The Story of the Tides.

From a scientific point of view the work done by the tides is of unspeak- sibly the moon was then only half its able importance. Whence is this energy derived with which the tides do their work? If the tides are caused by the moon the energy they possess must also be derived from the moon. This looks plain enough, but unfortunately it is not true. Would it be true to assert that the finger of the rifleman which pulls the trigger supplies the energy with which the rifle bullet is animated? Of course, it would not. The energy is derived from the explosion of the gunpowder, and the pulling of the trigger is merely the means by which that energy is liberated. In a somewhat similar manner the tidal wave produced by the moon is the means whereby a large part of the energy stored in the earth is compelled to ex-pend itself in work. Let me illustrate this by a comparison between the earth the moon spun round the earth once rotating on its axis and the fly-wheel of an engine. The fly-wheel is a sort of reservoir, into which the engine pours its power at each stroke of the piston. The various machines in the mill merely draw off the power from the store accumulated in the fly-wheel. The earth is like a gigantic fly-wheel detached from the engine, though still connected with the m chines in the mill. In that mighty fly-wheel a stupendous quantity of energy is stored up, and a stupen-dous quantity of energy would be given the succession of day and of night, but out before that fly-wheel would come to the day and the night together only rest. The earth's rotation is the reser- amount to three hours, instead of twenvoir from whence the tides draw the energy they require for doing work. mass of the earth is another much small-Hence it is that though the tides are caused by the moon, yet whenever they require energy they draw on the supply ready to hand in the rotation of the earth. The earth differs from the flywheel of the engine in a very impor-tant point. As the energy is with-drawn from the fly-wheel by the ma-chines in the mill, so it is restored thereto by the power of the steam-engine, and the ily runs uniformly. But the earth is merely the fly-wheel with-out the engine. When the work done by the tides withdraws energy from the earth, that energy is never restored. It therefore follows that the earth's rotation must be decreasing. This leads to a consequence of the most wonderful importance. It tells us that the speed with which the earth rotates on its axis is diminishing. We can state the result in a manner which has the merits of simplicity and brevity. The tides are increasing the length of the day. At present no doubt the effect of the tides in changing the length of the day is very small. A day now is not appreci-ably longer than a day a hundred years ago. Even in a thousand years the change in the length of the day is only a fraction of a second. But the im-portance arises from the fact that the change, slow as it is, lies always in one full of better and smarter young men direction. The day is continually in- than yourself that their feet stick out of to be feeling just right, can gain thirty. creasing. In millions of years the accu-mulative effect becomes not only ap-young men died, the old globe went mile. preciable, but even of startling magnitude. The change in the length of the in ten million went to the funeral, or day must involve a corresponding change in the motion of the moon. If the moon acts on the earth and retards the rotation of the earth, so, conversely, does the earth react upon the moon. The earth is tormented by the moon, so it strives to drive away its persecutor. At present the moon revolves round the entire earth at a distance of about two hundred and forty thousand miles. The reaction of the earth tends to increase that distance and to force the moon to revolve in an orbit which is continually getting larger and larger. As thousands of years roll on, the length of the day increases second by second, and the distance of the moon increases mile by mile. A million years ago the mile by mile. A million years ago the day, probably, contained some minutes less than our present day of twenty-four hours. Our retrospect does not halt here. We at once project our view back to an incredibly remote epoch which was a crisis in the history of our system. It must have been at least fifty million years ago. It may have been were a pichic successfully without them. But they are no novelties, my son. Oh no; nothing of the kind. They have been here before. Now, mind; I don't shut yourself clear out; but don't be so fresh you will have to be put on ice to keep from spoiling. Don't be afraid that your merits will not be discovered. People all over the State are huming been very much earlier. This crisis was People all over the State are hunting the interesting occasion when the moon was born. The length of the day was they will find you. A diamond is not only a very few hours. If we call it so easily found as a flint pebble, but three hours we shall not be far from the people search for it more earnestly, and truth. Perhaps you may think that if we looked back to a still earlier period the day would become still less and finally disappear altogether! This is, and if you are a diamond, you'll go into however, not the case. The day can never have been much less than three hours in the present order of things. Everybody knows that the earth is not a sphere, but there is a protuberance at the Equator, so that as our school books tell us, the earth is shaped like an orange. It is well known that this protuberance is due to the rotation of the earth on its axis, by which the equatorial parts bulge out by centrifugal force. The quicker the earth rotates the greater is the protuberance. If, however, the rate of rotation exceeds a certain limit the equatorial portions of the earth could no longer cling together. The astraction which unit s them would be overcome by centrilugal force, and a general break up would occur. It can be shown that the rotation of the earth when on the point of rupture corresponds to a length of the day somewhere about the critical value of three hours, which we have already adopted. It is, therefore, impossible for us to suppose a day much shorter than three hours Let us leave the earth for a few minutes and examine the past history of the moon. We have seen the moon revolve around the earth in an ever widening orbit, and consequently the moon must in ancient times have been nearer the earth than it is now. No doubt the change is slow. There is not much difference between the orbit of the moon a thousand years ago and the orbit in which the moon is now moving. But when we rise to millions of years turned to a snow white color. - St. Louis the difference becomes very apprecia- | Globe.

ble. Thirty or fo ty millions of years ago the moon was much closer to the earth than it is at present; very pospresent distance. We must, however, ook still earl er, to a certain epoch not less than fifty millions of years ago. At that epoch the moon must have been so close to the earth that the two bod es were almost touching. Everybody pensions is \$3,811,366 a year. knows that the moon revolves now —Chicago has now a popu around the earth in a period of twentyseven days. The period depends upon | 000 since the national census was taken. the distance between the earth and the moon. In earlier times the month must the country where there are more males have been shorter than our present than fema es, the excess being by this month. Some millions of years ago the moon completed its journey in a week, instead of taking twenty-eight days, as at present. Look ng back earlier still, we find the month has dwindled down to a day, then down to a few hours, until at that wond ous epoch, when the moon was almost touch ng the earth. every three hours. In those ancient times I see our earth to be a noble globe. as it is at present. Yet it is not partly covered with oceans and partly clothed with verdure. The primeval earth seems rather a fiery and half molten mass where no organic i fe can dwell. Instead of the atmosphere which we now have I see a dense mass of vapors, in which, perhaps, all the oceans of the earth are suspended as clouds. I see ty-four. Almost touching the chaot'e er and equally chaotic body. Around the earth I see this small body rapidly rotating. The two revolve together, as if they were bound by invisible bands. The smaller body is the moon.-Nature.

Individuality.

In asserting your own individuality, do it with becoming modesty. How? Oh no Telemachus, "cheek" is not "better than wisdom." It is not better than anything. It is too brassy to be mistaken for anything else. All the triumphs of cheek are only apparent. of Deeds in Philadelphia recently. It The world knows the cheery man, and assigns him to his proper level. It is true, that sometimes the man of cheek delphia & Reading Coal & Iron Combores his way along through the crowd to seats and places intended for better people, and for the time we give way to companies. The total value of the him. But so we give way, my boy, to a man carrying a pot of paint in each hand. Not because we respect the man, but because we want to take care of our clothes. Avoid cheek, because you can sell goods without it, and your customers won't run away and hide in the cellar when they see you coming. Remember, my boy, the world is older than yourself by several thousand years; that for centuries past it has been so full of better and smarter young men

FACTS AND FIGURES.

-The value of the increased yield over last year in South Carolina of wheat, oats and corn is estimated at \$10,000,000.

-There are 34,794 pensioners in Mas-sachusetts, Maine, New Hamp-hire and Vermont, and the aggregate of their

-Chicago has now a population of about 570,000, an increase of about 70, Chicago is one of the few large cities in last census 14,928.-Exchange

-There are thirteen Bostons, four New Yorks, five Chicagos, seven Phil-adelphias in the country. Of the 2,696 imper ectly addressed letters received one morning in New York, not more than half a dozen were sent to the Dead Letter office as hopeless. - Golden Rule.

-Ninety-nine locomotives and 11,697 car-wheels were exported from the United States last year. During the same period there were exported 2,164.-648 pounds of iron rails and 146,168 pounds of steel rails. The greater part of this material went to South American ports.

Mr. Porter, of the Census Bureau, says the census report will cost \$5,000,-The work was begun in 1879 and 000: will be un inished in 1883, after five years of solid work. It will be the completest work of the kind ever done. The English census cost only \$700,000. but it was completed in one night .-Chicago Times.

-The great cattle range of Wyoming, under the military protection of Fort McKinney, is about three hundred miles square. In this area there are now grazing 500,000 head of cattle, worth \$27 a head, amounting to \$13,500,000, to which can be added the value of the horses and ranches of the cattle-men and the farmers, and the stock of the So great, indeed, has been the grangers, making at least \$15,000,000 worth of property under the protection of Fort McKinney. - Chicago Times.

-A mortgage for \$160,000,000 was recorded in the office of the Recorder was executed by the Philadelphia & Reading Railway Company and Philapanies, jointly, and covers all the property, rights and franchises of those property is estimated at \$161,258,070-.59. This is the largest mortgage ever executed in Pennsylvania.—Philadelphia Press.

WIT AND WISDOM.

Good qualities are the substantial riches of the mind: but it is good breeding that sets them off to advan-

-A Nevada woman, if she happens

Nearly Eight Hundred Thousand.

Never before was there an immigration within any three years approaching that which has taken place since the last census was taken; and the agents of the steamship companies report that the flood is likely to keep up at an equal rate next year. The abundant harvest in which we now rejo ce will, of course, tend to stimulate the movement. The disturbed condition of Europe will also give it impetus. War, or the prospect of war, frightens away the subjects of militarism. The continued depression of agriculture in England will give a further impulse. The remarkable success wh ch those immigrants who came during the last year seeking employment have had in obtaining it will en-courage many thousands of artisans, mechanics, laborers and domestics to follow in their footsteps.

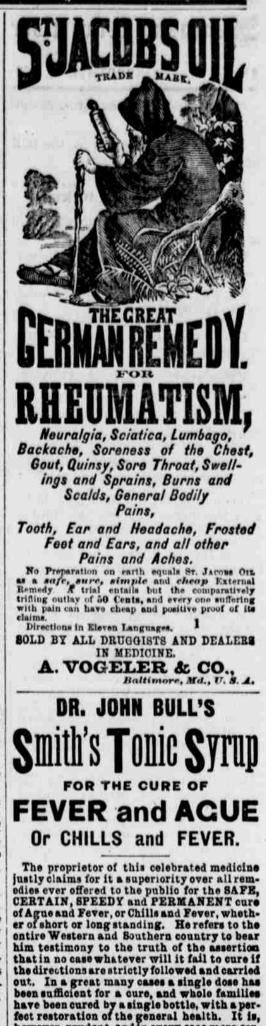
The official records show that the immigration to the United States during the fiscal year which ended with last June amounted to 789,003. About one hundred and twenty thousand more immigrants were received here than in 1880, when the number of arrivals was greater by over two hundred thousand than in any previous year. For the three fiscal years 1880, 1881 and 1882 the arrivals have amounted to 1,915,691. or nearly as many as the total for the eight years just previous, and about onefifth as many as the total during the whole per od from 1820 up to 1880.

About one-third of the immigration of the last year was from Germany and Austria. From Germany alone about a quarter of a million new settlers were received. England sent between eight and nine thousand more than Ireland, and nearly a hundred thousand came from Canada; but it must be borne in mind that a very considerable portion of these merely passed through the Dominion, after landing at Montreal, in

So great, indeed, has been the immigration of the last three years, and the prospect that the tide will continue equally strong for at least another year is now so well assured, that labor here begins to be alarmed at the influx. Some of our workingmen do not at all relish so vast an addition to their force. Among those who are now coming over are thousands of stalwart men who enter as competitors in the trades. The greatly increased population of New York since the census of 1880 is a proof that very many of the immigrants received at Castle Garden within three years have remained in the city to swell the ranks of the workers here.

But with abundant crops, cheap food, active trade, and busy manufacture, there will be work enough for all the new comers, as well as those already settled here. The majority of the new comers. too, go West to make new communities, and to furnish new markets for the products of the toil of the artisan, the mechanic and the laborer. -N.

Divulging a Trotting Secret.



whirling right along, and not one man even heard of the death.

Be as smart as you can, of course. Know as much as you can, without blowing the packing out of your cylinder heads. Shed the light of your wisdom abroad in the world, but try not to dazzle people with it, and don't always expect people to believe that a thing is so simply because you say it is. Don't be too sorry for your old father because he knows so much less than you do. Remember, my boy, he hasn't had your advantages. The world has great need of young men, but no greater need than the young men have of it. Young men are useful, and they are ornamental; we all love them and we couldn't engineer a picnic successfully without them. for you, and if you are worth finding. shout and show it to the world when they find it. If you are a pebble, my boy, you'll help macadamize the road, took a sail on the Sea of the crown jewels or travel with a minstrel troupe, the Fates only know which. -Burlington Hawkeye.

Fascinated by an Alligator.

I was at the Zoo yesterday and saw something which is worthy of being mentioned. One of the gulls entered the pond where the alligator was lazily propelling himself about and proceeded to enjoy itself in its native elements. But the eye of the scaly monster was upon it and the mesmeric influence of glare of the saurian; inch by inch it to resist the fascination, until it came close enough for the reptile to open its mammoth jaws and gulp down the luckless bird. After having devoured its prey the alligator sank to the bottom to digest its meal. - Toronto Mail.

-A Montana vigilance committee postponed a lynching matinee for two hours in order to allow the victim to shake in a raffle in which he had a chance. Thus doth the spirit of Christian magnanimity crop ont even in the rough and uncouth wilds of the West .-Chicago Herald.

-A woman of Tuesumbia, Ala., was struck by lightning and found upon recovery that her hair, once a beautiful brown, had been instantaneously

A Hartford firm has turned out a belt four feet wide and ninety-six feet long, and a woman with a waist to fit it can secure a bargain. - Detroit Free Press.

-There is not in all China a native surgeon who can set a broken leg or People in that country are suparm. posed to break their necks when they meet with an accident.-Detroit Free Press.

-"A constant reader" makes inquiry as to the authorship of "Patience." As in the case of the letters of "Junius" and the poem on "The Beautiful Snow," the author's name is not positively known, but it has generally been attrib uted to Job. -- Courier-Journal.

-A girl from Cincinnatah Kept on growing fat, and tattah, Though she dicted on battah For a yeah. In vain she tried to scattah All the adiposal mattah. Till the doctor said she'd bettah Stop her beah. Baltimore American.

A New York belle met with a sad loss while returning from a summer resort the other day. By some means her diary, containing the names of all the gentlemen she had become engaged to, tropped out of the car window, and now she can't tell which of her male friends

-While a tourist was in Palestine he took a sail on the Sea of Galilee. After visiting the different places of interest | Smith, the owner of the Maid, and told he returned to the landing and asked: him he would beat her. "How much for the trip?" "Ten she-"But," said Mr. Smi kels!" responded the smiling boatman, "Ten shekels!" said the traveler. "why that is an outrageous price." "Well," replied the skipper, "that's what they've been paying ever since the sea was here." "Thunderation!" growled the voyager, "I don't wonder that Peter tried to walk it."

-" How are the colored voters coming on, out on Onion Creek?" asked an Austin candidate of a darkey with a its glance was soon felt. It was im- load of hay. "Dar's a heap ob sickpossible for the gull to resist the baleful ness out dar among de colored folks." "What is it, malariap" "I reckon was attracted to the alligator, powerless | dat's de name ob de stuff. Hit am sumfin what he got from de druggery-shop. "What stun are you talking about?" "De stuff a white man out dar puts in his watermillions to keep de colored folks from mistakin' em from dar own watermillions."-Texas Siftings.

> -A scientist says: "Segregation is process tending ever to separate unlike units, and to bring together like units, so serving continually to sharpen, or make definite, differentiations which have been otherwise caused." This seems plain enough, and satisfactorily explains why the homogeneity of the contaction of the nebulosity and the evolutionism of the subsequentiation and individualism are in antipathy to the hereforeness and primordialism of the osmos in its relation to the unseenness of the vacuuity. And yet some persons may doubt it.-Norristown Herald.

We presume our readers have all heard of that private trial in the year 1870, when Mace drove Lady Thorne a ghostly mile in the gray of the morning, and only two others. John L. Doty and William B. Saunders, timed the mare. In regard to this trial her driver said: "I never saw Lady Thorne trot a full mile at her best but once, and there are two other men living besides myself who can tell how fast that was, but I shall never tell, and it is probable that they will not. It was so dast that it would not be credited by the public, and so we agreed that we would never mention the time. But I will say this much: It was a faster gait for the whole mile than I ever saw kept up by any other horse for a single quarter." For a round dozen of years did Dan Mace maintain his determination to "never tell," but in an unguarded moment, a short time ago, out popped the secret. On the occasion to which we refer Dan had become much interested in conversation with a gent eman about that year, 1870, when Lady Thorne was to meet Goldsmith Maid at Buffalo. She had beaten the Maid whenever they had contended on Eastern tracks, but the party of the little bay mare were quite confident of a victory at Buffalo. Dan, after the trial referred to, felt abundant confidence himself, and he related, on this present occasion, how he met Mr.

"But," said Mr. Smith, "we can trot three heats better than 2:20.'

" So can I," said Dan.

"We can trot three heats better than 2:18."

"So can I," said Dan.

"We can trot three heats in 2:16." "So can I." said Dan.

The gentleman to whom Mace related the forgoing conversation casually asked: "Why Dan, how fast did you ever drive Thorne?"

Dan impulsively replied: "I drove her a mile just as fast as a mile was ever trotted in public, and the last half in 1:05.1

The secret of a decade was now more fully out. Lady Thorne trotted a trial in 1870 in 2:10}, last half in 1:05, timed by two of the most experienced men on the turf, both still in the flesh, and driven by a man who now lacks only two years of his threescore.-N. Y. Spirit of the Times.

-It is reported that during the three years in which Mr. Henry M. Stanley has been conducting the Belgian Exploring Expedition on the Congo in Africa, he has never had a quarrel with the natives, and has succeeded in establishing four trading stations. This affords fresh evidence that exploration among sayage tribes can be conducted on Christian principles, and that the golden rule is a more potent force toward civilization than Gatling guns or steel bayonets. -S. S. Times.

tain to cure, if its use is continued in smaller doses for a week or two after the disease has been checked, more especially in difficult and long-standing cases. Usually this medicine will not require any aid to keep the bowels in good order. Should the patient, however, require a cathartic medicine, after having taken three or four doses of the Tonic, a single dose of BULL'S VEGETABLE FAMILY PILLS

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