# THE MOUNTAINEER.

"DO WHAT IS RIGHT, LET THE CONSEQUENCE FOLLOW!"

NO. 32. GREAT SALT LAKE CITY, SATURDAY, MARCH 31, 1860. VOL. I.

THE MOUNTAINEER IS PUBLISHED EVERY SATURDAY.

OFFICE—North-West Room of COUNCIL HOUSE, in the Basement Story.

BLAIR & FERGUSON, EDITORS AND PROPRIETORS.

TERMS: $6 per Annum in Advance.



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## Original Poetry.

### HAPPIER DAYS TO COME!

BY JAMES BOND.

'Tis said that the world is progressing
In wisdom and science and light;
That we now the day are possessing,
While our ancestors lived in the night.
We're told of the great rising glory
Of this grand, new, and golden age;
But who shall record the bright story
In the future on history's page?

The march of our *civilization*
Leaves the traces of tears and of blood;
Its fruit, throughout every nation,
Is evil opposing the good.
The poor are now feeling the anguish
Of woe that's abounding at home,
And millions are sighing, and languish
For the happier days yet to come.

The wise are their wisdom abusing,
In selfishness grounding each plan;
And men all their science are using
In crushing their weak fellow man.
And hope cometh not with the morrow,
To banish the dark clouds of gloom;
But death sings the chorus of sorrow—
Are there happier days yet to come?

But lo! from the mountains is sounding
Glad Freedom's enlivening call;
And anarchy, in its confounding,
With all its grand [illegible]
The world for the struggle is ready,
The time of the conflict is nigh;
Truth comes, and its progress is steady,
And darkness before it shall fly.

The honest in heart, now awaking,
Shall seek unto Zion for light;
The wicked, in fearfulness quaking,
Will see that in *right* there is might.
For evil shall not rule for ever,
Its triumph will soon all be past;
There is a strong arm to deliver;
It comes, and will save us at last.

Yes! God from the heavens has spoken,
The day of salvation's at hand;
When tyranny's yoke shall be broken,
And liberty bless every land.
Thus science with peace will soon flourish,
Wrong to right shall be made to succumb;
All men shall have rights they will cherish,
*Then* the happier days will have come!

## Lecture

ON

### GRAVITATION AND CENTRIFUGAL FORCES.

BY ORSON PRATT,

CHANCELLOR OF THE UNIVERSITY OF DESERET.

*Delivered in the Tabernacle, at G. S. L. City, on Monday evening, March 19th, 1860.*

GRAVITATION is a force exerted between every particle of matter in the universe. Two or more particles or masses of matter, placed in contact, have a mutual tendency to press themselves towards each other's centres. This pressure is equal and in opposite directions, however great may be the difference in the quantities of matter; 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 pressures, then the bodies, compounded of these different kinds, would necessarily move with a uniformly accellerated 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 not only be a pressure, but a motion in the direction the greater force is exerted.

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 accellerated motion. If a mass of matter, elevated above the surface of the earth, is at liberty to move, it will fall towards that 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 be 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 the one-hundredth part of that of the smaller, &c. The quantity of motion in a moving body is equal to the velocity multiplied into the mass; 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 others' motions, and remain at rest.

Thus, it will be perceived, that the force of gravity 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 result 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 the resistance of the atmosphere and other disturbances are removed.

The space through which one body falls from a state of rest towards another in one second of time, is the astronomical measure of gravitation. The space is usually estimated in inches or feet. The space through which a body falls from rest in this latitude, is 16 1-12 feet or 193 inches, in one second.

In adopting this measure of the force of gravity, there are three rules which should be well understood and carefully observed.

FIRST RULE.—*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 distances are the same.*

Thus, the Sun gravitates towards Jupiter, and the earth gravitates towards Jupiter also; but though the mass of the sun is 389551 times greater than the mass of the earth, yet 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 number of inches or parts of inches towards Jupiter in one second of time. And such must always be the case, whatever may be the differences of the masses of any number of moving bodies towards another body.

SECOND RULE.—*The space through which bodies, by their gravitation, move towards another in one second is proportional to the mass of the latter, if the distances between the former and latter remain the same.*

Thus, if the mass towards which a body gravitates is doubled, quadrupled, &c., the number of inches which the gravitating body will pass over in one second, will be doubled, quadrupled, &c. Suppose that the Sun and Jupiter are at equal distances from Saturn; as the Sun contains 1048 times more matter than Jupiter, then whatever may be the number of inches through which Saturn may gravitate towards Jupiter in one second of time, it will gravitate towards the Sun in the same time 1048 times that number of inches.

THIRD RULE.—*The spaces through which bodies gravitate towards one body, the spaces passed over by the former in one second of time, will be inversely proportional to the squares of their distances from the latter.*

Thus, if the distance of the surface of the earth from its centre be called 1, and the space passed over by a falling body near the surface is sixteen feet in a second of time, then at twice the distance from the centre of the earth, a body would fall one-fourth of sixteen feet in one second. At three times the distance, a body would fall one-ninth of sixteen feet. At four times the distance one-sixteenth of sixteen feet, or one foot. At sixty times the distance from the centre of the earth to its surface, or at the distance of the moon, a body would fall in one second, the one-thirty-six hundredth part of sixteen, or about one-twentieth part of an inch. The Sun, being 400 times more distant than the moon, falls towards the earth in one second, the 1-160,000th part of the 1-20th of an inch, equal to the 1-3,200,000th part of an inch. While Neptune, being 30 times more distant than the Sun, falls towards the earth in one second the 1-900th part of the 1-3,200,000th of an inch, which is equal to the 1-2,880,000,000th part of an inch.

Perhaps this audience may inquire how this law of gravity is known to be true? How is it known that the force called gravitation decreases as the square of the distance increases? Who has ascended the heights of heaven to experiment upon this force? Who has observed any phenomena by which he could exactly determine the fractions of an inch through which bodies would fall towards the earth in one second of time at the vast distances of the moon, Sun and planets? The answer is, that all mankind, of every age, have beheld the phenomena which include the data necessary for the solution of this grand problem. All have beheld the moon circling itself around the earth, at the distance of about 240,000 miles, or at the distance of 60 semi-diameters of the earth from its centre. All might have known that a body must move in a straight line, when once put in motion, unless deflected from that straight line by some force. All might have known that the orbit or path of the moon was curved towards the earth, 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 one 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, some two centuries ago, solved the simple problem. We say, simple problem, because it is now so easily solved; but in the days of Newton it was considered the greatest 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, causes the moon to fall 3600 times less, during the same time. If gravitation did not vary in its intensity with the distance, then the moon would fall with the same velocity as a stone near the earth's surface; if the velocities decreased merely as the distance, then the moon, being 60 semi-diameters of the earth distant, would fall 60 times slower; but its falling velocity is known to be 60 times 60, or 3600 times slower, being as before stated, only about the 1-20th of an inch in a second.

The mean semi-diameter of the earth is about 3956.2 miles: the mean distance of the sun is about 95,300,000 miles. The latter distance divided by the former gives a quotient of 24089; that is, the sun's distance is equal to 24089 semi-diameters of the earth; this squared or multiplied into itself is equal to 580,279,921. If the sun contained only the same amount of matter as the earth, then the latter would be deflected from the tangent of its orbit into a curve towards the sun with a velocity 580,279,921 times less per second than that of a falling body near the earth's surface: but observation proves that the earth falls towards the sun with a velocity several hundred thousand times greater: its deviation from the tangent of its orbit being about the 1-8th of an inch per second; or, more accurately, the earth falls towards the sun about 1,490 times slower than a stone falls near the surface of the earth. Now, if 580,279,921 be divided by 1,490 the quotient will be about 389,551; that is, the sun contains 389,551 times more matter than the earth; and thus the earth falls towards the sun 389,551 times faster than it would, if the mass of the sun were only equal to that of the earth.

Neptune, being about 30 times the distance of the earth from the sun, falls towards the latter, with a velocity about 900 times less than the falling velocity of the earth towards that luminary.

A planet, twice the distance of the earth from the sun, will fall 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.—As we have learned 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 examine the nature of those opposing forces by which the planets and satellites are prevented from falling to one common centre.

In my first lecture, I pointed out the principle of the composition of forces and motions; that a body acted upon by two forces would move in a direction intermediate between them. If one of the two motions is uniform, while the other is accellerated, the intermediate path will be a curve; its concavity being in the direction of the constant force which produces the accelleration.

All the planets and satellites of our system are under the influence of a projectile force, or a force which originally gave them motion, and then ceased to act; the same as powder ceases to act upon a ball, after the moment of explosion. Without a resisting medium, or some other extraneous cause, the planetary bodies must have continued to move for ever in the straight line in which they were projected. But gravitation every moment deflects them from this straight line into curvilinear orbits. The nature of these orbits will depend upon the intensity and direction of the two forces.

1st. If the motion arising from the projection is at right angles to the motion arising from gravitation, and if the velocity of the former is exactly proportioned to that of the latter, so as to keep the body at all times at the same distance from the centre, its orbit will be a circle.

2nd. Though the projectile velocity is exactly such as would produce a circular orbit, when operating at right angles, to the central force, yet, if operating at an acute or obtuse angle to the latter force the body must [illegible] velocity will be equal to that of its projection.

3rd. If a body be projected at right angles to the central force with a velocity insufficient to produce a circular orbit, it will describe an ellipse of which the point of projection will be the aphelion.

4th. If a body be projected at right angles to the central force with a velocity somewhat too great for the central force to deflect it into a circle, it will revolve in an ellipse of which the point of projection will be the perihelion.

5th. If a body be projected in a line making an acute or obtuse angle with the direction of the central force, and with a velocity somewhat smaller or greater than that which (if at the same distance, and acting at right angles), would produce a circle, it will describe an ellipse.

6th. If the projectile velocity is equal to that which the body would acquire in falling from the point of projection to the sun, it will describe a curve called a parabola; the body, in this case, would follow one of the branches of this curve with a retarded velocity far beyond the limits of our solar system, never to return to it again.

7th. If the projectile velocity is greater than that which a body would acquire in following from the point of projection to the sun, it would describe a curve called a hyperbola. As the branch of this curve in which the body is moving, extends, like the parabola, to an infinite distance, the body never could return again to the solar system.

The circle, ellipse, parabola, and hyperbola, are the only possible orbits or curves in which bodies can move under the influence of projectile and gravitating forces.

At a given distance, there is only one velocity of projection, which will produce a circular orbit; and there is only one velocity which will describe a parabola: but there is an infinite number of velocities which will produce an infinite number of elliptic orbits between a straight line and a circle. And there is also an infinite number of velocities which will cause bodies to describe an infinite number of hyperbolic curves of different forms.

All the planets and satellites of our system describe ellipses which do not vary much from circles. Some of the comets describe ellipses very eccentric: and some of them are supposed to describe parabolas and hyperbolas.

Let us next determine a measure for projectile forces, that they may be properly adjusted to any given central forces.

For the sake of simplifying our statements, let us suppose bodies to move in circles around central forces. It is required to determine what effect different velocities and distances will have in relation to central forces.

Let a string one foot long be attached to a ball of lead of the weight of one pound; let it be whirled around in a horizontal plane, and it will have a tendency to recede from the centre: the greater the velocity of revolution, the greater will be the force pulling upon the string in a direction outwards from the centre. This is called the centrifugal force. When the string performs a revolution in 1.09352 seconds, it will become stretched, by the circular velocity, equal to the force of its weight, that is, centrifugal force will be equal to one pound. Let the velocity of revolution, which generates one pound of centrifugal force, be represented by one.

Suppose the string connecting the ball with the centre, to be varied in its length, while its velocity remains the same, what 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 length of the string.*

Examples: A string one foot long, with a certain velocity, generates a centrifugal force of one pound: A string, two feet long, gives a force of half of a pound: three feet long, one-third of a pound; ten feet long, one-tenth of a pound, &c., &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 deflected from the tangent to the curve, through a space only half as great, in the same time; as that through which the nearer body is deflected. At three times the distance, the deflection is only one-third of that of the nearest body. At ten times the distance the deflection is only one-tenth of that of the nearest body, &c., &c. The forces exerted upon the string being as the deflections; and the deflections being inversely as the distances; therefore, the centrifugal forces must be inversely as the distances.

Next, suppose that the velocity of the revolving ball to be varied, 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 equal to one, generates a centrifugal force equal to one pound: if the same ball, at the end of the string, is made to revolve with twice the velocity, the force exerted upon the string will be four pounds: if the velocity is three times as great, the string will be stretched nine pounds: if the revolving velocity is five times as great, the tension on the string will be twenty-five pounds: if the circular velocity of the ball is 600 times as great, the force exerted upon the string will be 360,000 pounds.

The reason of this law will be perceived by reflecting, that a body, revolving in a circle with a velocity equal to one, will be deflected, in a given time, from the tangent of its orbit to the curve, through a space which may be represented by one. With twice the revolving velocity, the deflection, in the same time, will be four times as far; with three times the revolving velocity, the deflection from the tangent, in the same time, will be nine times as far: &c., &c. The deflections being as the square of the velocity, therefore the central forces, which produce these deflections, must be as the square of the velocities: but in circles the central and centrifugal forces, balance each other and are equal; therefore, the centrifugal forces must be as the square of the velocities.

As the central force, with two times the velocity, must be four times as great, a body, under its influence, must fall from its tangent four times as far in the same time. During the first half of the time, it will fall through one part of the space, equal to one quarter of the whole; during the last half of the time, it will fall through three times as much space: Therefore, during the whole time the amount of space fallen through from the tangent will be equal to the sum of the spaces fallen through during the two equal intervals of time, that is, equal to four.

If the central force [illegible] great, and the fall or deflection from the tangent must be nine times as far; for during the first third of the time, the deflection will be one part of the space equal to one-ninth of the whole; the next third of the time, the body will be deflected through three parts more; and the last third of the time, it will be deflected through five parts more: one, three, and five, being added together, will be equal to nine. These are the philosophical reasons why the deflections and forces vary directly as the square of the velocities.

By a combination of these two laws we obtain a law still more general, applicable to any given length of the string, and to any given velocity of the whirling ball. This law may be expressed as follows:—

*The tensions of strings vary directly as the squares of the velocities of the revolving weight, attached to their ends, and inversely as their lengths.*

Examples: A string, one foot long, having a velocity of one, will exert a force of tension, equal to one pound.

A string, four feet long, with a one pound weight attached, and whirling with a velocity of six, will exert a centrifugal force equal to nine pounds.

A weight of one pound, attached to a string ten feet long, and whirled with a velocity equal to twenty, will generate a centrifugal force equal to forty pounds.

A string, 400 feet long, attached to the same weight, and having a revolving velocity equal to thirty will stretch the string equal to two and a quarter pounds.

To determine the utmost tension that can be imparted to a string of given strength.

*When the strength of strings is made to vary inversely as the squares of their lengths, then the greatest revolving velocities which they will admit of, will vary as the inverse square roots of their lengths.*

Examples: 1. A weight, attached to a string of a certain given strength, one foot long, and revolving with a velocity represented by one, will support, at its greatest possible tension, before breaking, a centrifugal force represented by one.

2. A string four times as long will, according to the assumed hypothesis, be sixteen times weaker (one sixteenth being the inverse square of its length); and the greatest revolving velocity which it can endure will be half (half being the inverse square root of its length). The string, representing the central force, being sixteen times weaker, the centrifugal force, necessary to balance it, must also be sixteen times weaker; but the length four and velocity half will exactly generate a centrifugal force equal to 1-16.

3. If the string be 400 times as long, that of the first example, the assumed hypothesis would make it 160,000 times weaker (1-160,000th being the inverse square of its length); and the greatest circular velocity, which it is capable of enduring, will be equal to 1-20th (1-20th being the inverse square root of its length). In this case, the greatest possible tension which the string will endure is the 1-160,000th part of that in the first example: but the length 400 and velocity 1-20th will exactly generate this force of tension.

These simple mechanical laws are applicable to the revolving wheels of machinery. If the strength of the spokes, or of the other materials of wheels, and their diameters be known, the exact revolving velocities, which they are capable of enduring, can, by these laws, be calculated.

But, the most interesting exhibition of these laws, will be seen in their application to the celestial machinery of the universe.

If a one-pound ball be attached to a string reaching from the centre of the earth to its equatorial surface, its length would 3,962 81 miles, which would be equal to 20,923,637 feet. If this weight be whirled round the centre of the earth, so as to complete one revolution in 83 minutes and 22 seconds, it will generate a centrifugal force equal to one pound, which being exactly equal to its weight, the ball would be exactly balanced between the two forces, and would have no tendency to fall, but would continue to circulate around the earth, as long as its velocity continued the same.

I have already stated, that a ball of one pound weight, attached to a string one foot long, would generate a centrifugal force equal to its weight, if it is made to revolve once round in 1.09352 seconds.

Now, if the square root of the semi-diameter of the earth, or the square root of 20,923,637 feet (which is equal to 4,574.236), is multiplied into 1.09352 seconds, the product will be equal to 1002 seconds (which is equal to 83 minutes and 22 seconds): this, therefore is the precise time in which a body would revolve around the earth close to its surface.

Now, the moon is about 60 semi-diameters of the earth distant, the square root of which is equal to 7,746; this multiplied into 5002 seconds will be equal to 38745 seconds (equal to 10 hours 45 minutes, 45 seconds. If gravitation were the same at all distances this would be the periodic time of the moon; but her period is about 27 days; therefore, her velocity must be about the 1-60th of what it would be, on the supposition that gravitation retained the same intensity at all distances: but the tensions of strings, when the distances are the same, are as the square of the velocities: the square of 1-60 is equal to 1-3600: hence, the centrifugal force at the distance of the moon is only the 1-3600th part of what it is at the surface of the earth: Therefore, as the centrifugal and centripetal forces in circles are equal, gravitation must be 3600 times less at the distance of the lunar orb than it is at the surface of the earth.

Let the earth and moon be connected by a string whose length may be represented by 1; let the moon be whirled around the earth with a velocity of 1 mile in 1½ seconds; and let the centrifugal force thus generated be represented by 1. It is required to find what centrifugal force would be generated, if the moon were connected with the Sun by a string 400 times longer, and made to whirl around him with a velocity of 30 miles in 1½ seconds?

By the law of the distance, the centrifugal force on the tension of the string would be 400 times weaker, than when revolving around the earth; but, by the law of the square of the velocity the tension on the string would be 900 times greater: by dividing the latter number by the former, the quotent will be 2¼; hence the centrifugal force, which the moon generates in revolving around the Sun in company with its primary, is 2¼ times greater, than that generated by her revolution around the earth.

Therefore, if the tensions of the strings represent the gravitation of the moon, first to the earth and then to the Sun the force of gravitation to the latter, though 400 times more distant, is 2¼ times greater than to the former: but gravitation increases as the square of the distance decreases: let 400 be squared or multiplied into itself, the product will be [illegible] they were brought 400 [illegible] of the moon to 2¼ times 160,000 are equal to [illegible] greater. It represents the whole force of the Sun as compared with that of the earth, when both bodies are placed at equal distances from the moon. Therefore, if large scales were constructed, standing upon the moon; and if 360,000 earths were placed in one scale, and the Sun in the other, they would, in their pressure towards the lunar orb, balance each other. These numbers are used as convenient for illustration, but are not sufficiently exact for astronomical purposes.

The mechanical laws which I have explained constitute a perfect balance in which to accurately determine the comparative weights 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.

I have already continued my lecture to an unusual length, or I would point out some other interesting applications of these wonderful mechanical laws. The exact mathematical adjustments of the various forces of nature—the consummate wisdom and skill exhibited in every department of the universe, accessible to finite minds—the omnipotent power and grandeur displayed in the construction of the magnificent machinery of creation—proclaim the majesty and glory of Him who formed and governs the mighty fabric.

## Miscellaneous.

WHO'D DRINK WHISKY NOW?—Dr. H. Cox, official inspector of liquors in Cincinnati, in a recent report on the adulteration of liquors, relates the following:—"I called at a grocery store one day, where liquor also is kept. A couple of Irishmen came in while I was there, and called for whisky, and the first drank, and the moment he drank the tears flowed freely, while he at the same time caught his breath like one suffocated or strangling. When he could speak, he says to his companion—'Och, Michael, but that is warmin' to the stomach!' Michael drank and went through like contortions with the remark—'Wouldn't it be foine in a cowld frosthy mornin'?' After they had drunk I asked the landlord to pour me out a little in a tumbler, in which I dipped a slip of litmus paper, which was no sooner wet than it put on a scarlet hue. I went to my office, got my instrument and examined it. I found it had 17 per cent alcholic spirits by weight, when it should have had 40 per cent to be proof, and the difference in per centage made up by sulphuric acid, red pepper, pellitory, caustic, potassa and brucine, one of the salts of nucis vomicæ, commonly called nux vomicæ. One pint of such liquor would kill the strongest man.

EXPECTED RE-APPEARANCE OF THE COMET OF 1556.—Professor Lovering, in one of his late astronomical lectures before the Lowell Institute, said that the great comet of 1556, which caused the abdication of Charles the Fifth of Spain, is confidently expected to re-appear during the present year, and French astronomers are even now on the look out for it. If no error has been made in the revised calculations, it will probably be seen from this planet during the fall of 1860.

AN APPROACH TO PERPETUAL MOTION.—The *Norwich Mercury* states, that after years of mechanical labor and many mathematical tests, Mr. James White, of Wickham Market, has completed, and has now in constant operation, a self-winding clock, which determines the time with unfailing accuracy, continuing a constant motion by itself, never requiring to be wound up, and which will perpetuate its movements as long as its component parts exist.

A large statue of Neptune has been discovered in England by some workmen engaged in making an excavation in the interior of an apartment in the Duke of Clarence tavern, Clapton. It is about seven feet in height, cut in Portland stone. The triumphant attitude which it represents is said to be peculiarly bold and striking. The god is represented in the act of hurling his trident with his right hand, while the left grasps the tail of a large fish. It is thought to be the work of some early Italian, to adorn the grounds of a priory that once occupied the spot where it was found.

M. Adolphe Radiguel, a civil engineer, who has made human remains in the different geological strata a special study, has called the attention of the French Academy to the facts which he thinks prove the existence, at a recent epoch, of a species of man distinct from the present.

Not less than seven hundred persons are said to be professionally engaged in counterfeiting money in the State of Ohio alone.

THE CREEDS OF THE WORLD.—Mr. C. F. W. Deittenrich, a very thorough and careful statistician, and Director of the Statistical Department of Berlin, estimating the population of the world at 1,500,000,000, sets down the Asiatic religions as believed by 600,000,000, or about 45 per cent; the Christian religion by 335,000,000, or about 25 per cent; Mohammedans at 160,000,000, or about 12 per cent. The 335,000,000 Christians are again divided into 170,000,000 Roman Catholics, or about 50 per cent; 89,000,000 Protestants, about 25 per cent; and 76,000,000 Greek Catholics, about 22 per cent.

As an indication of the vile adulteration of liquors sold in the United States, the Detroit *Tribune* says that Dr. Miller, inspector of liquors at Detroit, has reported that of three hundred and eighty-two samples of whisky inspected, he found but two pure. He found no pure French brandy. In one hundred and he found but nine pure, and so on.

THE CHAMPION SWIMMER.—A Sandwich Island boy recently deserted the whale-ship Franklin when twenty miles at sea, jumping over board about eight o'clock at night; and swimming all night for the land. By daylight he was within half a mile of shore, but there encountered a strong opposing current, and after buffeting the waves in a vain effort to reach the beach, he saw a sail several miles to the leeward, changed his course for the vessel, striking out to sea again, and was on her deck by nine o'clock Friday morning, nothing harmed by his fourteen hours' swim.

Messrs. Naylor and Co., of Sheffield, have lately cast the largest steel bell yet made. The height is 5 feet 3 inches; diameter at the mouth 6 feet 2 inches, and thickness at the sound-bow 4½ inches. The bell weighs 2 tons 12 cwt or 5,824lbs., and is destined for San Francisco where it is to sound an alarm for fires.

THE COMING CENSUS.—According to the best calculation, the seventh census of the United States, to be taken this year, will result about as follows:—Whites, 28,000,000; slaves, 4,000,000; free blacks, 500,000; making in all 32,500,000. Within the memory of men now living the population of the United States was but three millions. They have seen it multiplied by ten in a single lifetime!

Recently prepared statistics show that of the immense quantity of wine manufactured in France, only about one eighty-eighth part is exported.

A batch of wire, of 14 lbs weight, gives material for 48,100 needles, and after having undergone every process, it is found that they number on the average 46,700, so that the loss by breakage has only been 1,400; even with this comparatively small waste, however, the accumulation of imperfect needles in the course of time is immense. Heaps of many tons weight may be seen at some of the large manufacturers. It is roughly calculated that upwards of ten tons of wire are weekly employed in the manufacture of needles in Redditch, England, and the adjoining villages. If we multiply this by 52 we get the enormous weight of 520 tons of needles turned out annually from this neighborhood alone.

INDIAN RELICS.—Dr. Day, of Springfield, Tuolumne county, recently found several singular relics of an ancient people who inhabited this portion of the world at some remote period. Among the articles found by the Doctor are two kinds of dishes, rudely shaped like a scollop shell, made of a species of asbestos, about eight inches long by about four inches wide, and of oval form. There is also a mortar formed out of a large pebble of gray granite. While writing on the subject of antiquity, we are informed, by a gentleman lately returned from that portion of the state, that about fifty miles from the forks of Walker's river he saw several ruins of ancient masonry, among the rest a bridge, the arch of which, though considerably covered by earth, was found to be nearly one hundred feet span.—*Columbia Times.*