



## PROFESSOR'S TALK.

### SOLAR ECLIPSES.

WHEN the moon passes between the earth and the sun then there is a solar eclipse; that is, the rays of the sun are cut off from the face of the earth.

A solar eclipse is caused by the moon only. There are two planes between us and the sun, and although each is much larger than the moon, yet there is no eclipse when either gets between the earth and the solar center. The reason is, they are so far away that when either is thus seen it seems as if a play-mare were crossing the face of the sun. Such a phenomenon is called a *transit*.

The moon is so near us that, although a comparatively small globe, it is apparently large enough to cover the face of the sun of day.

When the moon is precisely on a straight line running from the earth through the centers of the moon and sun, the eclipse is *total*; but when it is several thousand miles farther away from the earth than ordinarily, then its apparent size is smaller than the face of the sun, and hence at the very moment there otherwise would be a total obscuration, it is an *annular* eclipse. That is, the part of the sun that can be seen is like a ring.

Frequently the moon passes as if it were a little higher up or lower down than the imaginary line running from the earth through the solar center, and instead of the entire face of the sun being covered there is more or less a *partial* eclipse.

There are then three kinds of solar eclipses: partial, annular, and total. The last is by far the most interesting. The sudden darkness thus caused resembles neither the darkness of night nor the gloom of twilight. Stars and planets appear, and all animals are dismayed by the dismal aspect of nature. The very chickens return home to roost.

Astronomers take especial interest in total eclipses. Aside from calculating in advance the very day, the exact hour, the precise minute and fraction of a second when such an event will occur, they make great preparations for months beforehand to observe it, and often travel thousands of miles and transport many cases of instruments to make the observation as complete as possible.

The latest total eclipse occurred on May 17th last. It was visible in the northern part of Africa. The duration of the totality was but seventy-two seconds, yet our scientists say the results justify the expense and pains taken.

The first item of interest was the discovery of a comet heretofore unseen. Fortunately it was photographed and thus the picture of the daring intruder in solar domains will form a study of attractive interest.



WATERLOO BRIDGE.

The next item is the observation of phenomena that establish almost to a physical demonstration a lunar atmosphere. It was heretofore generally supposed the moon was a worn-out planet and its surface a scene of utter desolation without an atmosphere. But now we likely will have to modify our suppositions, and the coming century may lead to greatly enlarged views of this satellite.

The most important item is that the spectrum of the corona was photographed for the first time. We may hope for increased knowledge of the constitution of the sun's magnificent appendage—an appendage, seen only in a total eclipse, so grandly beautiful as to make the beholder feel like calling his eyes in the celestial presence. The corona with its silvery light, its spreading wings, its circles, arches and curves stretching out into fathomless depths around the darkened sun, is considered as one of the most impressive and awe-inspir-

ing sights in which colossal magnificence and grandeur are ever embodied. And of such we have a photograph.

### Up Vesuvius by Rail.

A RAILWAY UP VESUVIUS? It is a little thing of its kind, covering only the last four thousand feet of mountain summit. But the boldness of its design and the originality of its construction are greatly heightened in their effect upon our minds by the associations surrounding our work. Vesuvius, which still is a long summer, terrified the whole world in its awakening. Vesuvius whose mysterious fires have seemed to super-stition the outlet from a world of denunciations and chains by which a Lullian car, drawn up and down, brings puny loads of creation to gaze amazed and fearless at the glare of the mountain's volcanic wrath. Such a mode of climbing is so far appears, at least, not less poetic than the old system of elevation in a chair borne by four strolling and sweating laborers.

The plan of the Vesuvius railway is very different from that which ascends the Rigi. The incline is much steeper, and the course is direct. The expenditure of an endless rope running round pulleys at either end of the course and worked by a stationary engine, has long been familiar. It is, we suppose, older than the locomotive, and was, till quite recently, used in the Liverpool tunnel, between this city and the other side of the Mersey.

Up Vesuvius is considerably steeper than that of any other incline hitherto used for passenger traffic, unless that of the Simplon-Alp, near Vienna, equals it. The line up which the railway is run ascends at an angle of from thirty-three to forty-five degrees.

On such an incline, to trust a railway-carriage to the tenacity of a rope, over ten thousand feet long in its double course, might seem somewhat daring. But ropes of steel wire are more trustworthy than any chain, and the little carriage is fitted at either end with powerful brakes, which, it is said, would be sufficient to hold it stationary in mid-career, even were the rope to break. We earnestly trust, however, that the capacity of the brakes may never have to be proved by such an accident.

On first sight there appears to be only one rail laid on a single row of sleepers running along the middle of the way. But there are really three rails—one at the top of the sleeper, and one at either side beneath its base. Those side rails are laid at an angle, and adapted to wheels, whose axles project from the floor of the carriage at an angle of about forty-five degrees, which wheels, tightly grasping the rails on either side, keep the carriage secured upright. The carriage itself is so contrived that, notwithstanding the incline at which it runs, the passengers sit comfortably on horizontal seats, with a level floor beneath their feet. The station is situated close to the Ol-

iveon and earth, much celebrated the construction of industry's honest struggle to the nation of the past with the present to the conquest of nature's mysteries, and to the edification of the nation with opportunities and pleasures denied it and to all but a privileged few. The work has a beauty which we trust even when Vesuvius is in fieri would not be willing to respect.

### Waterloo Bridge.

Few people in this country fully know much about London. We go there and spend a few months, and are bewildered. It is by no means the wonder of the world, the El Dorado of wealth, the seat of industry, arts, sciences, products of every kind from every part of the world, mighty marvelous magnificence. When a man has been there five or ten years he begins to say: "Of all the cities of the world there is nothing like it." There are two things more to be found out. There are few structures in London more wonderful than the magnificent



WATERLOO BRIDGE.

bridge which cross the Thames. One of the finest of these bridges, of which there are over twenty, is Waterloo Bridge, as represented in our illustration.

### Tunbridge Castle.

TUNBRIDGE is a town of considerable size and importance. It is in the County of Kent, England, and stands on the Midway. It is only twenty-seven miles from London. The castle, which is situated on the Midway, near the entrance of the town, dates from the close of the thirteenth century, has a noble gate-tower of great size, richly ornamented, and is at present occupied as a military training school.

### Lord Byron and Count D'Orsay on Manners.

"MANNERS make the man," said Count D'Orsay. "I never judge from manners," replied Lord Byron; "for I once had my pocket picked by the civillest gentleman I ever saw with, and one of the mildest persons I ever saw was Ab Pacha."

### Pestalozzi on Thought.

THINKING leads man to knowledge. He may see and hear, and read and learn, whatever he pleases, and as much as he pleases; yet he will never know anything of it, except that which he has thought over, that which by thinking he has made the property of his mind. Is it, then, saying too much, if I say that man, by thinking only, becomes truly man? Take away thought from man's life, and what remains.

### Solon's Laws.

One day, while Solon was composing his laws he was ridiculed for his trouble. "Writings can never restrain men," said the objector. "They are spider's webs, which catch only flies." "Men," replied the philosopher, "readily observe that which they are agreed on, and I frame my laws in such a manner that the citizens will know it is to their advantage to be no prattler than to break them."

### Aime Martin, on the Responsibility of Wives.

A WOMAN disposes of the life and honor of a man, guided by his passions, who wishes, and her wishes are fulfilled; who wills, and is directly obeyed. Her children will may give a hero to her country, or an assassin to her family, according to the loftiness of her soul, or the blindness of her passion.



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