

## NEXT THURSDAY'S TOTAL ECLIPSE OF THE MOON.

(Written for the Deseret News by Dr. James E. Talmage.)

Astronomical event of considerable interest is announced for the evening of the 15th of October. This is nothing less than a total eclipse of the moon, under conditions that, barring cloudiness, promise to be particularly favorable for observation throughout the greater part of the United States. Nearly three years have passed since the occurrence of the last lunar eclipse, and that was but partial, the most recent total eclipse of our satellite visible in this country dates back four years. Furthermore, a partial eclipse of the sun is to occur on the 30th inst.; this, however, will not be observable in any part of the United States, though vis-

would not permit. The moon's umbral shadow is shown as touching the earth, but the penumbra of the moon is omitted.

## CASTING OF SHADOW.

The shadow cast by the earth, as the sun's rays bathe one side of our planet in light while leaving the opposite hemisphere in darkness, is of conical form, tapering to a point, and extending to a distance about four times the moon's distance from the earth. The shape of the shadow is determined by the fact that the sun is of vastly greater size than the earth. But beside this shadow cone of deepest darkness, from which all of the solar rays are excluded, there are regions of partial shadow, from which only part of the sun's light is cut off. The complete shadow is called the umbra, and the partially darkened space the penumbra.

Ordinarily there is so little diminu-

People of Utah and the Great West Generally More Favorably Situated to View The Event Than Those of the Far East—It is Nearly Three Years Since the Last Lunar Eclipse—Exact Time When Moon Will Enter Penumbra and Umbra and When Total Eclipse Will Occur and End—A Partial Eclipse of the Sun Will Take Place on the 30th Inst.

more favorably situated for observing the coming eclipse than are the people of the east, since, according to our time the event will occur much earlier here than on the Atlantic coast. The moon will pass almost centrally through the earth's shadow, and will remain in darkness for about an hour and a half. The principal features will occur in order as follows, according to Mountain standard time:

Moon will enter penumbra, 8:17 p. m., Oct. 15.  
Moon will enter umbra, 9:17 p. m., Oct. 15.  
Total eclipse will begin 10:19 p. m., Oct. 15.  
Total eclipse will end 11:48 p. m., Oct. 15.  
Moon will leave umbra, 12:50 a. m., Oct. 17.  
Moon will leave penumbra, 1:50 a. m., Oct. 17.

While eclipses of the moon are of great and instructive interest, they are of comparatively small value to the astronomer as a means of making accurate measurements, owing to the difficulty of determining the precise instant of contact between the moon's disc and the edge of the earth's shadow. For, while to the naked eye the shadow appears sharp as it first shows on the moon's face, through the telescope it is

structive. Place a ball or other small object near the center of a table to represent the sun; now place a smaller ball on the same table top at some distance from the first; this second ball is to represent the earth; and a still smaller ball may be used to typify the moon. Now, as these three bodies are on the same plane, the moon, when on the opposite side of the earth from the sun, would be in the position to suffer eclipse. If in place of the central ball representing the sun a lighted lamp were used, with its flame on the same plane, the shadow cast by the earth-ball would be seen to cover the ball representing the moon. But as stated, the sun, moon, and earth, are not always on the same plane, and therefore the moon may be, and is, sometimes above and sometimes below the shadow cone cast by the earth. Raise the moon-ball a few inches above the table top and move it round the earth-ball on a plane inclined about five degrees to the table top, to represent the moon's actual revolution about the earth, and it will be seen that the revolution may be completed without immersion of the moon-ball in the earth's shadow.

Sometimes the moon when full partly enters the earth's shadow, but is not entirely immersed; the result is that

that the darkness which prevailed at the time of the crucifixion was due to a solar eclipse; for it is uncontestable that the Jewish Passover, at which season the crucifixion took place, was held during full moon, and at such time no eclipse of the sun was possible.

From the explanation already given, it will be seen that did the orbits of earth and moon coincide, an eclipse of the sun would occur at every new moon phase. In fact, however, the sun is eclipsed only when the new moon is on a plane with the earth's orbit, or, as the astronomer would say, when the moon is at or near her nodes—points of intersection of the two orbits. See illustration No. 3.

The discs of sun and moon appear to be about the same size; but the apparent relative sizes vary as the distance of the earth from the sun and of the moon from the earth varies. When the moon is nearest us her disc may appear larger than the sun's, and if a solar eclipse occur at such time the sun may be entirely hidden by the moon, in which case the eclipse is total. If, however, at the time of eclipse the moon appear smaller than the sun, the face of the latter is not entirely covered, and a ring of light will border the edge of the moon, producing an annular or ring-like eclipse. This appearance is illustrated by diagram No. 4. Further, if the new moon be near, but not exactly at her node, only the upper or lower corner of the sun's disc may be covered, and the eclipse would be described as partial.

## A TOTAL SOLAR ECLIPSE.

An interesting and impressive incident of a total solar eclipse, is the opportunity afforded of viewing the glorious corona or fiery envelope of the sun. When the sun's face is entirely hidden by the moon, the lunar disc appears to be bordered with brilliant beady flames of indescribable color. See illustration No. 5.

The motions of earth and moon hav-

ing been determined, it is possible to calculate and predict with accuracy the occurrence of eclipses, many years in advance. But even without such accurate calculations the ancients learned to predict eclipses by the fact of their regular recurrence. The Chaldeans, centuries before the Christian era, discovered the Saros or period of recurrence of eclipses, which they found to be about 18 years, or, as we now state it more exactly, 18 years plus 10 or 11 days as determined by the occurrence of four or of five leap years within the period.

Inasmuch as an eclipse of the moon is visible over a whole hemisphere,

can be fewer than two eclipses of both kinds during a year. In the case of the maximum number, five will be eclipses of the sun and two of the moon, or four of the sun and three of the moon. If only two eclipses occur during a year they will both be of the moon. Of course, many of these possible eclipses may be but partial ones. Many superstitious fears of eclipses and their possible effects have been and still are experienced by ignorant people. The Hindus and Chinese used to consider a solar eclipse as an attempt on the part of some supernatural monster to swallow the sun; and on the approach of the darkness due to the passing of the moon in front of the sun, the people would assemble with all kinds of noisy instruments and make such uproar as was supposed to frighten the sun-devourer away.

It is related that Columbus once profited by his knowledge of an approaching eclipse of the moon. It was in 1504 when his ship was wrecked off the coast of Jamaica. After he and his men had reached the shore, the natives refused to supply them with food. He told them that their Great Spirit was offended at them for their unkind treatment, and would that night darken the moon as a sign of his anger. When the eclipse began the barbarous natives were thoroughly frightened, and hastened to extend the assistance desired, beseeching the white mariners to intercede with their deity for pardon. In the Chinese annals are records of eclipses, which if reliable, date back as far as 2127 B. C. It is related in the history of that oriental land, that fully four thousand years ago, and that the astronomer-calculator of that day, were put to death by order of the emperor because of their failure to predict an eclipse of the sun.



Corona seen at time of total eclipse.

While an eclipse of the sun is visible over a comparatively narrow tract, there are more lunar than solar eclipses visible at any one place. There may be as many as seven, and never

## MOST REMARKABLE BOOK IN AMERICA.

The most remarkable volume ever issued in this country has just been published by the Peabody Museum of American Archaeology and Ethnology at Harvard. It is an exact facsimile, in the colors of the original, of one of the finest and best preserved ancient Mexican manuscripts in existence—the long lost codex owned by Lord Zouche of Harynworth. This facsimile reproduction has been named the Codex Nuttall, in honor of Mrs. Zella Nuttall, an honorary assistant of the museum, who discovered the existence of the original after it had been lost to view for centuries, traced it to its present English owner, spent months in a careful study of its contents, directed the work of reproducing it and has written a careful introduction which explains its peculiarities and text so far as they are explainable in the light of modern archaeological science.

The Codex Nuttall, like the other examples of the same kind of picture-writing, is painted on strips of prepared deer skin which are glued together in such a way as to form a long folded band, and so lasting are the colors employed—which were made by a secret process that the native artists refused to disclose to their Spanish conquerors—that even now, after more than 400 years, they are still bright and fresh.

There is a belief among archaeologists that the codices were not complete records, but rather in the nature of notes which were used to preserve legends and perhaps history, for hands and heads in impromptu song or verse as they traveled about the country, much as Homer is supposed to have first told his story of Ulysses.

## SAN FRANCISCO GETS NEXT ENCAMPMENT.

Washington, Oct. 12.—The Grand Army of the Republic today decided by a large vote to hold its encampment in 1903 at San Francisco. Practically the only competitor was Atlantic City, but few votes were cast for Saratoga. The chances of the last mentioned place were destroyed by the decision of the New York delegation to support San Francisco, and when the solid vote of that delegation was cast today for the city of the Golden Gate, the vote was 1,000 to 100. The city of San Francisco, 573, Atlantic City, 178.

The selection of San Francisco was then made unanimous.

## STILL NO LAWYERS THERE.

"Billy" Saunders is a natural born wit. He is in his 80th year, living here in New York and still working at his trade, painting. On a recent occasion "Billy" and one or two of his mates were beautifying a lady's room, and one of the younger painters, thinking to take a "rise" out of "Billy," said:

"I say, 'Billy,' did you ever know of a painter going to heaven?"

"Yes," replied "Billy," "I knew of one once."

"But do you think he stayed there?"

"Well, I did hear that they tried to put him out."

"And did they not succeed?"

"No. According to the latest accounts, they had not succeeded."

"Why, how was that?"

"Well, sonny, it was this way: They couldn't find a lawyer in the place to draw up the papers!"—New York Tribune.

agnons, a large chalice, a small paten or cover for the chalice, and a large plate were given to the church by George II, and bear this inscription: The gift of His Majesty King George II to the church of St. George, in the city of London, in the year 1726, at the request of His Excellency Gov. Belcher, 1726. The royal arms of England are on each piece.

A bust of Washington, made by John Wright, the Quaker artist of the left of the phin, stands at a niche at the left of the church. It was presented to the church in 1815. Lafayette is said to have acknowledged the perfect reproduction when he visited "The Old North" in 1824, and said: "The Old North is a very large and valuable copy, printed by John Baskett at Oxford, England, in 1717. In the top left hand corner of the last page of the twentieth chapter of St. Luke is printed the words: 'The parable of the vineyard (vineyard)'. In one prayer book where the prayers for the king and royal family occur, paper has been pasted over them, and the words 'Protestant Episcopal church of America' have been substituted for 'Church of England.' In fact, all the prayer books have been altered to conform to the new order of worship.

The sterling silver communion service of 15 pieces was the gift of several people at different periods. Two large

## NEW LINCOLN ANECDOTE.

While I was an inmate of Gleason Sanitarium, Elmira, N. Y., I heard the following anecdote of Abraham Lincoln. We had at the sanitarium a very old gentleman by the name of Z. C. Robbins, but had lived in Washington, D. C., for 59 years, his business being a patent lawyer. He was intimately acquainted with Mr. Lincoln and was selected by him as chairman of the first police commission after his inauguration in 1861. To this Mr. Robbins I owe the recital of the story to which I have alluded. He said:

After the emancipation proclamation had been written, it will be remembered, six months were given to the Confederates to lay down their arms and come back to the Union, before it was to go into force. Providing the south returned to the allegiance to the Union as of yore, the proclamation was not to issue. But God was working out the destiny of this nation, and no man, and the result is known to history.

The early elections had gone against the Republican party. Republicans became alarmed. A prominent measure was brought to bear upon Lincoln to withdraw the threatened issue of the proclamation, upon the day fixed. They declared that it was against the spirit and wish of the people, and would ruin the party. Letters came pouring in from every state in the Union begging, imploring, sometimes threatening, and it was feared by a few stanch anti-slavery men of the country that Mr. Lincoln could not withstand the pressure. But he said nothing, kept his own counsel, and no man knew his mind.

One day about a week before the time in which the proclamation was to go into force, Mr. Robbins, as was his privilege, walked into the office of Mr. Lincoln, private secretary to Mr. Lincoln. He was feeling very anxious, for it was a dark and gloomy time for the country. Mr. Lincoln's room adjoined that of Mr. Robbins, and Mr. Robbins was sitting at an open fire talking to Mr. Lincoln. Mr. Lincoln walked in, put his hand upon the shoulder of Mr. Robbins and said:

"Well, old friend, the important day draws near."

"Yes," replied Mr. Robbins, "and I hope there will be no backing down or backing out on your part."

"Well, I don't know," says Lincoln, "Peter denied his Master. He thought he wouldn't, but he did."

Mr. Robbins says that he felt a thrill pass over him. He knew by this simple but subtle hint that the soul of Lincoln was determined, and the Union and liberty were secured.

The great day came, and with it freedom to both black and white. Hypocrisy had fallen, sincerity and manhood had come to abide. A few days later Mr. Robbins met Mr. Lincoln, and the latter greeted his hand and said: "Well, old friend, I beat Peter!"—Bangs Commercial.

## THE OLD NORTH CHURCH.

Boston's Treasure House Relics and Traditional Lore.

Indissolubly linked in the chain of Revolutionary events during the year 1775 are the names of Paul Revere, Robert Newman and "The Old North Church" or Christ church, properly, in the city of Boston. Revere's ancestors were Huguenots, his grandfather emigrating from St. Poy, in France, to the coast of Guernsey; his father, at the age of 13, being sent from that island to Boston to learn the goldsmith's trade. Revere was born in 1734. He was brought up to work at the trade of his father, and few are aware that he acquired the art of engraving on copper, one of his best works being the "State Street Massacre" and the "Landing of the British Troops." Copies of these pictures are in the office of the secretary of state of Massachusetts.

During the entire struggle for independence Revere felt like a true American. He acted as the son of a Huguenot. He was a man of the hour, quick to see and ready to act. When he became of age he was a member of the expedition against Crown Point, in 1759, and as lieutenant of artillery was stationed at Fort Edward on Lake George. Revere quietly carried on his business as a goldsmith, ever watching, however, for a chance to assist in breaking the bonds between the mother country and the land of patriots. It came in 1765. When the English Parliament passed the celebrated stamp act. The news of the historical act swept over America like a thunderbolt. People were grieved, indignant, and then, in Revere's town, Boston, bells rang a funeral peal, telling of the death of liberty, some said.

On the evening of April 18, 1775, the alarm of the church, Robert Newman, quietly in his house in Salem street, awaiting the arrival of his friend, Capt. Thomas Bernard, who was watching the movements of the regulars, while on the other side of the river Paul Revere watched and waited for the signals that would lead him to his route.

After completing his momentous task of a back window, and unobserved, to his house and retired to bed, only to be aroused by the sound of the alarm. No charges being proved against him, he was set at liberty. To commemorate this historical event, the day of Boston caused a note to be

down and repaired, and it looks today as solid as it did 52 years ago. It has been the desire of each board of trustees, from 1723, to retain, if possible, the original fittings of "The Old North Church," and repairs have been made only where absolutely necessary require them, as in the old organ, which was placed in position in 1759, and stands looking toward the front of the church. With the exception of the two end rows of pipes, which were put in in 1884, the organ remains the same. The fortunes of war are exemplified by four statues which stand before the organ. They were intended for a Spanish church—Catholic, obviously—in one of the early settlements on the St.

Lawrence river, but were captured during the French war, in 1749, by Capt. Genster, commander of the privateer Queen of Hungary, and presented by him to the church. They are excellent examples of Spanish art in wood-carving.

To tick the minutes for over 150 years has been the duty of the old clock in front of the gallery, and in the stillness which reigns here.

North—one images his heartbeats are in unison with the church.

The first peal of bells in the church is possessed by the church, and was subscribed for in 1741 and 1742, in the names of those who assisted in raising the money being inscribed in one of them. The combined weight of the eight bells is 5,432 pounds, and they cost \$260. Belfounders consider them the best in the country. Following are the inscriptions on each of them.

Bell No. 1.—This peal of eight bells is the gift of a number of generous persons to Christ Church, in Boston, New England. Anno 1744. A. R.

No. 2.—"This church was founded in the year 1723, Rev. Timothy Cutler, the first rector. Anno 1744. A. R."

No. 3.—"We are the first ring of bells cast for ye British Empire in North America. Anno 1744. A. R."

No. 4.—"God preserve the Church of England. Anno 1744. A. R."



A "MORMON" MISSIONARY PARTY IN 1865.

Friends of Dr. J. S. Richards will recognize his features in this picture, even though it is 37 years since it was taken. His figure is the front center one among those reclining on the ground. The picture illustrates how "Mormon" missionaries used to travel before the advent of the railway. Dr. Richards, then a boy of 18, was bound for Europe, others in the company were John Hardie, Zebulon Jacobs and Howard Coray, the two latter being perched aloft. Most of the others are freighters bound for Julesburg. The picture was taken by C. W. Carter, the photographer, who is still in the business in this city. He met the party and took the photo in Echo canyon in May, 1865.