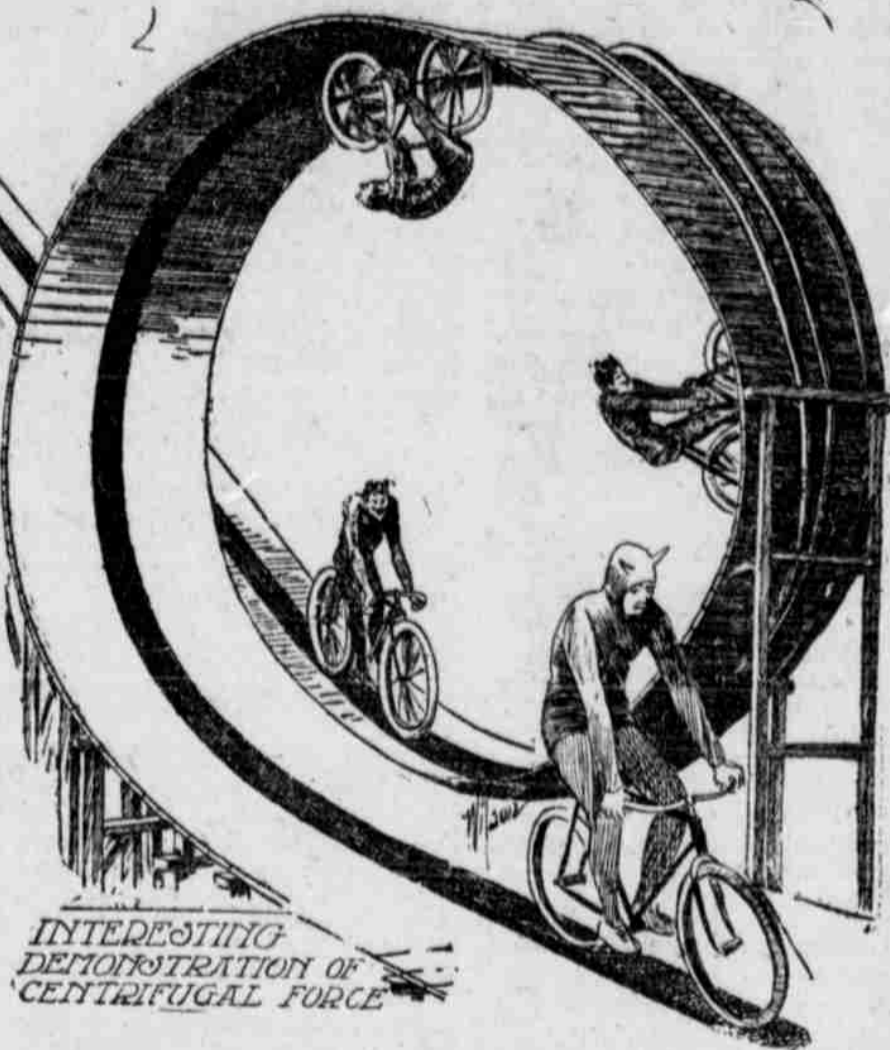


# How a Thrilling Circus Feat Teaches a Scientific Law



INTERESTING DEMONSTRATION OF CENTRIFUGAL FORCE

The bicycle "loop" presents a most interesting demonstration of a great scientific principle, which plays its part in preventing the earth from dropping into the sun, and the moon from being precipitated upon the earth, no less than in keeping the rider and his wheel from falling to the ground when he hangs, head downward, in midair, at the top of the loop.

Centrifugal force is the agent concerned in this seemingly miraculous feat, a force that has many appliances in everyday life, some of which—like the swinging of a bucketful of water around the head without spilling—astonish the uninitiated, while others are so familiar that nobody stops to think of them. But when applied in the case now under consideration, centrifugal force presents itself in a most sensational form.

Yet, thrilling though it is to watch the bold rider defying gravitation, like a fly on the ceiling, without anything except his motion to hold him in place, the natural law that he obeys is extremely simple and perfectly certain in its operation. If he observes all the requirements of that law it will never fall him, so that his safety depends entirely upon himself.

He must develop a centrifugal force great enough to counterbalance his weight when he is at the top of the circle. Mathematics, knowing the size of the loop, is able to tell him how to develop the force needed. The force depends upon the velocity with which he moves. He acquires that velocity, not by pedaling, but by riding down a steep slope. How high must the starting point be? A general rule, applying to all such cases, is that the elevation of the point from which he starts must be to the elevation of the top of the loop in a ratio exceeding that of five to four.

The air resistance and the friction must all be carefully allowed for, and this is the business of the engineer who plans the apparatus. Accordingly, if the loop is twenty feet high, the starting platform must be more than twenty-five feet in height, and the acquired velocity must exceed that named above. Of course, the loop may be less than twenty feet in height and then all the other dimensions will be proportionately reduced.

It is probable that, in the actual case considered, the velocity with which the rider arrives at the bottom of the slope and begins the ascent of the circular loop is at least thirty miles an hour. This velocity immediately and rapidly falls off as he commences the ascent of the steepening curve, so that when he reaches the top he is moving only fast enough to impart a centrifugal force exceeding his weight (or the effect of gravitation) by a margin sufficiently large to insure his safety.

As the bicycle strikes the curve of the loop and begins to ascend, the wheels are pressed against the track with tremendous force and the rider is pitching forward with an energy which only practice and trained muscles can enable him to withstand. It is as if the weight of half a dozen men had suddenly been thrown upon him and his machine. If we estimate the actual weight of bicycle and rider at 200 pounds, then it can be shown that their combined weight, or rather their pressure upon the track, owing to centrifugal force, becomes, as they begin the ascent of the loop, more than a thousand pounds; and this, too, at the minimum speed theoretically required to carry them around. In practice this pressure may be considerably greater.

Here, then, would seem to be a point of special danger. The rider must be prepared for this instantaneous increase of virtual weight. He has to keep his nerves steady and his head

clear, and must retain control over his muscles in order to hold his balance and guide his wheel. But this is only a beginning.

As he rises, in a moment he is going straight upward, and the pressure swiftly diminishes. When he whirrs across the overhead portion of the track and reaches the center of the top of the curve his head is down, his feet are up and his bicycle is on top of him. They are sustained only by centrifugal force. Gravitation is pulling them straight downward with a force of 200 pounds. If the centrifugal force but slightly exceeds gravitation at this point, the rider, if he has time to analyze his sensations, must feel almost as if he were floating like a feather, deprived of nearly all weight.

This is the critical point. If the calculations have been correct, there will be enough velocity remaining when the top is reached to counterbalance gravitation, and, even if the excess is slight, the rider and his wheel will pass on and, once over the center, they are henceforth secure against a fall. They will remain on the track during the downward journey. Theoretically, with a loop 20 feet in diameter, and neglecting resistance, they must reach the top with a velocity of nearly six feet a second. In practice the velocity would have to be considerably greater.

But consider the effects upon mind and body of the rapid changes of apparent weight that the rider undergoes. At the bottom of the loop his apparent weight was instantaneously increased to a prodigious amount, almost crushing him down upon the handle bar. This lasts but a moment, and then, again almost instantaneously, his weight drops upon him, and at the top of the loop he seems to weigh comparatively little, but only to be a second later again bent over the handle bars by the pushing pressure, as the wheel, having gained momentum, swings upon the slope leading to the stopping place.

It is apparent, from what has been said, that the principal peril involved is personal in its origin. The rider must not allow his head to swim, or his muscles to relax their control over the wheel. Given perfect self-command, the danger is reduced to a minimum.

The same force that carries the rider around his twenty-foot circle would carry him, through empty space, completely around the earth, if he could start from a mountain top with a velocity of five miles, instead of a few yards, per second. The needed velocity varies with the radius of the circle traversed.—Prof. Garrett P. Serviss in Hearst's Chicago American.

## ENCOURAGEMENTS TO MATRIMONY

Cases Where Slight Provocation Caused an Epidemic.

It would seem that at times matrimony only needs to be encouraged to become epidemic. The mayor of a town in Southern France, not satisfied with the manner in which his young people were shying at marriage, offered a reward of 100 francs to every couple under the age of 24 who were joined in wedlock during his term of office. It cost the good mayor many hundreds of dollars, but the scheme

dining-room before going to welcome her to take a drop of that from which he had abstained during her absence. While in the act of pouring whisky into his glass he heard Mrs. Thurman pattering down the stairs. Quickly putting his left hand in which he held the glass, behind him, with his right hand extended he said: "I'm glad to see you home, my dear."

"Allen, what have you behind you?" she asked.

"Whisky, my dear."

"Oh, Allen, don't you remember last

year, when you were stumping the state, you did not taste a drop, and you were never so well in your life?"

"Yes, my dear, I remember, but we lost the state."

"Honor for American Scientist.

Dr. William Zebina Ripley of New York has been awarded the valuable Prix Bertillon by the Societe d'Anthropologie, France, for his monograph on "The Races of Europe."

The wells of salvation are not filled with tears.

worked, and young unmarried people became scarce in the community.

When the marriages in a certain Alsatian town fell below the average the authorities hit upon a curious inducement for tardy couples to seek the matrimonial altar. They publicly announced that all people who married within a certain time would be exempt from local taxation for a period of five years. A marriage fever swept through the town at once.

A well-known Austrian nobleman was anxious to encourage matrimony among the peasants on his estate. He undertook to provide every bridegroom with tobacco for life and every bride with a pair of gloves once a year as long as she lived. This generous offer acted like a charm, and soon there was scarcely an unmarried man on the estate. Nearly every eligible male was in the enjoyment of domestic bliss.

## ANSWERS BY PRECOCIOUS PUPILS

Some Humorous Replies to a Number of Simple Questions.

One of the greatest things that Columbus discovered was that he had not the faintest idea that he had discovered America.

Washington said to the soldiers at Valley Forge that they that are whole need not a physician.

The Chesapeake attacked the Shannon and drove her up the Shenandoah Valley, then the Shannon attacked the Chesapeake and the war ended in a battle.

At the battle of New Orleans three of the British officers were killed, one of them mortally.

The Romans left the Britons low spirited and crest-fallen.

The Parthenon was used as a powder magazine during the Trojan war.

The outline of Greece is very rugged, surrounding all the country or nearly all.

The Persians hurried across the Hellespont, burning it behind them.

A great many of our authors were born there. Howthorne, Thoreau, and the battle of Concord.

Dickens married, but not successfully.

The chief elements of English are Anglo and Saxon.

The three great literary works of the Hebrews were the Translation of the Old Testament into the New and several great histories, these they wrote on papyrus paper made from that weed.

Cognate—born together. Example: Cats are cognate. Cats cognate together.

Append—hang to. Example: Ulysses appended to the raft.

She returned his affection as much as she thought prudent, considering the hasty temper of her brother.

The president of the society was magnanimously elected.

God tempers the wind to the short-horned lamb.—Christian Endeavor World.

Wealthy Women Poor Payers.

A woman examined in a New York bankruptcy court last week said she had failed in her livery business because, while in a fashionable (or, as she said "swell") neighborhood, her patrons didn't pay her. She said she lost \$75,000.

year, when you were stumping the state, you did not taste a drop, and you were never so well in your life?"

"Yes, my dear, I remember, but we lost the state."

"Honor for American Scientist.

Dr. William Zebina Ripley of New York has been awarded the valuable Prix Bertillon by the Societe d'Anthropologie, France, for his monograph on "The Races of Europe."

## THE WEEKLY PANORAMA

### CAPT. WYNNE HAS GALLANT RECORD

Drave United States Sailor Who is in Trouble in Italy.

Capt. Robert F. Wynne of the United States marine corps, whom the Italian authorities at Venice have punished more severely than the other officers of the cruiser Chicago for a fracas in a cafe, is a native of Washington, and the son of Robert J. Wynne, the well-known Washington correspondent. The captain, who has been sentenced to four months and ten days in a Venetian prison, is a graduate of the Georgetown college law department with the class of 1897. He is 26 years old. He served with the allied forces at Tientsin two years ago and assisted in the assault on the walls July 13, in which action young Lieut. Butler of Pennsylvania was so severely wounded. Wynne began his career in the navy during the war with Spain. Previously to that he had served five years as a member of the national guard of the District of Columbia. He served in the operations at Guantanamo, Cuba, with distinction, and at the end of the war passed a splendid examination for a commission in the regular service. He then went to the Philippines, fought in the battle of Novellita and in all



the skirmishes around Manila in which the marines took a part. His reputation is that of a brave, capable and courteous officer.

### Not Worth the Money.

Justice William L. Putnam of the United States circuit court of appeals in Portland, Ore., recently fell into conversation with a young man of the nouveaux riches who expressed astonishment that the judge could get along on his salary of \$6,000 a year. "Why" said the purse-proud youth, "it easily costs me twice that amount to live a year." The judge answered gravely: "It isn't worth it, George; it isn't worth it."

### SON-IN-LAW OF FAMOUS PREACHER

Death of Rev. Samuel Scoville Once Fire Chief of Norwich, N. Y.

Of the church wherein Rev. Henry Ward Beecher acquired fame—Plymouth, of Brooklyn—his son-in-law, Rev. Samuel Scoville, was assistant pastor when death came to him the other day. In some ways Rev. Mr. Scoville resembled his distinguished father-in-law. He was more than a formal minister of the gospel and wherever his career was cast every phase of life—social, moral, educational, literary and professional—felt his influence. For eighteen years he was pastor of the Congregational church in Norwich, Conn., and he made himself beloved by every resident of the county, for his influence radiated through it. While in Norwich he took a deep interest in fire department matters, and served for a time as chief.

Rev. Mr. Scoville was born in West Cornwall, Conn., in 1834, and was a Yale graduate. He studied for the ministry at the Theological Seminary at Andover, Mass., and at Union Theological Seminary, from which he



graduated in 1861. The same year he was married to Harriet E. Beecher by the distinguished father of the bride. His first charge was at Norwich.

### Governor Days in Trouble.

Gov. Jeff C. Davis of Arkansas has been summoned to answer to grave charges of heresy by the Baptist general convention of the state. The governor has hitherto been regarded as an exemplary member of the church. His friends declare he has the politeness of Henry Clay, the finesse of Abraham Lincoln and the force of Daniel Webster.

## Persons, Places and Things

### LIFEWORK OF REMARKABLE WOMAN

Active in Many Walks of Life and at the Head of a Big Business.

Mrs. C. E. Merritt, of Norwich, N. Y., may well be classed among the women whose varied attainments place them on a level far above the



Mrs. C. E. Merritt.

ordinary. She is the largest property owner in the village, and consequently the heaviest taxpayer. She is the president of the Ladies' Village Improvement society, which has done much to beautify and benefit Norwich by building a chapel, erecting a fountain, improving the parks and by work of a similar nature. She is also the proprietor of two well-conducted and paying newspapers.

But it is as president of the extensive David Maydole Hammer company that Mrs. Merritt attracts most attention. The works were founded by her father and her late husband succeeded to the presidency of the concern. For many years she was vice president, but has recently become herself the directing head, a position for which her unusual business capacity well fits her.

### ARCHBISHOP CORRIGAN'S ILLNESS.

Noted Roman Catholic Prelate Suffering with Pneumonia.

Archbishop Michael Augustine Corrigan, whose illness is causing considerable anxiety in Roman Catholic circles, has been head of the rich see of New York since 1885 and has ruled his diocese with a dignity and power which have won him the admiration and respect of all New York. The archbishop has numerous friends among the Protestant people of the city, and these are anxious for the outcome of his present attack of pneumonia as are the members of his own



Archbishop Corrigan.

faith. For twenty-two years the learned prelate has practically administered the affairs of the diocese. He has been a bishop of the Roman hierarchy since 1873.

### President Polk's Relics.

The Chicago Historical Society is now the owner of the diary and correspondence, state and personal, of James K. Polk, which has been purchased of the heirs in Nashville for \$3,500. The correspondence covers a period of twenty years—one of the most important and trying periods in American history. It is in Polk's own handwriting. There are letters from Andrew Jackson and replies from Polk, negotiations on the Oregon boundary, the annexation of Texas, communications with the British parliament over what then were vexing questions, and a complete history of diplomacy at that time.

### The President's Way.

George B. Cox, the Republican boss of Cincinnati, was in Washington a few days ago and was taken to the white house to be presented to the president. Congressman Shattuck had him in tow and said, when they were in Roosevelt's presence: "Mr. President, I wish to introduce George B. Cox, a Cincinnati Republican of whom you have heard of course." Mr. Roosevelt looked hard at the two men for a moment and then said, rapidly: "Ah, how-de-do, Mr. Cox, delighted, I'm sure, good day," and almost before his visitors knew what had happened they were outside.

### The Author at Home.

"No," said the author's wife. "It's hard to understand these men of genius. There's my husband, for instance."

"Why—anything wrong with him this morning?"

"I should say so! Do you know, I merely asked him to take down the stovepipe and take up the parlor carpet and hang the new curtains on the bay window and stain the dining-room floor and move the piano to the east corner—and he flew into a rage and acted as if he had lost all the mind he thinks he's got!"

## BEFORE THE PUBLIC EYE

### SAVAGERY IN THE PHILIPPINES

How a Moro Kills and Dies for His Religious Beliefs.

There is a species of individual among the Moros of the Sulu islands called Juramentado (sworn) that can discount an Apache. These Moros believe that one who kills a Christian increases his chance of a good time in the world to come. The more Christians he has killed, the brighter his prospect for the future; and if one is fortunate enough to be himself killed while killing Christians, he is at once transported to the seventh heaven. From time to time one of them wears of this life, and being desirous of taking the shortest and surest road to glory, he bathes in a sacred spring, shaves off his eyebrows, dresses in white, and presents himself before a pandita to take a solemn oath (juramentar) that he will die killing the enemies of the faithful. Hiding a kris or barong about his person, or in something that he carries, he seeks the nearest Christian town, and, if he can gain admission, snatches his weapon from its concealment, and runs amuck, slaying every living being in his path, until he is finally despatched himself. So long as the breath of life remains in him he fights on. Often when being bayoneted he will seize the barrel of a rifle and push



Moro Chiefs.

the bayonet farther into himself, in order to bring the soldier at the other end of the piece within striking distance, and cut him down. The number of lives taken by some of these mad fanatics is sometimes almost incredible. He is eventually killed himself, and his relatives have a celebration when the news of his death reaches them. They always insist that just as night is coming on they see him riding by on a white horse, bound for the abode of the blessed.

### Subscription Paid to March 2002.

The Huntsville (Mo.) Herald, whose plant was burned the other day, says: "An old subscriber to the Herald, and a dear friend of ours who is all wool and a yard wide, has handed us \$100 on subscription to the Herald, saying: 'Take it; I give it freely. It will assist you in paying for your new plant.' Well, it filled our heart so full of joy that it was several minutes, it seemed, before we could say, 'Thank you.' This \$100 pays our good friend's subscription to March 14, 2002. We do not expect to live that long, of course, neither does our friend, but the Herald may."

### Susan B. Anthony Writing a History.

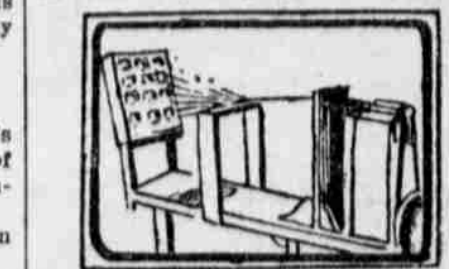
For many years Susan B. Anthony has been collecting material for and planning an exhaustive history of the woman suffrage movement in this country. She is now at her home in Rochester, N. Y., writing the history. She has not appeared on the public platform for a year and seldom goes out, wishing to reserve all her strength for the conclusion of this work, expecting to make it a monument to the cause in which she has made such a long and valiant fight.

### Makes a Costly Beverage.

Congressman Bowersock of Kansas urges people to adopt a milk diet, new that all kinds of meat have gone up in price. "I pasture three or four Jersey cows on my place," he says, "and one way and another I think their milk costs me about \$2 a gallon, but I also think it's worth the money. I went out to Senator Stewart's dairy farm near Washington a few days ago and it surely is the finest place of the kind I ever saw."

### Brain Wave Photography.

Telepathic photography is the latest fad of the novelty-seeking elite of Paris. By it photographs are taken of thought, of brain waves, of the absent or the dead. The high priest of the new photography is Dr. Baraduc. In order to photograph the absent or



dead it is necessary for the subject to concentrate his thought very intensely upon the individual to be photographed. The greater the intensity, the clearer will be the photograph. The impression is conveyed to the plates not by materialistic means, but by intense thought, and the exteriorized plate must be highly sensitive.

## THOUGHT HE HAD A GOOD EXCUSE

Senator Thurman's Reason for Resuming His Disordered Habit.

The late Senator Allen G. Thurman of Ohio was by no means an abstemious man. Like a sailor he enjoyed his grog, and though he was regular in his potations he seldom passed the line of perfect sobriety. Once upon a time his wife, leaving for a visit to friends exacted from the judge a promise that he would be a "teetotaler" during her absence. On the day of Mrs. Thurman's return the judge stopped in the