six degrees there will be nothing interesting in her far-away greeting.

The moon just now is an important member of the solar family. Something new is promised in her monotonous story. The observers of the recent solar eclipse detected intimations of an atmosphere on her apparently lifeless surface. This is confirmation strong of some appearances on her disk that have never been accounted for and scarcely credited in scientific quarters. Only two days after the eclipse an observer, armed with forty years' experience, while looking at the moon saw, just over the westerly edge of the Mare Crisium, a peculiar cloud not less than a hundred miles long and forty or fifty miles wide, presenting a misty, feathery appearance, unmistakably different from the other portions of the lunar surface.

If this appearance was a reality, and not an optical illusion, other observers will probably detect something similar when the new moon comes round to the same position again. The face of our neighbor will be scrutinized as it never was before if there be the slightest prospect of overturning the old theories of lunar physics.

TELESCOPIC WORK.

The July field of labor for the amateur telescopist is not an extensive one. Jupiter, Saturn, and Mars are too far away to be favorable for observation. Venus still presents her gibbous phase, but is too near the sun for a satisfactory view. Mercury, until the 19th, takes on the form of a crescent. On the 19th his appearance is that of the moon at her first quarter. The rest of the month he presents the gibbous phase. It will require a powerful telescope to bring to view the sea-green disk of Uranus, but his delicate tint, in contrast with the ruddy hue of Mars, when, on the 27th, they are only six minutes apart, will be an interesting planetary study. Observations on the moon will receive a new impulse from recent events bearing upon her history.

The never-failing variety that characterizes the study of astronomy finds ample illustration on the July records. Three important themes demand the close attention of the student of the stars. The approaching transit of Venus comes first in importance. The busy notes of preparation for the event are sounding over the civilized world. Forty expeditions are beginning to carry out their plans. The eight French expeditions start for their stations during the month. All over the United States the observatories are being put in order, and the instruments are being prepared to do their best work, while the astronomers congratulate themselves that the transit has come to them, instead of obliging them to go to the transit.

The Martian canals, and the more marvelous observation of their duplication by progressive parallel lines, as seen by the keen-eyed Schiaparelli in the serene atmosphere, and under the cloudless sky of Milan, is another theme for study which may greatly influence the present theory of Martian physics.

In the third place, the moon comes in for a large share of attention. The French astronomers have discovered indications of an atmosphere, and unexplained appearances on her disk, before and since the eclipse, confirm the observations made at that auspicious hour.

Thus July furnishes astronomical studies of intense importance. The transit of Venus takes more tangible form as it draws nearer, the Martian markings are a wonder to the men of science, and the moon, apparently the abode of death, gives signs of life. Meantime the four morning stars sing together as they move in rhythmical harmony around the central source of life and light, and the three evening stars fulfill their course, the peerless Venus reigning supreme over her brother planets and the grand concourse of attendant stars.

IS THERE WATER ON THE MOON?

In a recent communication, Mr. Helmuth Dueberg, of Berlin, presents a new theory of the moon, and argues the possibility of its being inhabited on the further side.

It is well known that the moon always presents the same face to the earth. Because this side of the moon is an airless and waterless desert, we are not justified, Mr. Dueberg thinks, in assuming that the other side is like it.

Since the moon does not revolve so as to change the side presented to the earth, and since the attraction of the earth for the moon is very great, the heavier side, if there is any, must be turned this way. Supposing the moon to possess air and water, these lighter and more fluent elements of her composition would of necessity lie on the further side.

In the absence of any centrifugal force due to rotation on her own axis, the only centrifugal force acting upon the moon must be that resulting from the moon's motion round the earth. This would tend still more to throw the moon's air and water to the "out"-side with respect to the earth. For a practical illustration of this view, Mr. Dueberg suggests a ball swinging in a circle by means of a cord. The ball, like the moon, will always turn the same side to the center of revolution; and if it be dipped in any liquid, the liquid will be rapidly accumulated on the opposite or outer side. Hence the possibility of water, air, and life on the moon, around the shores of a central lunar sea, on the side always turned away from us.

RUSSIAN PETROLEUM PIPE LINE.—The petroleum pipe constructed from the Couban oil territory over the Caucasus Mountains to Novoroszisk Harbor, on the Black Sea coast, was opened May 27. It is 105 miles long, with a daily capacity to deliver 30,000 puds (about 1,000,000 lb.) of petroleum.

John Scott Russell.

John Scott Russell, Vice-President of the British Institution of Civil Engineers and the Institution of Naval Architects, is dead. He was born in the Vale of Clyde, in 1808. On leaving college he adopted the profession of engineering, and in course of time became manager of one of the largest shipbuilding and engineering establishments in Scotland. He removed to London in 1844, where he constructed several large steamships.

As a ship builder he was led to investigate the laws by which water opposes resistance to the motion of floating bodies, and he established the existence of the "wave of translation," on which he founded his "wave system" of construction of ships, introduced into practice in 1835. A paper bearing on this subject was read before the British Association in 1835, and for some years he continued his experiments, which amounted to the almost incredible number of 20,000.

The first vessel constructed on his "wave principle" was the Wave, in 1835, which was followed by the Scott Russell, in 1836, and the Flambeau and Fire King, in 1839, all of which proved successful. Mr. Scott Russell's principle was adopted by Mr. Brunel in designing the Great Britain, and it has steadily made its way both in this country and in the United States, and was carried out in the Great Eastern, the latest triumph of Mr. Scott Russell's genius. A memoir on the laws by which water opposes resistance to the motion of floating bodies was read by Mr. Scott Russell before the Royal Society of Edinburgh in 1837, and obtained for him the large gold medal, and he was elected a fellow and placed on the council of the society. Ten years later he was elected Fellow of the Royal Society of London and member of the Institution of Civil Engineers, of which he was a vice-president; had long been an active member of the British Association; was a member of the Society of Arts, and was for some time its secretary. He was one of the three original promoters of the Great Exhibition of 1851, who, under the direction of Prince Albert, planned and organized the preliminary arrangements, and, in conjunction with Sir Stafford Northcote, was joint secretary of the royal commissioners for carrying out the Exhibition. He was one of the founders of the Institution of Naval Architects, and was one of its vice-presidents, and had contributed many important papers to its Transactions. He completed a large and costly treatise entitled "The Modern System of Naval Architecture for Commerce and War," which comprehends the theory of naval design, the practice of ship building in iron and in wood, the principles of steam navigation, and is illustrated with 150 engravings, containing the finest works of modern shipbuilders and engineers.

Erastus W. Smith.

In the death of Erastus W. Smith New York loses one of its most prominent mechanical engineers. Many of the largest engines in the country are from his designs. Those of the Bristol and the Providence, of the Fall River Line, and of the Massachusetts and the Rhode Island, of the Providence, are among the latest. That of the Rhode Island was the last one he designed.

Mr. Smith was at the time of his death engineer-in-chief of the Providence Line, and a trustee of the Brooklyn Bridge. Among the public works in which he was engaged at different times are the iron bridge across the Harlem River and the waterworks at New Orleans and Chicago. The honorary degree of Doctor in Physical Arts was conferred upon Mr. Smith in 1866 by the University of New York. It was the first degree of the kind ever conferred in this country.

David Thomas.

David Thomas, inventor of the process of smelting iron with anthracite coal, died at his home, in Catasauqua, Pa., June 20. Mr. Thomas was born in Wales, November 3, 1794. At the age of eighteen, he went to work in a blast furnace in which coke was used. Subsequently, when at work in a furnace built over a fire bed of anthracite coal, he began to experiment with it, finally arriving at the knowledge that the one thing needed to make anthracite available for iron making was a stronger and hotter blast than was employed with other coals. The first successful anthracite iron furnace was completed in February, 1837. The same year Mr. Thomas was engaged by the Lehigh Coal and Navigation Company to set up an anthracite furnace in Pennsylvania. It was completed in 1839, and became the founda tion of the vast iron industry at Catasauqua. Mr. Thomas lived to see 5,000,000 tons of pig iron produced annually by the process he invented.

The Iowa Tornado.

On Friday and Saturday, June 17–18, a severe storm swept over the Central West, and a number of violent whirlwinds were developed in a belt of country four hundred miles wide, along the southern edge of a barometric depression stretching from Dakota to Lake Michigan. The greatest havoc was wrought, Saturday night, in Iowa, beginning at Jefferson, ninety miles west of Grinnell, and trending eastward and southerly past Grinnell to Iron Ridge and Mount Pleasant, a distance of 200 miles. For a distance of 150 miles across a thickly settled portion of the State the tornado swept a path half a mile wide, wrecking in its course parts of Grinnell, Malcolm, Mount Pleasant, and smaller settlements, besides a vast number of detached farm houses. The *Des Moines Register* had learned (June 20) the names of sixty-nine killed and five hundred wounded, perhaps one hundred of them fatally. Over three hundred families had their homes entirely wrecked. Iowa College had all its buildings destroyed.

One remarkable feature of the storm was the late hour of the occurrence of the severe whirls. The fierceness of the tornado near Grinnell was first felt about seven miles north west, where at eight o'clock in the evening, buildings were blown down in the track of two waterspouts, causing five deaths. Immediately northwest of Grinnell the two water funnels merged into one, and struck the west line of the town where the most lives were lost. The buildings were smaller, and many of them were without cellars. In the northern part of the city, where the houses were larger and with more cellars, there was less fatality. After wrecking the large college buildings—a three story brick and a four story stone structure—the storm seemed to narrow and take on more of the whirling character, twisting buildings in all conceivable directions. Professor Macomber, of the Agricultural College, gives the width of the storm funnel there as 300 feet. Trenches were torn by it in the ground from one to three feet deep and fifty feet long, probably plowed by wrecks of houses. It is estimated that fifteen hundred persons in Iowa were left homeless and impoverished by the storm. The general storm of the 17th was exceptionally severe throughout Kansas, Missouri, and Illinois. Many buildings and vessels were wrecked at St. Louis and across the river at East St. Louis. Much damage was also done at Kansas City, Mo., and elsewhere. The storm was severe also in Canada, and something like a tornado was felt as far east as Saratoga in this State.

The Recent Eclipse of the Sun.

The chiefs of the English, Italian, and French eclipse expeditions to Egypt, Messrs. Lockyer, Tacchini, and Thollon, report their observations in the following collective dispatch:

Unprecedented facilities were accorded by the Egyptian Government for the observation of the eclipse. A plan was agreed upon between the English, French, and Italian expeditions. Among the results the most satisfactory are photographs of the corona and a complete spectrum obtained by Schuster on Abney's plates. H and K are the most intense lines. A study of the red end of the spectrum of corona and protuberances was made by Tacchini. A comet near the sun was a striking object; it was photographed and observed by the naked eye. Bright lines were observed before and after totality at different heights by Lockyer, with intensities differing from Fraunhofer's lines; by Lockyer and Trepied an absolute determination was made of the coronal line 1474 in Kirchhoff's scale; by Thollon and Trepied the absence of dark lines from the coronal spectrum was noted. Tacchini and Thollon, with very different dispersions, noted many bright lines in the violet. Thollon observed spectrum of the corona, and Schuster photographed it. The hydrogen and coronal line were studied in the grating spectroscope by Buisieux, and with direct vision prism by Thollon. Rings were observed in the grating by Lockyer, of the first, second, and third order. The continuous spectrum is fainter than 1878, stronger than 1871. An intensification of the absorption lines was observed in group B, at moon's edge, by Trepied and Thollon.

American Watches in New Zealand.

In a report on the watch and clock trade of New Zealand, Consul Griffin says that, though the introduction of American clocks and watches into New Zealand is comparatively of recent date, they have become so very popular and so general in use that the trade in them bids fair to swell to large proportions. Most of these goods reach New Zealand by way of London.

Mr. Bartlett, a leading jeweler of Queen Street, Auckland, said to Mr. Griffin:

"It is difficult to sell an English watch, and as far as the Geneva watches are concerned, they are being fast driven from the market. Everybody seems to want an American watch. I am not prepared to say that American watches are any better than other watches, but it is the fashion to have them. There is not a boy or a servant girl in the country who can raise five pounds, who does not want to invest it in an American watch."

Mr. Bartlett, while acknowledging the popularity of American watches, expresses a decided preference for the old-fashioned hand-made watch, but frankly admits that his customers do not agree with him.

Artificial Parchment.

Messrs. Herold & Gawalowski, of Bruun, make as follows, a strong, artificial parchment, impermeable by water, and capable of serving for the diaphragm in osmotic operations on solutions of impure sugar, etc.: The woolen or cotton tissues are freed, by washing, from the foreign substances, such as gum, starch, etc., which may cover them. They are then placed in a bath slightly charged with paper pulp; and to make this pulp penetrate more deeply, they are passed between two rollers, which slightly compress them. The principal operation consists in steeping the product for a few seconds in a bath of concentrated sulphuric acid, after which it undergoes a series of washings in water and ammoniacal liquor, until it has lost all trace of acid or base. It is then compressed between two steel rollers, dried between two others, covered with felt, and finally calendered, when they are fit for use.