set in a shelf extending across its back. A coat of phosphorescent paint gives the glow. The sun consists of a box with a cover of isinglass, on which the sun is painted. Semicircular wooden arms inclose a reflector, and support six incandescent lamps, set radially inward.

The box hooks into a piece of leather with a circular aperture coincident with the sun's face and sewed into the drop. Holes in the drop allow the light from an arc light to imitate stars.

The surface of the moon is painted on canvas supported on hinged props having spread feet; a stiff rod joins the hinges and forms the horizon. A footlight is placed within this tent-like cover to illumine it.

The drop curtain carrying the sun box is raised by a windlass, and as the sun rises accompanied by the stellar host, the footlight is turned up. In passing behind the earth the sun imparts a crimson hue to the earth's atmosphere, which the footlight transfers to the moon until the extinction of the solar disk. The return to earth is marked by a view of that part of the earth's surface most resembling the moon's, the Tyrolean Highlands. The after glow of sunset, moonrise and a lunar eclipse are depicted with great accuracy.

The gradual movement of a deep red gelatine film across the lantern slide holder causes the moon to appear to enter and emerge from the earth's shadow.

A sunset in the Indian Ocean and moonrise on the first scene conclude the lecture. A series of stereopticon views of great beauty are interspersed between the mounted scenes, and thus a continuous and most interesting entertainment is provided.

The scenery and ingenious mechanical effects are designed by Mr. W. Kranz. The regulator is the invention of Mr. J. Carl Mayrhofer, the electrician of the theater. The stage plugs used for electrical connections enable that part of the work to be effected instantly. The work of this scientific theater is not to be confined to astronomy alone, but is intended to embrace those sciences that can be attractively illustrated.

Caviar.

Caviar, which is made from the eggs of the sturgeon, is an important article of exportation for many cities of Russia and Astrakhan, and principally Taganrok. The annual amount is estimated at 40,000 pouds (1 poud=35 pounds). The greater part goes to Turkey, Greece, Italy, and Germany, very little to England, and still less to France. The fisheries are situated at the mouth of the Volga, upon the banks of which stand vast storehouses with basement and cellars in which are found the tubs that contain the brine used in the preparation of caviar. The most profitable fishing is done in autumn, this season yielding the largest quantity of eggs. In winter, the fishermen make large holes in the ice and fish with the spear. At all other times they use nets, about 300 feet in length, to which are attached cords provided with hooks. Each of these is strong enough to hold a fish of large dimensions. Each establishment owns a fleet of boats. The fishes brought on board are laid upon boards and covered with salt, and are then opened for the purpose of extracting the eggs and the entrails, which the Russians are very fond of, and which they eat in a fresh state. For exportation, caviar is prepared in two different ways: 1. The eggs are washed and then immersed in strong brine for three quarters of an hour and finally allowed to drain. In this way "granular" caviar is obtained. 2. For "compact" caviar, the eggs are first cleansed, then pickled and finally allowed to dry slowly. Then they are packed closely in canvas bags which are inclosed in wooden barrels, after which they are ready for shipment. A ruder process, but one much used in the trade, consists in immersing the eggs, immediately after collection, in brine, wherein they are left for several months, after which they are dried in the sun.—*La Nature.*

A Tar Asphalt Lacquer for Iron

is composed of 30 parts of West Indian copal, 30 parts of American pine resin, 30 parts of mineral asphalt, 30 parts of tar asphalt, 5 parts of yellow wax, and 6 parts of Venetian turpentine. These ingredients are melted and uniformly mixed by stirring. If the mixing is properly done the melted compound runs off the spatula in a cohesive, uniform, thick stream. The following are then added to the substance while it is still moderately warm: Twelve parts of resin oil, 30 parts of linseed oil varnish, 30 parts of turpentine oil, and, finally, from 30 to 45 parts of benzine. If it be desired to make the lacquer thin fluid, the quantity of benzine is increased. Painting must be several times renewed, the more often the finer the appearance.

FLANGED pulleys destroy many good belts. A properly rounded pulley will retain the belt on the center. A belt ought only to have contact with the pulley face.

Correspondence.

Detecting a Mirage.

To the Editor of the Scientific American:

In answer to "R. M." (4171), who inquires about means of detecting a mirage, will say: If the mirage be near the horizon, as was the case in each instance observed by the writer in Southern California, the deception may easily be eliminated from the real by bending close to the ground and taking a view, then suddenly rising to the full height, keeping the eye on the scene in meantime. Then reverse the plan. Before bending very low, the false view suddenly "shuts out," or disappears as by a screen, while the real scene only disappears as terrestrial objects hide it. In certain instances it is well to add to the upright view by a jump if no object can be utilized. This experience adds to the novelty of a mirage, and is wholly convincing.

JOHN S. PALMER.

Litchfield, Ct., March 26, 1892.

Occupation for Old People.

To the Editor of the Scientific American:

I have been much interested in the discussion in relation to the suitable occupation for aged and feeble people, and in the many good suggestions offered I have not seen a word regarding one of the most interesting occupations that an old or retired person can devote himself to, and that is the breeding of poultry. There is nothing more suitable to one with feeble health than the care of a growing flock of poultry, whether it be of common barnyard stock or the purest of pure bloods. There is especially in regard to the latter a fascination that has enraptured many a tired-out business and professional man, and the old men will find in it an ever-changing, an always-interesting, and many times a puzzling topic of study. And there is an incentive of profit that should not be overlooked. How to feed to get the best supply of fresh eggs, the proper course to follow in setting the old hen, the impatient longing to see how many chicks she will bring off, the pleasure of "counting the chickens before they are hatched," and then to watch the growth and development of the future prize winners—all of these serve to stimulate and keep up the interest of many an old man who is weary with nothing to do. Then there is plenty of opportunity for him to exercise his ingenuity in building houses, fitting up his yards, and the thousand and one things necessary to the proper care of fine fowls, that he need not complain for lack of occupation. Let the old man invest in a pen of Brahmas or Plymouth Rocks; my word for it he will take a new lease of life. And when he partakes of an egg laid on his own premises, or masticates the juicy flesh of a home-grown broiler, it will be with a keener relish and a sense of satisfaction that can only be realized by those who have earned their appetites by their own exertions.

W. H. HAMILTON.

Danielsonville, Conn., March 23.

Aluminum as a Coin.

Sir Henry Bessemer points out the insecurity and inconvenience of the proposed £1 note, and suggests the introduction of a coin which shall represent a value of £1, and be redeemable on presentation. He says: The issue of a coin which shall represent a value of £1, and be redeemable on presentation, would, it seems to me, be in inself as acceptable a security as a promise to pay printed on paper; while the convenience of handling in the daily course of trade, its safety from injury or destruction in the pocket, or from accidents by fire or water, and its immunity from the accretion of dirt and the consequent indistinctness of the paper note, are greatly in favor of the coin. The first impression produced on the minds of many persons by this proposal will naturally be the door which it apparently opens to fraud by the casting of such coins in plaster of Paris moulds and the coating of them by the electrotype process, just as base silver coins are now made. Some ten years ago such fears would have been well founded, but the science of metallurgy has given us a new metal which effectually bars the way to this mode of forgery, while its distinctive character is so clearly defined that a child could tell, even in the dark, a genuine coin from a spurious one. The new metal—aluminum—may be slightly alloyed, so as to harden and increase its durability, and at the same time raise its fusing point, and thus render the casting of it in plaster moulds quite impossible. The specific gravity of aluminum is 2·56, while that of silver is 10·47, so that an aluminum coin of the exact size and thickness of a common florin would weigh a minute fraction less than a silver sixpence; hence, as I before observed, if taken from the pocket in the dark it would be instantly recognized by its extreme lightness, and could never be mistaken for any coin made of gold or silver, while the great weight of all lead or pewter alloys, which are capable of being cast in plaster moulds, would not admit of their being passed off as aluminum coins, however their external surface might be coated or colored in imitation of that metal.

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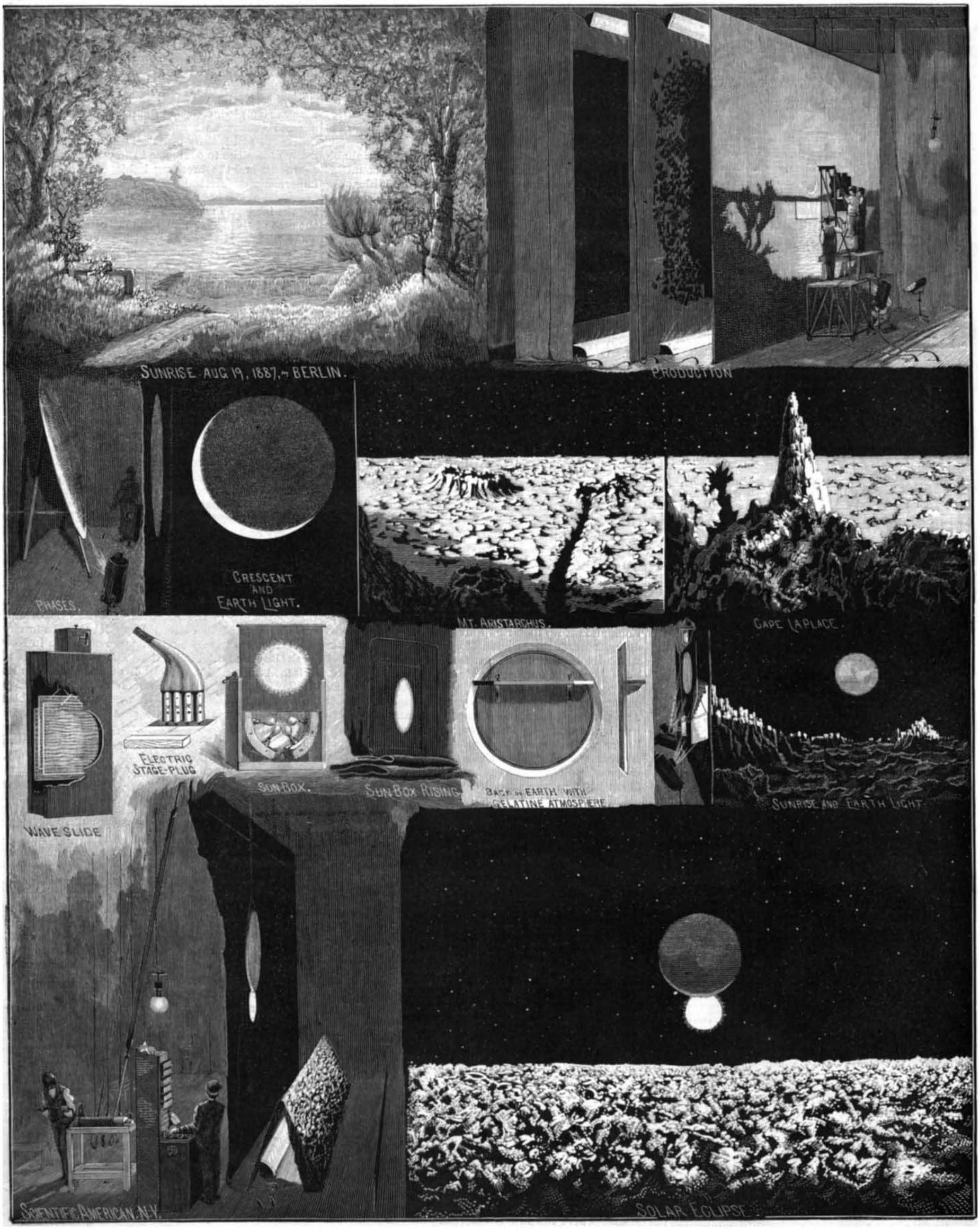

APPARATUS USED FOR ILLUSTRATING "A TRIP TO THE MOON," CARNEGIE MUSIC HALL, NEW YORK —[See page 229.]