LECTURE

ON

Gravitation and Centrifugal Forces,

BY

ORSON PRATT, Sen.,

Delivered before the Members of the Normal Institute, at the Deseret University, on Wednesday Evening, August 11th, 1875.

GRAVITATING FORCE.—*Its Two Manifestations—Falling Bodies—Universal Tendency of Worlds to fall to each other—Three Laws of Gravitating Force—When Discovered.*

CENTRIFUGAL FORCE.—*Antagonistic to Gravity—Universal Tendency of Worlds to Move in Straight Lines, instead of Curves—Orbits—Curvilinear Orbits the Result of Two Forces—Four Curves produced, viz., the Circle, Ellipse, Parabola and Hyperbola—Under what Circumstances each is Produced—Measure of Projectile Forces—Illustrated by Whirling Weights—Revolving Worlds—Law of Distance and Velocity—Weight of Worlds—Celestial Mechanism an Exhibition of Infinite Wisdom and Power.*

1.—GRAVITATION is a force exerted by all particles of matter in the universe. Two or more masses or bodies of matter, at rest, if in contact, have a mutual tendency to press towards each other's centres. This pressure, however great may be the difference in the quantity of matter, is equal and in opposite directions; for instance, one pound weight exerts the same pressure, upon the surface of the earth, as the earth exerts upon the one pound weight; and as the two forces press in directions opposite to each other, the two bodies must remain at rest.

If one kind of matter exerted a greater force than another in their mutual pressure, then the body, compounded of these different kinds, would necessarily move with a uniformly accelerated motion in the direction of the greater pressure. This may be represented by two steam vessels of equal weight in contact, pressing in opposite directions: if the force of steam on the two boats is equal, they will remain at rest; if the force of one preponderates over the other, there will be, not only a pressure, but a motion in the direction the greater force is exerted.

2.—Particles and masses of matter, not only exert the force of pressure when in contact, but when separated they manifest a mutual gravitation towards each other. By virtue of this force, when not restrained, they will move towards each other with a uniformly accelerated motion. If a mass of matter, elevated above the surface of the earth, is at liberty to move, it will fall towards the surface, while the earth, at the same time, will rise to meet it; but the velocities of the two moving bodies will be inversely proportional to their masses; that is, if the masses of the two moving bodies are equal, their velocities towards each other will be equal; if the mass of one body is twice that of the other, its velocity will be one-half; if its mass is three times greater, its velocity will be one-third; if its mass is one-hundred times greater, its velocity will be one-hundredth part of that of the smaller, etc.

3.—The quantities of motion in a moving body, is equal to its mass multiplied into its velocity. Hence, when two bodies move towards each other by virtue of their mutual gravitation, their quantities of motion are always exactly equal. Therefore, when they meet, they will mutually destroy each other's motions, and remain at rest.

Thus it will be perceived that the force of gravitation is exhibited in two ways, namely, by pressure and by motion. Both of these effects are used to measure the force. When gravity is measured by pressure, the result is called weight, and is represented by the number of ounces, pounds, tons, &c. When it is measured by motion, the measure is determined by the space through which a body moves by gravitation in a given time. Newton demonstrated, by careful experiments, that every kind of matter near the surface of the earth, falls from a state of rest, through equal spaces in equal times, when no resistance of the atmosphere and other disturbances are removed.

4.—The space through which one body falls from a state of rest towards another, in one second of time, is used as the common measure of the force of gravitation. The space through which a body will fall towards the earth, in one second, is usually estimated in inches or feet. The space through which a body falls from rest, to the earth's surface, in one second, is sixteen feet and one inch, or, 193 inches in one second.

5.—By adopting this measure of the force of gravity, there are three laws which should be well understood.

FIRST LAW.—*The space through which one body, by virtue of its gravitation, moves towards another in one second, does not depend upon the mass of the former, but is the same whatever may be its mass, if the distance and the mass of the latter are the same.*

Thus, the Sun gravitates towards Jupiter, and Jupiter also, but the mass of the Sun is 314,760 times greater than the mass of the earth, the gravitation of the former towards Jupiter is exactly equal to the gravitation of the latter towards him, when the Sun and earth are equally distant from him. In other words, the Sun and earth, when at equal distances from Jupiter, move through the same space in the same interval of time. In the case, whatever may be the differences of mass, the same law holds good in respect of any number of moving bodies towards any other.

SECOND LAW.—*The space through which one body gravitates towards another in one second, is proportional to the mass of the latter, if the distance is the same, and the former may be of any size whatever.*

Thus, if the mass towards which a body gravitates is doubled, quadrupled, &c., the space fallen through will be doubled, quadrupled, &c. [illegible] ... than Jupiter, the number of feet which the Sun would cause a body to fall ... towards Jupiter in one second of time, it ... [illegible]

THIRD LAW.—[illegible] ... the space through which one body moves towards another in one second ... inversely as the square of the distance ... latter.

Thus if the distance of the surface of the earth ... [illegible] ... the distance of 16 feet. [illegible]

... thirty-two-hundred-thousandth part of a foot, in one second of time. While Neptune, being sixty times more distant from the earth than the Sun falls towards the earth only the ... of a foot ... [illegible]

6. Perhaps the audience may inquire how the law of gravity is known to be true? It is known that the force called gravitation decreases as the square of the distance increases? Who has ascended into the heights of heaven by experiment upon the gravitating force? [illegible] ... the distance of the moon, and observed any phenomena by which he could exactly determine the fractions of an inch through which it would fall towards the earth in one second of time? The answer is that if mankind, of every age, have beheld the phenomena upon which the data necessary for the solution of the grand problem. All have beheld the moon circling itself around the earth, at the distance, in round numbers, of about 240,000 miles, or at the distance from the earth's centre, of 60 semi-diameters of the earth. All might have known that a body must move in a straight line, when once put in motion, unless deflected from that line by some force. All might have known that the moon's orbit ... [illegible] ... that the moon, being an elliptical orbit, was being deflected every moment from a straight line, called its tangent, into a curved line. All might have known, by a simple calculation, the exact amount of this deviation from the tangent to the curve in any second of time. Yet, strange as it may appear, this simple phenomenon, though observed for thousands of years, was not comprehended till the immortal Newton, about two centuries ago, solved the simple problem. We say, simple problem, for now it is so easily solved; but in the days of Newton, it was considered the greatest scientific discovery that ever was unfolded to the mind of man.

Thus we see that the same force which makes a stone fall 193 inches in one second, makes the moon fall 193 (3600) times less, or ... [illegible]

7.—Every semi-diameter of the earth in the distance of the moon is about 3,956.2 miles; the mean distance of the moon is ... [illegible] ... about 91,430,000 miles. The latter divided by the former, the quotient is equal to 23,110.6 semi-diameters of the earth. ... [illegible] ... towards the Sun with a velocity several hundred thousand times greater than it would on the above supposition; its deviation from the tangent of its orbit would be about the one-eighth of an inch per second ... [illegible] ... 1,607 times slower than the fall of a body near the surface of the earth. Now if 1,607 be divided by 1,607, the quotient will be about 314,760, which is the number of times the mass of the Sun is ... [illegible]

8.—A planet, twice the distance of the earth from the Sun, will fall towards him four times less distance in one second; at three times the distance, its falling velocity will be nine times less; at four times the distance, sixteen times less; at ten times the distance, one hundred times less, &c., &c.

Centrifugal Forces.

9.—As we have examined the law of gravitation, and determined a proper measure of its force for any given quantity of matter, and for any given distance, next, let us inquire into the nature of those opposing forces by which the planets and satellites are prevented from falling to one another.

10.—Every mathematician is well acquainted with the law of the composition of forces and motion. If a body is acted upon by two forces, it will generally have a motion in a line, somewhere between the directions which it would have resulted from the action of either force singly. For instance, if a ball be projected on a smooth plane of ice, in a straight line, the ball will be found to describe a ... [illegible] ... the ball is attached to a cord, the cord being held in the hand, the ball will move in a circle ... [illegible]

[illegible] ... the centrifugal force of the string, the first impacts the impulse or progressive motion, and the second, circular motion, being constantly and uniformly exerted ... [illegible] ... would travel in a straight line, in one second, by virtue of the projectile force, and the perpendicular distance from the end of the straight line reaching the curve, at the end of one second, is the true measure of the fall towards the centre.

11.—All the planets and satellites of our system, are under the influence of a projectile force, by which they are continually preserved from falling to the central body. Their projectile forces act in the same manner as a ... [illegible] ... given an impulse, the body would continue to move forward in the same right line, with the same velocity, for ever. But gravitation every moment deflects them from this right line into curvilinear orbits. The nature of these orbits will depend upon the intensity and direction of the two forces.

12.—1st. If the motion arising from the projectile forces is at right angles to the direction of the gravitating force of the latter, so as to keep the body at all times at the same distance from the central body, the orbit will be a circle.

2nd. Though the projectile velocity is such as to at right angles to the central force, yet, if its velocity is less than what is required to produce a circular orbit, it will be an ellipse, the point of projection being the aphelion, or point in the orbit the farthest from the central body.

3rd. If a body is projected at right angles to the central force, with a velocity greater than is required to produce a circular orbit, it will also describe an ellipse, the point of projection being the perihelion.

4th. If a body is projected at any angle to the central force, no matter what its velocity, it will describe ... [illegible]

5th. If the projectile velocity is in a line making an oblique angle with the direction of the central force, the body will describe an elliptical orbit, if the velocity be not too great ... [illegible]

6th. If the projectile velocity is ... [illegible] ... the body will describe a parabola ... [illegible] ... the body would never return to it again.

7th. If the projectile velocity ... [illegible] ... the body will describe a hyperbola ... [illegible]

8th. The circle, ellipse, parabola, and hyperbola, are the only curves in which bodies can move ... [illegible]

9th. ... [illegible]

10. ... [illegible]

11. ... [illegible]

For the sake of simplifying our statements ... [illegible]

[illegible] ... circles around central forces. It is required to determine what effect different velocities and distances will have in the centrifugal forces.

12. Let a string, one foot long, be attached to a ball of lead of the weight of one pound, and be whirled around in a horizontal plane, and it will have a tendency to recede from the centre. It will be seen that the greater the velocity of revolution, the greater will be the force pulling upon the string in a direction outward from the centre. ... [illegible] ... the ball performs a revolution in 1.11379965 seconds, it will become stretched by a force equal to one pound ... [illegible] ... will be equal to one pound. Let the velocity of revolution, the force exerted by the string ... [illegible]

Suppose the string, connecting the ball with the centre, to be varied in its length, while its velocity remains the same ... [illegible] ... will be the law of force exerted upon the string? Both experiment and calculation demonstrate that,

With the same velocity, the centrifugal force varies inversely as the distance.

Examples: A string, one foot long, with a certain velocity, generates a centrifugal force equal to one pound. A string two feet long, of one pound ... [illegible] ... generates a force of one-half of a pound; at three feet long, ... one-third of a pound, &c.

The philosophy of this law will be seen, by reflecting that a body, revolving with the same velocity, at twice the distance from the centre, is, when the arcs are small, deflected from the tangent only one-half through a space only one-half as great, in the same time; ... [illegible]

Next, suppose that the velocity of the revolving ball is doubled, while the length of the string, connecting it with the centre, remains the same. What will be the law of force exerted upon the string? In this case, as in the former, both experiment and mathematical calculation prove that,

When the length of the string remains the same, the centrifugal force varies directly as the square of the velocity.

Examples: A string one foot long, with a velocity causing the same centrifugal force equal to one pound: if the ball is made to revolve with twice the velocity, the force exerted upon the string will be four pounds. If the revolving velocity is three times as great, the string will be stretched nine pounds. [illegible] ... at ten times as great, the tension on the string will be one hundred pounds; ... [illegible] ... will be 360,000 pounds.

The reason of this law is apparent, by reflecting that a body revolving in a circle with a velocity equal to one, ... [illegible]

[illegible] ... the centrifugal forces of a body revolving with twice the velocity in the same time, is four times as great. Hence, to balance the centrifugal forces must be as the square of the velocity.

A body having twice the revolving velocity, will, during the first half of the given time, be deflected through a space towards the centre, equal to what it would have passed over if the velocity had been one; ... [illegible]

If the circular velocity is three times as great, the deflection from the tangent ... [illegible]

Falling bodies observe this same law, that is, the space fallen through in the next quarter of a second is ... [illegible] ... 1 foot, 4 inches. ... [illegible] ... fall 16 feet in one second.

13.—By a combination of the law of distance with the law of velocity, a law still more general may be obtained, applicable to any length of the strings, and to any given velocity of the revolving body. This law may be expressed as follows:

The tensions of strings vary directly as the weights attached to their ends, and inversely as their lengths.

EXAMPLES:—1. A string, one foot long, with a one pound weight attached, and having a velocity of one foot, performs one complete revolution in a horizontal plane in 1.11379965 seconds, will have a force of tension on the string equal to a pound.

2. A string, 4 feet long, with a velocity 9 times greater than in the first example ... [illegible]

$$\frac{6 \times 6}{4} = 9$$

3. If the weight is attached to a cord 10 feet long, ... [illegible]

$$\frac{30 \times 30}{10} = 40$$

4. A string, 400 feet long, attached to a 1 pound weight, and having a horizontal revolving velocity 20 times greater than the first example, the string will strain the cord equal to 2½ pounds; thus,

$$\frac{30 \times 30}{400} = 2\tfrac{1}{4}$$

To determine the utmost tension that can be given to a string of any length ... [illegible]

When the strength of strings is made to vary directly as the squares of their lengths, the squares of revolving velocities are as the cubes of their lengths, will generate ...

EXAMPLE.—A pound weight, attached to a string of a certain given strength, one foot long, and revolving in a horizontal plane, ... [illegible]

5. A string four times as long, but with the same velocity, and the same weight at its end, ... [illegible]

$$\frac{1 \times 1}{4} = \frac{1}{16}$$

6. If the string is 400 times longer than that in the first example, ... [illegible] ... will be 160,000 times weaker; ...

$$\frac{400 \times 400}{400} = 160,000$$

Examples: ... [illegible]

... to 84 minutes and 42.7146 seconds; this, therefore, is the precise time in which a body would revolve around the earth, near its surface at the equator, without falling.

The amount of centrifugal force generated can be calculated by making the length of the string equal to 20,923,597 feet, and the velocity of the revolving one-pound weight equal to the square root of the length of the string; that is, 4574.23622 times swifter than the ball with one foot radius. The numerical formula will be

$$\frac{(4574.23622)^2}{20923597} = 1 \text{ pound};$$

that is, the one pound of centrifugal force upwards from the centre of the earth, just balances the one pound of gravitating force towards the centre.

The moon is 59.96435 times the equatorial radius of the earth distant. Why does it not fall to the earth? We answer, it would fall, if it did not revolve around the earth with a velocity sufficient to generate a centrifugal force upwards, equal to that of its gravitation downwards. Under the influence of these two opposing forces, it is constantly maintained at its orbit distance.

If the intensity of gravitation were the same at all distances, the moon would fall towards the earth, from the tangent to the curve of its orbit, 16 feet and 1 inch, in one second of time. To balance this downward tendency, its velocity around the earth would have to be increased 59.96435 times greater than its present mean velocity; that is, the moon would have to revolve around the earth in 16 hours, 54 minutes and 6.58275 seconds. This is calculated by taking the square root of the moon's distance, or 59.96435 which we have already stated to be 7.74365; and then dividing the time of the revolution of the ball near the surface of the earth, which is 1 hour, 24 minutes, 42.7146 seconds, or 5082.7146 seconds, by 7.74365; this multiplied into 5082.7146 seconds, gives a product of 39398.58275 seconds, which is equal to 10 hours, 56 minutes, and 6.58275 seconds.

One pound of centrifugal force generated at the distance of the moon, by the whirling of a pound weight, would require a velocity, greater than when whirled near the surface of the earth. The exact velocity necessary, will be found by taking the square root of the moon's distance, or 7.74365 times the velocity of a revolving body at the earth's surface. Then we shall have the numerical formula, thus:—

$$\frac{(7.74365)^2}{59.96435} = 1 \text{ pound}.$$

But from observation we know that the moon's real velocity around the earth is not 7.74365 times swifter than a revolving body at the surface of the earth; indeed, it is known to have a mean velocity 7.74365 times slower than that of a body at the earth's surface, or 59.96435 times slower than the velocity necessary to generate 1 pound of centrifugal force.

But we have already shown that the tensions of strains upon cords, or rather the centrifugal forces generated by the revolution of balls or globes, when the distances are the same, are as the squares of the velocities. But the real velocity of the moon is only the $\frac{1}{59.96435}$ part of that velocity necessary, if gravitation remained the same at all distances. Therefore, the square of $\frac{1}{59.96435}$ which is equal to $\frac{1}{3595.7}$, is the true measure of the centrifugal force, at the mean distance of the moon. But the gravitating force towards the moon, must be equal to the centrifugal force from the earth; and therefore, the gravitating force must vary inversely as the square of the distance; that is, it must be about 3,596 times less at the moon's distance, than at the surface of the earth. Hence, the moon falls towards the earth 3,596 times slower than a stone would fall near the earth's surface.

We have proved that if gravitation was the same at all distances, the moon would necessarily go once around the earth in 10 hours, 56 minutes, 6.58275 seconds, in order to balance the centrifugal force. But as gravitation is greatly diminished by distance, the period must be greatly increased; that is, 10 hours, 56 minutes, and 6.58275 seconds, or 39366.58275 seconds must be multiplied by 59.96435, which is the number of times the velocity is decreased; the product will be 2,360,581.58 seconds in the moon's real period, which is equal to 27.3216614 mean solar days, which is the exact period as given in Herschel's Tables, in his "Outlines of Astronomy."

14.—It is a wonderful achievement in science to be able to demonstrate the law of gravity, from the simple experiment of whirling a weight, attached to a cord of given length, around a pivot as a centre, and observing the centrifugal forces generated in any given time. We could have supposed that the whirling of a ball in a small circle of one foot radius, was a phenomenon of precisely the same nature, as the revolution of magnificent worlds, in their grand orbits? and that the laws which apply to the one class of motions, apply equally certain to the other? The problem may be generalized thus:—

Given the time of the revolution of a weight, having a foot radius, in generating a centrifugal force equal to its weight, to discover the universal law of gravitation.

The method of solution has been fully developed in the lecture. And its truth may be verified in the most minute particulars by its application to the grand machinery of the solar system, which we will now give two examples.

EXAMPLE 1.—Let the distance of the moon be called unity, then the distance of the Sun on the same scale will be = 382.8839; and its mean velocity around the earth, will be 28.67 times its velocity around the earth, what will be the centrifugal force generated by the revolution of the moon around the sun? We have

$$\frac{v^2}{d} = \frac{(28.67)^2}{382.8839} = 2.147$$

Hence the centrifugal force which the moon generates in revolving around the sun, in company with its primary, is 2.147 times greater than that generated by her revolution around the earth.

EXAMPLE 2.—If the earth and sun were placed at equal distances from the moon, what would be the intensity of the gravitation of the latter towards the two? Gravitation increases as the square of the distance decreases; therefore we have

$$d^2 \times 2.147; \text{ or } (382.8839) \times 2.147 = 146,600.08 \times 2.147 = 314,760.$$

Thus we see, that if the moon were taken as near the sun as she is to the earth, the intensity of her gravitation to the solar orb would be increased 146,600 times more than at her present distance. But we have shown, by the first example, that even in her present position, the moon's gravitation towards the sun is 2.147 times greater than towards the earth; and, therefore, the sun must be 314,760 times greater; or in other words, the sun must contain 314,760 times more matter than the earth.

15.—The mechanical law, which I have explained constitute a perfect balance in which to accurately determine the comparative weight of worlds. The astronomer of the present day is as familiar with the process of weighing worlds, as the chemist is in weighing the ingredients which enter into his compounds. These wonderful problems are now exceedingly simple, and their solutions few within the range of the laws which govern a common school education. An Arithmetic, Geometry, physical and astronomical problems of the nature of those just investigated, would not be too abstruse for common school pupils. The science and knowledge should now be introduced and inspire the youth of our country with a love for these grand exhibitions of mechanical skill, so wonderfully displayed in the works of Creation.

Nothing is calculated to inspire the mind of man with a more profound reverence for the Great Author of nature, than the contemplation of his wonderful works, and the exact mathematical adjustment of the various forces of nature—the accountability with which they are all exhibited in every department of the universe, accessible to our minds.—The omnipotent power and grandeur displayed in the construction of the magnificent machinery of creation—proclaim that the Infinite Mind who formed and governs the mighty fabric.

Correspondence.

Deceiving Cloth Peddlers.

PROVO, Aug. 3rd, 1875.

Editor Deseret News:

Permit me through the columns of your paper to make known to the public of this Territory an attempt to mislead them by a Mr. ———, who is traveling through the Territory (and is now on his way to Juab and Sanpete Counties) with a fresh supply of merchandize), as he represents it, the importer of an English firm of New York, offering to the public English goods, consisting of woollen cloths cut into seven yard lengths, pop lins cut into dress patterns, and also shawls. These are offered to the public for cash, or produce, or for notes of hand, amounting in value (so said) to $150 each, for which the accommodating agent receives the note of the well-to-do farmer citizen at ninety days. Now the part of the deception practised by this agent, after using all the persuasive eloquence that men in such business are capable of (and in which he has attained great proficiency), produces his book or ledger, showing the names of many of our most prominent citizens, to whom the verdant are supposed to have sold at least $300 each. Amongst the many is the name of A. O. Smoot, whose name he says was used at American Fork for the sum of $300 worth, also to quiet the suspicions of his customers, who may urge that they have a factory ... in the ... to purchase imported cloth when good ... manufactured by ... the Provo woollen factory. Neither A. O. Smoot, David John, Esq., nor S. S. Jones has purchased cloth of the agent.

Now, Mr. Editor, how long is the public to be thus duped? This man, from his own records, has obtained from the people of Utah hundreds of thousand of dollars, from this County alone, while at the same time our own factories are glutted with cloths equal ... by the lords of creation hereabouts ... which is offered by this importer. These same dollars, invested in home made cloths, would have seconded the noble efforts of far-seeing men who are using their financial ability to make this people self sustaining.

HOME INTEREST.

LIST OF LETTERS

REMAINING in WELLS, FARGO & Co's Office, August 14, 1875.

A	Ericson Mrs	N
AstradoJas	Anna	Neeblan Mrs B
B	Emmund A B	P
Blakely Sw	F	Peters W H 2
Bolvine N	Fairfield Mrs	R
Bates T W	M E	Robbins G Collin
Bates F W	Fauen Jos	S
Blackie C D	Farron A D	Stourell D P
Banows W M	G	S B L
Booth Mrs	Green A C	Shales Mrs
Jennie	Gamble Fred	Jane
C	Grimm G G	Spahe Miss
Curtis Mrs	H	Sapwaite H
Flora	Hunter J W	Sherwood H D
Cheldi Mrs	J	Saxton Geo J
Amanda	Johnson Mrs	Simon Henry
Clawson Mrs E	Johnson J H	Stowall Dan F
Curtis Thaless	Jenson Mrs	Shaffer Harrie
Catroll L	Gertrude	T
Culeff Mrs B	K	Thane Misses
Cortis Joo	Kelting Miss O	S B
D	Ketchin L R	Timms W J A
Davidson D	Kelley Jos	W
Dahlstom C I	Keobe Thos J	Wooley E A
Davis Mrs	L	Williams Mrs
Gertrude	Leach Frank	Fanny
Dudler J	M	Watson C W
E	Mathews T A 2	Wasnip Miss
Ersenbach A		Amanda
		Watts Mrs Lucinda

H. WADSWORTH, Agent.

SPECIAL BUSINESS NOTICES.

FOR throat disease and affections of the chest, *"Brown's Bronchial Troches,"* are of value. For coughs, irritation of the throat caused by cold, or unusual exertion of the vocal organs, in speaking in public, or singing, they produce beneficial results.

THE best recommendation of any article is from the consumer. These all give the Elmwood the preference.

THE Provo Co-operative Company announce that they keep on hand, at Taylor & Cutler's, an assortment of first-class business suits manufactured from the newest patterns of Provo manufactured cloth and put together by the best workmen at the tailor business. Furthermore, cloth scrip is taken in part payment. Now's the time to look out for your Fall clothing.

IT will be seen by advertisement, in another column, that the first term of the ensuing year, of the 20th Ward Seminary commences on Monday.

READ notice to taxpayers by Collector Golding.

READ estray notice, American Fork district.

LADIES' Kid Foxd Shoes. The best and cheapest at GEO. DUNFORD'S.

THE Provo Manufacturing Company invite attention to their splendid assortment of goods, always on hand, for which they take cash and all marketable kinds of produce. They also buy wool to any extent. Read their advt.

MISS JENNIE LEE and Mr. Burnett and the company in "May Blossom" again this evening at the Theatre.

HATS AND CAPS "cheaper than ever" at "Our Hatter's,"
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GRAND MATINEE at the Theatre to-morrow.

ALERT HOSE CO. No. 1.—The Picnic Excursion to Calder's Farm will start from the Fireman's Hall at 6, 8 and 10 a.m. on Monday, Aug. 16th. Purchasers will have their time of starting endorsed on the back of their tickets.

Tickets one dollar each, which includes rides, admission to farm, dancing, boating, swinging, etc. For sale at Idaho Store, Young & Paul's Ice Cream Gardens, Morton & Tufts', Fireman's Hall and by members of the Company. d219

THEATRE OPEN every night to come this week. Matinee on Saturday.

"A SLIGHT COLD," COUGHS.—Few are aware of the importance of checking a cough or "SLIGHT COLD" which would yield to a mild remedy, if neglected, often attacks the lungs. *"Brown's Bronchial Troches"* give sure and almost immediate relief.

BOOK OF MORMON IN SPANISH.—Those persons who have subscribed money for printing the Book of Mormon in the Spanish language will please send the same immediately to the DESERET NEWS Office, as the work is now commenced and must be paid for. Persons not having yet subscribed for the work and wishing to do so can send their subscriptions to the office and obtain a receipt for the same.

D. W. JONES,
dsw Agent.

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IMPORTANT TO THE TRAVELING PUBLIC.

It is the duty of all persons before starting on a journey to ascertain by what route they can reach their destination with the least trouble, and if there are two or more roads leading to the same point, to decide which is the safest and pleasantest to travel.

We take pleasure in stating, that the CHICAGO & NORTH-WESTERN RAILWAY is the oldest, and several miles the shortest, route between Omaha and Chicago. Within the past two years the road bed has been put in admirable condition, and almost the entire line has been re-laid with steel rails.

The Depot in Chicago is centrally located, and as their trains arrive there thirty minutes in advance of all other lines, passengers can always be sure of making Eastern connections.

Close connections are made at Chicago with the Lake Shore & Michigan Southern, Michigan Central, Baltimore & Ohio, Pittsburg, Fort Wayne & Chicago, Kankakee Line and Pan Handle Routes, for all points EAST and SOUTH-EAST.

If you are going to Chicago, or East, you should, by all means, purchase your tickets the Old Pioneer Route—

The Chicago and North-Western.

You will find on all through trains Pullman Sleepers, new and magnificent Day Coaches, and the best Smoking and Second Class Cars now on any road in the United States.

Particular information with maps, time tables, etc., may be had at any of the Through Ticket Offices in the West, or upon personal or written application to J. W. Irons, Ticket Agent, Salt Lake City, A. H. Earl, Ticket Agent at Ogden, or to J. H. Mountain, Western Traveling Agent, Omaha Neb. or to W. H. Stennett, General Passenger Agent, Chicago. d54

KOYLE OYLE 50cts per gallon at Reid and Kinsey's.

ICE! ICE! Get your Ice from E. M. Caste, Plum St., East of Commercial St. Free Delivery.

NEW ADVERTISEMENTS.

SALT LAKE THEATRE.

Lessee and Manager, ... E. B. MARDEN
Stage Manager, ... W. T. HARRIS
Musical Director, ... C. J. THOMAS

SATURDAY,

August 14th, 1875.

THIRD APPEARANCE

Of the Charming Soubrette,

MISS JENNIE LEE,

And the Talented Comedian,

MR. J. P. BURNETT,

Miss Jean Clara Walters

AND

MR. J. C. GRAHAM

Will appear.

THIS EVENING,

AT EIGHT O'CLOCK PRECISELY,

Will be presented, for the first time in this city, the Sparkling Comedy, entitled,

Kind to a Fault!

To conclude with the Charming Two-Act Comedy, entitled,

THE LITTLE TREASURE.

IN PREPARATION.

M'LISS.

A Trip to Lake Point and Steamboat Ride for 75c.

A SPECIAL TRAIN will leave the U. W. Depot, August 18th, at 11 A.M., for Lake Point and back, including a ride on the *General Garfield*, under the auspices of the Relief Society of the 17th Ward. Tickets 75c, Children from 5 to 12 years, 40c. Tickets can be obtained at the 17th Ward Store, half-a-block east of Union Square. d223

TAX NOTICE.

THE Tax-payers of Salt Lake County are hereby notified that the Territorial and County Taxes for the year 1875 are now due.
R. J. GOLDING,
d221 Assessor and Collector for Salt Lake County.

ESTRAY NOTICE.

I HAVE in my possession: One white MARE, five or six years old, branded J B on left hip.

[illegible] ... If not claimed, they will be sold at public sale at the Estray Pound, American Fork, on Thursday, August 19, 1875, at 2 p.m.
WM. GRANT,
District Poundkeeper.
American Fork, August 6th, 1875. d2sw

THE FIRST TERM

OF THE

TWENTIETH WARD SEMINARY,

For the ensuing year, commences next Monday, August 16th, at 9 a.m.

d223 KARL G. MAESER.

THE PROVO CO-OPERATIVE

Will be represented at

TAYLOR & CUTLER'S,

An Assortment of FIRST-CLASS

BUSINESS SUITS,

Manufactured from the Newest Patterns of the Provo Cloths, with the Best of Workmanship.

DO CALL AND SEE THEM.

P.S.—Cloth Scrip will be taken in part payment. d223

WANTED,

A WET NURSE. Apply immediately to Mrs. Elizabeth ... [illegible]

As You Dry

YOUR

APRICOTS,

PLUMS

AND

PEACHES

Take them to

TEASDEL'S!

And get the

Highest Market Price

FOR THEM.

UTAH SOAP Factory.

THE S. O. OF EIGHTEENTH WARD, Salt Lake City, offer to the public a variety of first-class Soaps, including

Thomas Patent Soap,
Pale Savon,
Castile,
Walnut Oil Shaving,
Variegated Toilets,
Scouring or Fuller's Soap.

Also ADAMANTINE or MINING CANDLES, which are guaranteed to be equal to any in the market.

Cash paid for Grease and Tallow, and also for boxes returned.

Our soap is sold in all the Co-operative Stores in the Territory and at the Factory. Orders addressed to John South, Assistant Secretary, P. O. Box 716, will receive prompt attention.

A. H. RALEIGH, Prest.
d109 A. W. CARLSON, Secty

T. LATIMER, GEO. ROMNEY, GEO. M. TAYLOR, F. ARMSTRONG.

HAVING REMOVED into our New Building, we are now prepared to furnish everything in our line at the Lowest Rates and with dispatch.

Lumber, Shingles,

SASH & DOORS,

AND

Everything in the Building Line.

—ALL KINDS OF—

MOULDINGS & FRAMES,

—A SPECIALTY.—

We will not be Undersold.

SOUTH TEMPLE STREET,

1½ Half Block East of Depot.

Latimer, Taylor, & Co.

CARPET!

JOSEPH BENTLEY,

Tenth Ward, S. L. City,

Will Weave Carpets as cheap as can be done by any. Give him a call.

W. H. JONES .... President.
JOHN SHARP, Jr. .... Vice-President.
J. T. LITTLE .... Treasurer.

UTAH FORWARDING COMPY,

(Incorporated under the laws of the Territory.)

Under contract with U. S. Co. and ...

WILL FORWARD GOODS TO ALL points in Utah and Southern Nevada.

The handling, sampling and shipping of ORE and BULLION a specialty.

Rates of freight given and guaranteed to all points East and West. ...

Office opposite U. C. R. R. Depot, Salt Lake City.

... SUPT.

DAY & CO.

☞ Buy your Dry Goods of

DAY & CO.

☞ Buy your Hats, Boots and Gloves of

DAY & CO.

☞ Buy your Groceries of

DAY & CO.

☞ Buy your Hardware of

DAY & CO

☞ Buy your Class and Queensware of

DAY & CO.

We call the attention of the Trade and Families to our

IMMENSE STOCKS,

Which we sell,

Wholesale and Retail,

PRICES THAT DEFY COMPETITION

Call and examine prices.

We are determined to Sell

☞ *Cash paid for Eggs, Butter and Grain.*

CONSTITUTION BUILDINGS.

d167

F. A. MITCHELL .... DAVID JAMES.

Mitchell & James

RESPECTFULLY announce to the public that they have

REMOVED

To their new premises on

West Temple Street,

Opposite to City Meat Market,

Where they hope, by strict attention to business and small profits, to merit the continued patronage so liberally bestowed upon them.

Tin, Sheet Iron & Coppersmiths

Furnace Work and Roofing.

GALVANIZED IRON CORNICE. GAS, WATER and STEAM FITTERS.

WEST TEMPLE ST.,

Opposite City Meat Market.

BEWARE OF IMITATION!

IT IS A WELL-KNOWN FACT THAT a great many Imitation Watches are in circulation at the present time. At

Carl C. Asmussen's,

Opposite the Post Office,

You will find the

GENUINE ELGIN

AND

Waltham Watch.

He has the most flattering Testimonials from the highest authorities for the excellence of the Watches sold by him. He has also the Finest Assortment of

JEWELRY,

In every style, which will all be disposed of

At a Great Sacrifice and without Delay,

To close out business. Purchasers will surely be accommodated.

GILMER & SALISBURY'S

DAILY

STAGE LINES

THROUGH

MONTANA AND SOUTH-EAST NEVADA.

Leave Franklin, Idaho, the northern terminus of U. N. R. R. daily, running North to Virginia City, Helena, Fort Benton, Deer Lodge, Cedar Creek Mines, and running through all the principal towns of ... Office, with Wells, Fargo & Co's Building, Salt Lake City.