

## DREAD PLANETARY SHAKE

History Dotted with Records of Seismic Disturbances.

SOME CRUDE NOTIONS OF THEIR CAUSE

Phenomena of Earthquakes Largely a Mystery to Scientists—Instruments to Measure Their Velocity, Duration and Force.

North America had experienced a lively seismic shaking up, and earthquake literature for the next thirty days will be the fact. The magazine, the scientific monthlies, the sober old quarterlies, and the current reviews will tell the causes, the effects, and the analysis of the recent phenomenon. Dry-as-dust cosmologists, prying geologists and inquisitive professors will dig into the records of the past to find the why and wherefore. Old theories will be revived and fresh ones mended. Scientific disputes will be overhauled. Chaos will reign, and out of chaos will come the new cosmos. The principles of a Lyell, a Humboldt, a Kirsch will be scolded to scorn. Aristotle and Buffon will be knocked together in the same bag of ridicule. Ancient and modern alike will give way to the recent school of materialists. Even those who fight among themselves, and raise such an earthquake in scientific circles that we will entirely lose sight of the force of the original. In the meantime, trade will go on as the votaries of pleasure will hum the old song.

Oh, let the wide world wag as it will, for I'll be happy still.

The remarkable earthquake that visited Charleston August 31, 1886, says the Chicago Chronicle, brought the science of such phenomena home to us in a most forcible manner. On Tuesday, the morning of the 31st, a distant rumbling was heard like the firing of cannon. The terrible noise rapidly increased, and at the same time the floors of the houses began to rock like the decks of a vessel in a storm. Then the walls began to sway back and forth, and the falling of masonry could be seen in many places. The damage throughout the city was extensive. Very few buildings escaped uninjured. The effects of this earthquake were felt as far as the great lakes of Canada and the Rocky mountains.

The extent of the earthquake of New England in 1754 was estimated by Prof. D. S. Marshall, who says that it was felt in the heart of Brooklyn, and seemed to travel within a circle of half a mile. In 1727 an earthquake in New England was estimated to have formed a fissure, from which sand and water boiled in sufficient quantities to form a quagmire. In some places ashes and sulphur are said to have been ejected. In many parts of the world seismic phenomena have been followed or accompanied by some most remarkable phenomena. During the earthquake of 1155 in England the Thames was dried up and was so low that it could be crossed on foot over the sand.

The shock of Roebuck, which occurred February 4, 1797, was so great that it threw corpses from the graves to the height of 100 feet. By this time the earthquake was so violent that men and women sank into the great fissures that were formed and were lost. At the time of the Owens valley earthquake in 1872, the fissures extended for miles, nearly parallel to the neighboring Sierras. In some places reaching a depth of twenty or thirty feet. In some places the ground was destroyed in 1755 boiling water issued from the cracks which were formed, and similar phenomena were witnessed near La Bana, in Mexico, in 1820. In 1820, a number of men who had fallen into crevices were in some cases thrown out again by great jets of water.

**IN ORIENTAL COUNTRIES.**

In Japan earthquakes are of such common occurrence that it is an easy matter to record one every week, if not often. During the year 1880 12,000 distinct shocks were recorded in that country. The greater number of these shocks were felt along the eastern coast, commencing at Tokyo in the south, and going northward to the end of the main island.

From the earliest times man has been attracted to the study of earthquakes, and a vast library devoted to this branch of knowledge has been created. Prof. Alexis Perry of Dijon, one of the most astute investigators in this line of cosmology that the world has ever known, gave, in 1856, a catalogue of 1,387 works on seismology. Mr. Robert Waller, in 1858, published in his report to the British association a list of 1,387 works on seismology. This work, treating on this subject, and as early as the year A. D. 138 the government of that country appointed a commission to investigate into the subject. Japan has sixty-five books on earthquakes.

The first account we have of an earthquake is recorded in the Bible—1 Kings, xix, 11-12. It occurred in Palestine during the reign of Ahab, B. C. 918-897.

The early Thucydides affirmed that the valley through which the Peneus flowed was caused by Neptune, but the hard-headed Herodotus remarks that the Peneus was supposed to be Neptune's cause of earthquakes, and that the consequent chasms are the work of that deity. May, on viewing this spot, easily ascribe it to the power of Neptune, and the effect of an earthquake.

Herodotus also affirmed that at the time Darius was losing his whole army against Eretria, the island of Delos was affected by a tremendous storm, a circumstance which the Delians said was happened before his time. Thucydides relates that this island was shaken by an earthquake at the commencement of the Peloponnesian war, and in the memory of a man this had never happened before. It is probable that Herodotus and Thucydides both had reference to the same fact.

**GREEK VIEW OF EARTHQUAKES.**

The Greeks, of course, as related by Herodotus, clothed the phenomena of earthquakes, as they related the operations of nature, with a garb of mystery and poetic imagery. As there was a deity for every natural force, so there was one for earthquakes and volcanic eruptions. The mythic tale, the deformed son of Uranus, the white-gowned queen Juno, the mistress of the golden throne.

The Pythagoreans held to the doctrine of a central fire as the source of volcanic phenomena. Plato, in his dialogues, alludes to a subterranean reservoir of lava. Pity believed that it was by earthquake evulsion that islands were formed, and averred that in this manner Sicily was torn from Italy. Cyprus from Syria, and Euboea from Boeotia. This view, however, was previously annulled by Aristotle, who stated that earthquakes had torn to pieces many parts of the earth; that lands had been converted into seas, and that tracts once covered by the sea had been converted into land.

Probably the most philosophical views of the ancients regarding terrestrial phenomena are those given by Ovid as having been held by Pythagoras, B. C. 550. It is a most remarkable feature of his *Metamorphoses* that the opinions then advanced concerning the interchange of land and sea, the effect of running water in eroding valleys, the growth of deltas, and the burying of cities by earthquakes, are, in fact, anticipations of doctrines now generally held.

Strabo doubtless originated the view entertained today that active volcanoes are safely valves to the regions in which they are situated.

Pliny, the younger, in his letters to Tacitus, gives a graphic description of the recorded eruption of Vesuvius, which overcame Pompeii, and during which his uncle, the elder Pliny, lost his life.

So, for ages, writers have been giving the history of earthquakes and volcanoes, and scientists have been seeking for their origin and cause. In fact, the phenomena have been reduced to almost a scientific nicety and can be studied with almost as much precision as the weather. Modern studies meteorological changes. From the cloudy mythology of the Greeks is being evolved a knowledge that is marvelous in the scope of its prognostications. Thus we see Rudolf Falb, whose writings have of late years attracted considerable attention, bringing forth views the audacity of which has astonished the scientific world. Falb regards the inner portion of the earth as a fluid. In the crust above he maintains that there are cracks and channels, into which, by the attraction of the sun and moon, the fluid is drawn. When the fluid enters

these cracks cooling takes place, causes the explosion of gas, and hence eruptions. By computing the relative distances of the sun and moon Falb contends that he can predict the occurrence of earthquakes. He commenced by the predictions of great storms, and in 1870 predicted the destructive eruption of Etna. He explained why the year 4000, there should have been a great flood, and predicts the repetition of such an occurrence for A. D. 6400.

**MEASURING AN EARTHQUAKE.**

As far back as A. D. 126 a Chinaman named Chou invented a seismometer, or earthquake measuring instrument. A description given in the Chinese history, "Gokan," reads:

"This instrument consists of a spherically formed copper vessel, the diameter of which is eight feet. It is covered at its top and in form resembles a wine bottle. Its outer part is ornamented by the figures of different kinds of birds and animals and old, peculiar instruments. In the inner part of this instrument a column is so suspended that it can move in eight directions. Also in the inside of the bottle there is an arrangement by which some record of an earthquake is made according to the direction of the shock. On the outside of the bottle there are eight dragon heads, each of which holds a ball in its mouth. Underneath these heads there are eight frogs, so placed that they appear to watch the dragons' faces, so that they are ready to receive the ball if it should be dropped. All the arrangements, which cause the pillar to knock the ball out of the dragon's mouth are well hidden in the bottle."

"When an earthquake occurs and the bottle is shaken one of the dragons instantly drops the ball, and the frog which receives it vibrates vigorously, causing the column to move in the direction of the shock. This instrument can easily watch earthquakes."

While one dragon may drop the ball, it is not necessary for the balls to be dropped by the other dragons. The column can tell at once the direction of an earthquake.

Not only is this instrument of great interest on account of its antiquity, but also on account of the resemblance that it bears to many of the machines that are in use today for the same purpose.

**MODERN GAUGE.**

Probably the most accurate machine that has been invented for the recording of earth movements is the Gray and Milne seismometer. This machine two mutually rectangular components, the horizontal motion of the earth are recorded on a sheet of smoked paper wound round a drum. It kept continuously in motion by clockwork, by means of two conical pendulum seismographs. The vertical motion is recorded on the same sheet of paper by means of a compensated spring seismograph.

By causing the circuit of two electro-magnets to be closed by the shaking of the time of the occurrence of an earthquake is determined to a nicety. One of these magnets revolves a mechanism, forming part of a time-piece, to come suddenly into the hands of the pen and then move backward to its original position.

The hands are provided with ink pads, which mark their position on the smoked paper, indicating the hour, minute and second when the circuit was closed. The second electro-magnet causes a pen to make a mark on the paper receiving the record of the motion. This mark indicates the part of the earthquake that is being recorded.

The duration of the earthquake is measured from the length of the record on the smoked paper and the rate of motion of the drum. The nature and period of the different movements are obtained from the curves drawn on the paper.

This apparatus has been modified by Mr. Gray by the introduction of a pen which can be moved to take a record for twenty-four hours without repetition. The record is written on a sheet of paper, which is continuously moved, and not only are earthquakes shown, but also volcanic eruptions, which have of late years attracted much attention.

**HOUSES FOR SHAKING CITIES.**

In earthquake-stricken countries, like Japan and some parts of South America, architecture is one of the most important things. In Tokyo a number of experiments have been tried in the construction of houses. As a rule it has been found most expedient to erect the houses of light material, join them closely together, and to make them not extend the height to more than two stories. Even with all the precaution areas of the dwelling are recently destroyed.

But Japan is not the only country where buildings are wrecked by earthquakes. In 1857 the Cathedral at Palermo was completely destroyed by the earthquake. In 1858 the church of St. Augustine, Manila, was wrecked to the bottom by the earthquake of July 18-20, 1859.

The effect that is sometimes produced upon an old building is shown by the Webster house in San Francisco, which was shattered in 1868.

Within the last few years the cosmologists have agreed that there is a common connection between earthquakes and volcanic eruptions. Earthquakes, however, often occur in countries where there are no volcanoes, but Edw. H. Hunt accounts for this phenomenon on the ground that the earth movement is an abortive attempt to originate volcanic eruptions. From observations made by Hopkins, Tyell and others it seems to be pretty clearly established that earthquakes have their origin in some sudden impact of gas or steam under high pressure beneath the solid crust.

R. B. Kirtley briefly states the situation in this way:

"Owing to the secular cooling of the earth and the power to move the crust from the surface, this crushing from time to time overcomes the resistance, in which case shocks are experienced along the lines of fracture and faulting by which the crust is intersected. These shocks give rise to earthquake waves, and as the crushing of the crust is continued, the fissures develop and we have here the cause both of volcanic eruptions and earthquake shocks—the former intensified into explosions by access of water through the fissures."

**POMPEII AND HERCULANEUM.**

The eruptions of Vesuvius, the grandest of volcanoes, have been recorded since the time when Diodorus Siculus and Strabo inferred that the whole country was in a burning state. The first great catastrophe, however, did not occur until the commencement of the Christian era, and for years the beautiful cities of Pompeii, Herculaneum, and Stabiae nestled about the foot of the big mountain whose fires were slumbering within. The eruption of Vesuvius, which occurred in the sixteenth year after Christ, when the whole campaign was shaken by an earthquake which did much damage to the towns and villages even as far as Naples. For sixteen years these shakings continued. On the night of August 24, 79 A. D., the motion became so violent that the whole regions seemed to reel and totter, and the next day about noon a dense black cloud arose from the summit of Vesuvius. This cloud spread out and intensified and slowly descended. The fine, sifting dust and clinders fell like a rain snow; gradually and gently everything was covered, and Pompeii and Herculaneum, with their vice and their splendor, sank from view.

To sum up, then: The primary causes of an earthquake are telluric heat, solar heat and variations in gravitating influences. The secondary causes are dependent upon the primary causes, and are the result of contractions of the crust, variations in temperature, barometrical pressure, rain, wind and the attractive influences of the sun and moon in producing tides in the ocean or the earth's surface.

DeWitt's Little Early Risers cure indigestion and bad breath.

**HAS MONEY TO BURN.**

A Jerseyman's queer method of squandering his fortune.

Hamilton McK. Twombly has been building and tearing down a \$1,000,000 country house at Madison, N. J., twenty-six miles from New York, for the past six years. He amuses himself in this way, relates the New York Press.

One might suppose from the drawing of the mansion that Mr. Twombly's diversion is nearly ended, but that does not follow at all. Judging from past experience the house may not be in existence two months from now. Even the great cellars may be filled up and the broad drives leading to the mansion may be carted away.

Mr. Twombly is a millionaire and his wife was Elizabeth Adele Vanderbilt, consequently he has made money enough to amuse himself with the most expensive architectural pastime on record. No one knows exactly how often the mansion has been built since the ground was broken for it. Once after the foundations had been laid Mr. Twombly's delicately balanced mind changed completely regarding the plans for the superstructure. He ordered radical alterations. The architects, McKim, Mead & White, explained to him that such changes would make it necessary to alter the foundation completely. Not one stone could be left on another. Mr. Twombly said he didn't care. "I know when I like a thing," he remarked, "but I am not expert to tell from the architect's plans what the effect of the finished work will be."

Consequently Mr. Twombly has not trusted such to architects' drawings. He would have part of the house built to see how it looked and then he changed his mind a dozen times only to return occasionally to a slight modification of the original plan.

The living room in particular has received a great deal of attention from Mr. Twombly. Four different plans were made for it before his fancy was captured. The plan was realized in wood and plaster and then Mr. Twombly concluded that the horizontal motion of the earth are recorded on a sheet of smoked paper wound round a drum. It kept continuously in motion by clockwork, by means of two conical pendulum seismographs. The vertical motion is recorded on the same sheet of paper by means of a compensated spring seismograph.

## LEADING BUSINESS MEN OF LINCOLN, NEB.

**ABSTRACT OF TITLE.**

J. H. McArthur, 227 S. 11th St.

**AGRICULTURAL IMPLEMENTS.**

J. Shamp Implement Co., 10 & M Sts.

**ARCHITECTS.**

Wm. Gray, R. 43 & 44, Richards Bk.

**ART MATERIALS.**

Geo. A. Crance, 212 S. 11th St.

**ATTORNEYS.**

Bochner & Hummons, 1011 O St.

J. L. Caldwell, R. 10 & 11, Montgomery Bk.

J. C. Johnson, R. 12 & 13, Richards Bk.

**BAKERS.**

Love & Frampson, 1025 O St.

J. L. Mack, 1025 O St.

J. C. McNeely, 1137 O St.

John P. Naule, McMurtry Bk.

Jacob Oppenheimer, 1029 O St.

C. M. Parker, McMurtry Bk.

C. E. Philpot, 1122 O St.

M. M. Starr, 132, Brownell Bk.

Thalbot, Bryan & Allen, R. 330 McMurtry Bk.

**BANKS.**

American Exchange National, 1100 O St.

**BARBER SHOPS.**

T. E. Doeteh, 9th and O Sts.

C. B. Hawkes, Lincoln Hotel.

Geo. M. Hollinger, 208 N. 10th St.

G. A. L. Johnson, 940 P St.

Miller & Wallace, 10th & O Sts.

S. F. Ross, 10th & O Sts.

C. T. Neville, 109 N. 11th St.

G. W. Pleasant, 125 S. 10th St.

Renner & Ford, 231 N. 10th St.

W. M. Smith, 1025 N. St.

W. M. Vannell, 9th & O Sts.

J. D. Williams, 719 P St.

**BICYCLES.**

Jack Farrell, 1025 S. 11th St.

E. R. Guthrie, 1540 O St.

H. B. Pierce, 13th and P Sts.

H. B. Sides, 112 S. 11th St.

W. H. Warner, 10th & O Sts.

**BLACKSMITHS.**

C. W. Carsons, 825 R St.

Fisher & Westover, 920 N. St.

James & Son, 1029 N. 9th St.

A. P. Livingston, 221 N. 12th St.

A. W. Mott, 10th & M Sts.

C. G. Sharnack, 2210 O St.

A. Spann, 22 S. 9th St.

S. J. Tylee, 212 S. 9th St.

**BOARDING HOUSES.**

J. A. Barnes, 108 N. St.

Mrs. S. A. Cuthrie, 128 O St.

Mrs. M. Gratigny Dougart, 1021 M St.

Mrs. Edna Peers, 1128 Q St.

**BOOKS AND STATIONERY.**

A. T. Lentine & Co., 1106 O St.

H. B. Ross, 1025 O St.

W. B. Brown, 127 S. 11th St.

W. P. Burlingame, 135 S. 11th St.

J. P. Hebard, 202-206 S. 11th St.

**BOTTLING WORKS.**

Lincoln Bottling Works, 315-317 O St.

**BROKERS.**

Atwater & Co., 231 S. 11th St.

A. D. Hick, 1025 O St.

Penny & Co., 11th & N Sts.

G. R. Young, 137 S. 11th St.

**BUILDING & LOAN ASSOCIATIONS.**

M. A. Polson, 1130 O St.

**BUSINESS COLLEGE.**

D. B. Philbrick, 11th & A Sts.

**CARPENTERS.**

D. B. Brown, 231 S. 10th St.

**CARPETS.**

The A. M. Davis Carpet Co., 1112 O St.

**CARRIAGES AND WAGONS.**

J. M. Carson, 301 O St.

Harmer & Winchester, 1020 O St.

Hess & Mueller, 235 S. 9th St.

Hume Huges Co., 1524-28 S. O St.

James & Son, 10th & M Sts.

Swanson & Anderson, 1121 P St.

S. J. Tylee, 212 S. 9th St.

A. D. Head, 228 N. 12th St.

**CIGARS.**

Feed Bremer, 5 N. 12th St.

Frank Du Toit, 1029 O St.

Neville Bros., 115 N. 11th St.

G. R. Wolf, 1036 O St.

**CLOTHING.**

Browning, Kline & Co., 1013-19 O St.

Edw. Gray & Co., 10th & P Sts.

Maxer Bros., 11-22 N. 10th St.

Globe Clothing Co., M. A. Newmark, Manager, 10th & O Sts.

Palme, Warfel & Bunsand, 1136-38 O St.

**CLOTHING CLEANED.**

Mrs. Mary Walker, 137 S. 11th St.

**COAL.**

Horton Fuel Co., 1024 O St.

Russell Coal Co., 1024 11th St.

Dierks Lumber & Coal Co., 125-140 S. 8th St.

Charles B. Gregory, 1100 O St.

H. B. Hayes & Co., 12th & O Sts.

Hutchins & Hyatt, 1040 O St.

H. M. Leavitt, 10th & P Sts.

Lincoln Coal Co., 1045 O St.

Charles E. Wilson, 140 S. 11th St.

**COLLECTIONS.**

Sprague's Collection Agency, H. Har-

vey, 10th & P Sts.

R. K. Kemmel, 1031 N. St.

Ricketts & Wilson, McMurtry Bk.

H. C. Young, 137 S. 11th St.

Commission Merchants.

C. Jacobson, 217 N. 9th St.

**DENTISTS.**

Dr. G. W. Clutter, 1134 O St.

Clyde Davis, D.D.S., Richards Bk.

L. P. Davis, 10th & P Sts.

Dr. F. D. Sherwin, 1400 O St.

Louis Wente, D.D.S., 137 S. 11th St.

**DEPARTMENT STORES.**

Samuels Bros., 940 P St.

**DETECTIVES.**

State Detective Association, A. R. Pound, Chief, 315 Brownell Bk.

**DRESSMAKERS.**

Mrs. George Bowater, 1016 P St.

Anna K. Dick, 1208 O St.

Mrs. R. Earhart, 120 S. 10th St.

Miss Annie Hayden, R. 16, Newman Bk.

Miss M. Malone, Brownell Bk.

**DRUGS.**

R. W. Brown, 127 S. 11th St.