

Correspondence.

Leap Year.

To the Editor of the Scientific American:

The Gregorian calendar, as it is, loses one day in 3,600 years. The rule for leap year is, add one day to February every 4 years, unless it be divisible by 400. It would be much better to add one day to February every 5 years, two days every 25 years, and three days every 450 years. Thus every 5th year, February would have 29 days, and the year 366 days; every 25th year, February would have 30 days, and the year 367 days; every 450th year, February would have 31 days, and the year 368 days. By this plan every year ending in 0 or 5 is a leap year, and could be known at a glance. The error in this amounts to one day in 50,000 years.

E. A. F.

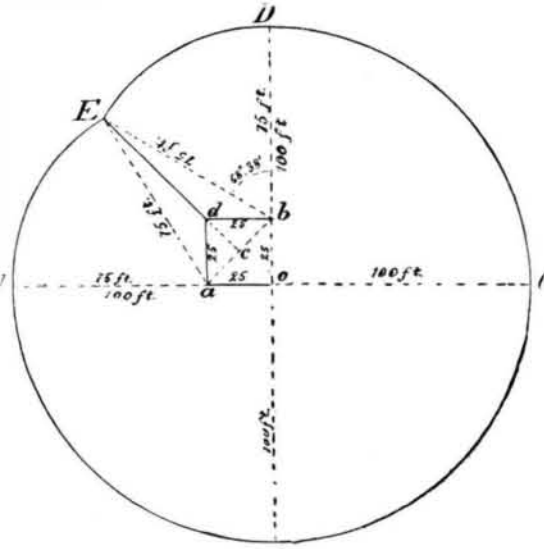
West Salem, Ill.

The Horse and Barn Problem.

To the Editor of the Scientific American:

Your reply (No. 2892) in the Notes and Queries column of March 21 issue is, I think, erroneous. It assumes that the tethered horse can feed only in one direction. But by the terms of the problem he is not so restricted; he is free to graze on all sides, as far as his rope will let him. By a reference to the accompanying figure, it is clear that the horse, tethered at O, can feed through three quadrants of 100 ft. radius, viz., quadrants O A B, O B C, and O C D.

Feeding from A toward E, and from D toward E, the radius will be 75 ft. Here the horse has two overlapping quadrants of 75 ft. radius each to feed over. The correct solution, therefore, seems to be this: The feeding ground comprises three quadrants of 100 ft. radius, two sectors E a A and D b E of 75 ft. radius and $58^{\circ} 38'$



angle, and the figure E a d b, which is equal to the triangle E a b minus the triangle a d b. In these triangles the sides are known.

Area of the three quadrants of 100 ft. radius.	23561.925 sq. ft.
" " two sectors of 75 ft. radius.	5756.188 " "
" of triangle E a b 1288.465	
Minus triangle a d b 312.5 (or figure E a d b).	975.965 " "
Total.	30294.078 " "

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[This is one of many communications we have received on the subject. The assumption underlying the solution given in query 2892 was that the horse started with his rope at its full stretch and fed around in one direction until it was exhausted or completely wound up. If the statement is taken without such assumption, then the answer is easily obtained. The above communication gives a simple method in outline. The error in the solution of Query 2892 was in the misconception of the statement. The above letter we commend to those interested as an exponent of the true method of treatment.—ED.]

Premonitions, Coincidences, and Superstitions.*

Nobody can fully explain the states of his own inner consciousness, or tell the reasons why, when in apparent good health, the atmosphere is luminous with transcendental glory, and anon is shadowed by diuily comprehended specters. Many individuals have strangely recurrent coincidences or presentiments, which, considered abstractly, are—whether forewarnings of good or of evil—so frequently fulfilled that it is difficult to assume them to be casualties only. Science, however, is dumb in explaining the rationale of such phenomena. There are times and seasons when the entire firmament is rose colored, and then, without any apparent reason, the heavens are overcast, and we each learn this lesson anew, that the cause of our sorrows, discomforts, and misfortunes lies deep in the nature of things. Perhaps this is one reason why we pay attention to mystical forecasts, and there seems to spring into existence "the prophetic soul of the wide world dreaming on things to come."

* By M. J. Gorton in *Popular Science News*.

It is customary to say it is lucky to do a certain act at a certain time; it is unlucky to do certain things, or to leave undone this, that, or the other thing. If logically traced to the source from which such observations sprang, it is found all such superstitions are based on the law of coincidences. Take an individual in a slightly morbid or reflective state, and the dark side of human affairs thrusts itself upon his notice—the tyranny of the strong toward the weak, the cruelty abounding in nature, the transitoriness of all human affairs; and let a number of coincidences occur bearing upon some one of these subjects of thought, and a superstition is founded, which may be transmitted and become perpetuated from generation to generation.

Many persons reject and ridicule the common superstitions found to exist quite as much among the intelligent as in the every-day life of the common people. The individual who sits at the table, making the company thirteen, will laugh and jest at the timorous anxiety of his hostess, who had—previous to his unexpected arrival—been to considerable trouble to avoid such a casualty, but will feel uncanny if he spill the contents of the salt jar accidentally, and will hasten to burn some immediately, to ward off any evil effects which might otherwise occur in his business relations; or he will pass some anxious moments if he observes the new moon over his left shoulder, instead of his right, nor will he undertake anything important on Friday. Many persons who pride themselves on being proof against the folly of superstition yet feel uneasy if they do not observe the rules governing this bit of unreason in other people. Scientific scholars who have reasoned from effect to cause, who have accepted the fact that matter and force are indestructible—such minds may be observed to be influenced by the good will of Puss, she having since the days of the Egyptians traditionally brought good luck to the house of her choosing; while the breaking of a mirror is supposed to bring misfortune seven years long to the unlucky possessor.

The negro and Indian races are very superstitious; their comings and goings, their up-risings and down-sittings, are governed by a series of invisible laws that would render life one long nightmare to a sensitive and trained intellectual race. Among the negroes, after death the soul of the dead is supposed to be hovering around, and many devices are resorted to to appease the ghost, and to appease the ill will that may have been awakened by lack of reverence to the living and unseen portion of the departed in the handling of the dead. Still, if any person has a blemish—is lame, sick, bruised, or sore—he will not touch the dead, as his ailment is thereby rendered incurable; indeed, any one who assists in caring for the body of a deceased person will be sure to carry away something belonging to the deceased, to insure him against visits from the "duppy," or ghost. The flight of certain birds over the house and back again indicates a sudden death in the family. The beautiful turtle dove, from the plaintiveness of its note, is looked upon as a token of evil omen, foretelling serious misfortune or death if it lights upon the house. No "duppy" ever visits the living with good intent, but always to work harm. There are certain plants and trees given exclusively to be the habitation of the ghosts, and no negro will pass or handle one of the bewitched specimens of vegetation. The practice of dancing about the corpse is out of fear of vengeance to be now paid to any person from the ghost, as no one can make the circle who did harm (*i. e.*, administered poison) to the deceased, as he would, if guilty, surely fall into convulsions and die miserably. Occult methods of obtaining poison from plants and deadly snakes obtain, and may be administered so as to defy discovery; hence this disgusting practice of the dance of the death circle. Remedies are prescribed of so simple a nature that if no good is done, no harm can follow. Tying knots in a bit of woolen yarn, a knot for each wart, walking backward, muttering "de spiruts come settle down," with the knotted string held in the hand till near the fire, then rubbing the knots until slowly consumed, will cure the warts.

A similar formula over a bit of wet paper plastered on the chest will cure hiccoughs. The hand of a dead person slowly rubbed over sore eyes, with the same formula, only "de spiruts done walk ober" added, is a sure cure. Nails can be conjured from the joints of rheumatic patients by repeating a charm, and whooping cough cured by placing the child under a charm. The faculty for seeing "duppies" is given to those persons who at birth had a caul over the face. This membrane is treasured by the family with much care, as the possession brings good fortune and the power to foretell coming events.

The Indians are quite as superstitious as the negroes, but they are a much more reserved and unsocial race, so it is much more difficult to ascertain the legends and explanations for their curious rites. An Indian will turn from his course and vary to the right or to the left without any explainable reason, apparently; he has come to a marching column of migrating ants, and has turned to one side to avoid crossing the route traveled by them. The worst of disasters would be drawn down on the unlucky mortal who failed to ob-

serve this rule. Birds are credited with having supernatural powers. The rain-crake, with its unearthly and melancholy cry, is a very prophet of evil. They are popularly thought to be the spirits of the departed come back to mourn and avenge injuries done to them in life. Eating together constitutes a sort of kinship, and he who breaks the bond will be detected by the ticking of a certain beetle. The neighing of a horse when you meet a stranger betokens trouble. To have a crow cross your path, flying over head, is a sure forerunner of sickness and death.

Most of these superstitions can be read by the law of coincidence. Thirteen persons at table coincides with the unlucky number at the memorable supper in which Judas betrayed the sinless one and went to his own death. Spilling salt is coincident with the evils that accrued to the salt-tax gatherers during the French revolution. The strangest part of these coincidences—which, if observed until sufficient data are collected, may be termed analogies—is that there seems to be a certain unexplained law of the mind in its groping that often leads to new facts and discoveries.

In his *Budget of Paradoxes*, De Morgan relates the following story or theory: "The late Baron Zach received a letter from Pons, a successful finder of comets, complaining that for a certain period he had found no comets, though he had searched diligently. Zach, a man of much sly humor, told him that no spots had been seen on the sun for the same length of time—which was true—and assured him that when the spots came back, the comets would come with them. Some time after, he got a letter from Pons, who informed him with great satisfaction that he was quite right; that very large spots had appeared on the sun, and that he had found a comet soon after."

To make the story complete there should now be found a connection between the comets and the sun's spots. The curious thing is that just this paradox was maintained before the Royal Astronomical Society by Professor Ashe before De Morgan's book came out.

I have known one who has the capacity for invention to make statements about the necessary mechanical appliances needed to produce certain ends, that sounded wildly improbable; and yet the most improbable are now facts. The quadruplex system for use in telegraphy was dreamed of when to relate the dream was a tale of wild improbability. This has occurred many times, and allows a perfectly natural interpretation—as some other mind traversed the same road and solved his dream into practicability by creating the necessary steel and iron image to express an embodiment of his thought.

Again, there have been well attested instances in which mind acts on mind independently of distances. It would be hard to prove that when we think—and that in spite of a determination to think of other things—of some absent person that he is thinking of us. But if in a number of instances a number of persons were to record such experiences and compare results, the law of coincidence would have great weight in determining the truth or fallacy of such a law. In trying to grasp an abstruse subject like the relation between mind and matter, there must, from the nature of the working medium, ever be many opportunities for fallacious reasoning—as it is impossible to speak of mind as affiliated with the body, with a brain and the nerve currents, without localizing the mind, and proving its habitat and absolute identity. Mental and bodily states are never identical, but contrasted. There is no means of effecting a compromise between them, and in trying to express thought about mind it is not easy to say anything without localizing it. There is the old difficulty to be met: Is mind found in every organ, or all in the whole?

Leaving all this, however, and allowing the statement that mind is, indeed, as a phenomenon different from physical forces, but correlates more or less directly in strict proportion with these, mind must be admitted into the circle of correlated force. Of course, it is quite impossible to reduce the quantity or quality of mind force to any method of mathematical precision. Vitality, energy, mental qualifications, health, courage, love, irascibility, may have a standard in our own mind with regard to an individual, but we cannot reduce such qualities with mathematical precision, and cannot communicate to others with exactness our own idea. When taking into consideration the physical facts underlying the mental facts, it may show that widespread concomitant action of the nerve currents and the agitation of the brain that may account for many of the unexplained incidents, divinations, witchcrafts, and similar phenomena as a result of that tumultuous conflict, and exercise of energy in reconciling the union of the material to the immaterial, even among the inferior races of mankind.

ONE of the latest additions to the British navy is the *Blenheim*, a protected cruiser of 9,000 tons displacement. Of this weight 4,000 tons are used for the protecting plates, armament, equipment, and coal. She is 375 ft. long, 65 ft. beam, 20,000 h. p., and 22 knots speed. She is considered to be the largest, fastest, and most powerful war ship in the world.