

SCIENCE AND INVENTION

ORIGIN OF THE OCEAN TIDES

Producing Agents Are Sun and Moon and Law by Which They Act is That of Gravitation.

The tide visits us practically twice a day, rising to a height that can be measured by so many feet. In many places it comes only once, and is measured by inches. The tide producing agents are sun and moon, and the law by which they act is the law of gravitation. This law declares that there is a force of attraction between two bodies, or, to put it differently, that every particle of matter in the universe attracts every other particle, the attraction depending on their mutual distances and their mass. Taking the moon's attraction first, it is assumed that the whole of the earth is covered by the ocean. The moon attracts the waters, and that layer of water immediately under the moon gets heaped up on the side nearest the moon. High tide will be there. The waters on the distant side are heaped up also, and this is a little detail that puzzles most people, because here one would naturally expect low water. The reason of the seeming paradox is that the waters on the distant side are thousands of miles further away from the moon than is the earth's center. The earth thus gets more of the moon's pull than the distant waters. These waters heap themselves up away from the earth and moon, and high tide will be there also. The observed tide is the effect of both lunar and solar pull. Of the two the sun's pull is the weaker, because of its greater distance from the earth. At new moon the height of the tides is increased. Sun and moon then pull in the same direction. At full moon there is also an increased height. Sun and moon then reinforce each other, though they are on opposite sides of the earth.

INVENTOR OF DIVING ARMOR

Present Perfect Form of Dress Largely Due to Genius of William Hannis Taylor.

Among pioneer inventors, to whom the diving dress in its present perfected form owes so much, was William Hannis Taylor, says Scientific American. The previous "bit or miss" attempts were superseded by the Taylor patent of June 20, 1838 (No. 578), in which the essential feature was the valve allowing the emission of consumed air without an influx of water. Previous to this time, there had been the diving chest and the diving bell, of which the latter, introduced by Smeaton in 1778, was the safest and most practical device for submarine exploration. The diving bell has been developed alongside of the diving dress, and is still in use.

The general appearance of Taylor's diving armor was like that of a knight's suit of mail, except for a prominent bulge in the body piece. A large pipe coming down from the surface and penetrating the body piece at the bulge, supplied the fresh air, while a short pipe entered the body piece on the other side, and was provided with a valve which carried off



First Diving Armor.

the exhaust. Although diving armor has now reached its perfected state, this valve has never been materially improved upon. The accompanying illustration is reproduced from Mr. Taylor's patent.

Shifting of North Pole.

Since the autumn of 1899 the slight shifting of the north pole has been observed closely at six stations around the world near the thirty-ninth parallel of latitude, and Prof. Albrecht of Potsdam has now completed a diagram of the pole's wanderings for ten years. Up to the end of 1899 the mean position had been circled around eight and one-half times in an irregular spiral course. The pole was very near its middle place in 1900, and nearly touched the center again in 1906 and 1907. Its oscillation reaching another maximum in 1909, it kept about 30 feet away from its central place during the rest of the year.

Oyster Shell Window Panes.

On the west coast of India is found a species of oyster whose shell consists of a pair of roughly circular plates, about six inches in diameter. These plates are thin and white. They can be, and are, used for window panes; they admit light and have the appearance and effect of frosted glass, but look much more ornamental.

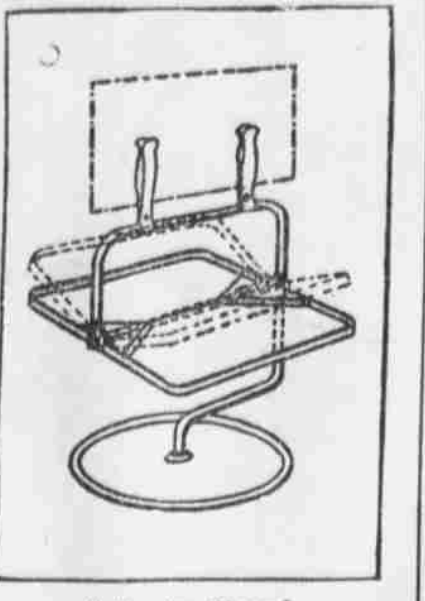
Lightning Arrester.

Has your telephone got a thoroughly reliable lightning arrester, one that you can operate from near the telephone, disconnecting it from the line

HOLDER FOR SMALL CHANGE

Eliminate Difficulty of Picking Up Silver Coins From Glass Casts, Counters, Etc.

The difficulty of picking up coins from the top of glass casts, counters, etc., has resulted in the invention of numerous articles to facilitate the collection of change. There are rubber mats and felt mats and hollowed glass trays galore, but one of the most pretentious of these devices is that designed by a Washington man and shown here. A metal or wooden folding pan, that normally is fastened in open position, is pivotally supported by a rod that arches over the top



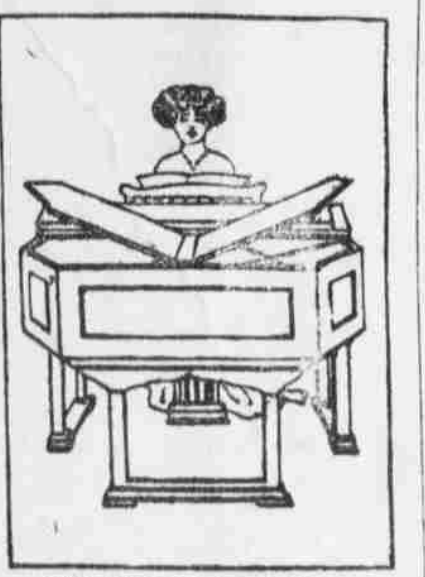
Holder for Change.

of it and curves under it to the center of an extended base. There is room both above and below the pan to turn it and insert a hand. The change is laid on the tray and the customer holds his hand beneath it and lifts it, the coins thus being dumped off in a twinkling. There is no claying necessary, as when the money lies on a flat surface that is immovable. The tray is made to fold in the center and can be closed when not in use. At the top of the support are clips adapted to hold notices or advertising cards.

WELL-BALANCED GRAND PIANO

New Musical Instrument Which Comes From England Possesses Tone Purer Than Big Ones.

In the effort to secure a compact grand piano, with all the volume and other merits of the larger instrument,



The Balanced Grand Piano.

there has been evolved in England the balanced grand, which is said to have all the points of merit of the large instrument without its bulk and its unwieldy shape, for it is arranged so that one side is the duplicate of the other. This change in shape has required the scale being doubly overstrung, giving a tone of volume and quality which many musicians claim is purer and has greater carrying power than the old full-sized instrument. This is the very first piano of symmetrical shape and that opens either side, the top forming two lids, hinged in the center so as to distribute the sound waves.

Electrified Smoke.
The smoke problem was the chief topic of discussion in the convention of the American Chemical Society, recently held at San Francisco. Leading scholars contributed a symposium on smelter smoke. Prof. E. G. Cottrell of the University of California has gained greater success so far than any chemist in the solution of the smoke evil. Cottrell's remedy is an electrical precipitation of the impurities in smoke by sulphuric acid, lead and zinc. Cottrell proposes to make the smoke which pours from the smelter chimneys of the country harmless by static electric discharge.

Novel French Brake.

The resistance of water to a paddle wheel is utilized in a novel French brake for motor cars. A bevel wheel is loosely mounted on the shaft between the engine and the gear box and can be clutched to the shaft as desired. The bevel wheel meshes with a pinion having attached a fan, or paddle wheel in a small water tank. On using the brake the paddle is set in motion, and the resistance of the water exerts a braking effect that is considerable at high speeds, decreasing with lower rates.

NOTES OF SCIENCE AND INVENTION.

Nearly one-fifth of the area of France is forest land.
A ton of ice will cool about 28,000 pounds of water one degree.
A recent estimate placed the population of the world at 1,467,000,000.
British post-offices handle 12,000,000 letters and 250,000 telegrams a day.
Nearly one-fifth of the deaths in England occur in public institutions.
Alabama has held third place among the states for iron production since 1894.
More paper is made in Holyoke, Mass., than in any other city in the world.
Something like 300,000 horsepower is going to waste in the waterfalls of Iceland.
Although it weighs but half a pound, a female herring will lay 45,000 eggs

NEW NEWS OF YESTERDAY

By E. J. Edwards

Story of Grant's Opponent

Horatio Seymour's Practical Political Lesson to Chauncey M. Depew When Latter Was Secretary of State of New York.

"It was just four years before Horatio Seymour was nominated by the Democratic party, in 1868, to run against General Grant for president of the United States, that I received from him what I have often regarded as the most practical political lesson that was ever taught me," said Senator Chauncey M. Depew at a time when the discussion turned upon political leadership and political leaders of yesterday.

"Mr. Seymour had been elected governor of New York in 1862—he had also filled that office ten years before—and in the election of '63 I was a candidate for secretary of state. I went into the campaign very earnestly—it was only eight years out of college, and political life looked mighty tempting to me—and the argument that I delivered on the stump throughout the state were at times pretty well seasoned with political spice of the very hot sort.

"Well, after the campaign was over and I had found myself elected by a majority twice as large as that which Governor Seymour had received the year before, the thought occurred to me that the governor might not want to speak to me, for I had been quite personal regarding him in some of my speeches. But to my astonishment I had not long been in office when the governor invited me to spend a few days with him at his home in Utica, promising, among other things, to take me to his farm at Deerfield, a few miles out of the city. Overjoyed at the discovery that I had not made a personal enemy of him, I immediately accepted the invitation, and arriving at his home, found him a man of wonderful personal charm, of an ideal domestic life, and a most entertaining storyteller of men and events.

"We chatted for a long time, and many a vivid word picture my host drew of men then prominent in state and national politics. Finally, as the sun was beginning to cast shadows from the west, he began to speak about myself.

"You have begun a political career," he said. "Well, in my opinion, you have many qualities for a successful career of that sort. You have some gift of public speaking, and you know how to approach tactfully. But if you were to ask my advice, I should tell you emphatically not to go into politics, but to stick to your profession. The law always offers a good field to the ambitious young man."

"For a moment he looked at me furiously, to see how I was taking his advice, and then continued:

"But if you insist upon a political career, I have just one piece of advice for you. Never read an opposition newspaper, never read a personal or political attack upon yourself or your party, never listen to anyone who brings you a report of that kind; read your own party journals, read plenty of history, study the careers of great political leaders of the past. This plan I have followed for over twenty years, and to it I attribute whatever success I have had in politics, as well as peace of mind, even when I have been most violently attacked."

"Again the governor glanced furiously at me, then, looking at his watch, guessed it was time to return to Utica. He summoned the farm wagon, and it clattered up with the tools in it still untouched. We mounted the board seat, and, like a true rustic, the governor drove back to the city. And as I sat bonneting up and down beside him and thought of that untouched lot of farm tools jangling behind us, I could not help saying to myself:

"Governor Seymour, no matter what you say, you do not owe all of your success in politics to the fact that you never read opposition newspapers, or paid any heed whatever to personal or political attacks upon you."

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Dirge Carl Schurz Played

Rendered "The Heart Bowed Down" After Horace Greeley Was Nominated by the Liberal Republican Convention in 1872.

One of the men who took a very prominent part in the organization of the famous Liberal Republican party movement of the early seventies, which instantly went to pieces following Greeley's defeat for president by General Grant, running for re-election in 1872, was the late Samuel Bowles, for more than thirty years prior to his death in 1875 a powerful editorial influence throughout the country. Allied with him in the task of organizing the Liberal Republican party were three other famous editors, the late Murat Halstead, Henry Watterson and the late Carl Schurz, then United States senator from Missouri.

These four men were prominent members of the national convention of the Liberal Republicans, held in Cincinnati in 1872. But not one of them had planned for Mr. Greeley's nomination. Their candidate was Charles Francis Adams of Boston. Yet, brilliant editors though they were,

Incident of Sherman in 1846

How Henry A. Wise, Then the Minister to Brazil and Later a Confederate General, Entertained Him at Rio Janeiro.

On the morning of Dec. 27, 1846, Henry A. Wise, United States minister to Brazil, and later the governor of Virginia, who signed John Brown's death warrant and a Confederate major general, went for a stroll to the docks of Rio Janeiro. Some days before he had been told that an American clipper ship might make the port, and he did not wish to miss his fellow countrymen there; hence his daily haunting of the water front.

On this particular morning he had not quite reached the dock when he spied two keen-eyed and alert young men, who bore every outward sign of being Americans and who seemed to be intensely interested in the scenery of the harbor of Rio Janeiro. Going up to them, Mr. Wise put out his hand.

"You are from the United States," he said. "So am I. Am I right in assuming that you are passengers upon the clipper ship that I see is taking in stores at the pier yonder?"

The two young men replied in the affirmative and then Mr. Wise introduced himself, saying that he was the American minister at the Brazilian court, and adding that he would be pleased to have the two travelers dine with him. Thereupon the strangers expressed their delight at the invitation and immediately accepted it, the younger of the two then introducing the other as Colonel Sherman in Washington and asked him if he remembered being entertained with General Halleck in Rio Janeiro, back in 1846, by the United States minister of Brazil, Henry A. Wise.

"Oh, yes, I remember the incident very well," was the reply, "and I also recall the little surprise party we had."

"Well, General, I was that baby," said Representative Wise.

The old warrior critically surveyed the heavy weight before him.

"Well," he retorted, with his eyes characteristically a-twinkle, "all I've got to say is, you can't look it."

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"Grant" for Janitors.
Mayor Gaynor of New York city who holds that "all benevolent folk should be in bed before midnight" would find Vienna a city after his own heart. The Viennese are subject to a form of impost unknown in America, the "sperrgeld," or door-opening tax. They all live in flats and the street entrances are invariably locked at ten o'clock each night. When the bolts are drawn persons passing in or out must pay four cents until midnight and eight cents from that hour until 6 a. m. This toll is levied every time you go through the doorway. If you post a letter you have to pay to go out and pay to come in. The janitors, or "house masters," as the Viennese call them, draw handsome incomes from this source, although persons liberal in other respects strongly object to paying "sperrgeld" and will hurry over a costly dinner to save four cents.

Made a Bad Impression

Gracie's Inquiry Unfortunate Coming as it Did Just at the Wrong Time.

The number of things children can do to annoy their parents is unlimited. No one parent's experience can be a guide for another, for each babe terrible breaks out in some unexpected place and the most their progenitors can do is to console one another.

"For a small but acute mortification," said one young mother, comparing notes with some friends, "I have seldom had anything so equal to a performance of Gracie's a short time ago. You know she is about four years old. This summer when Frank and I were traveling we took no nurse with us, so we always made special arrangements to have Gracie at the hotel tables with us. At many of the resorts it is practically impossible to have a table by yourself. At the first place we stopped

Hints For Hostess

TIMELY SUGGESTIONS for Those Planning Seasonable Entertainments

A Boating Dinner.
This dinner was given by a coterie of four couples who had passed a great part of the summer together yachting on the great lakes. The occasion was in the nature of a little farewell to the one they called "commander." The table was lovely and had for the center a lake made first by the tinsmith, who concocted a circle about three feet in circumference, which was surrounded with a border of ferns, vines and pond lilies. In the water: two sail boats and a toy launch floated as natural as life, manned by cute doll sailors. To add to the festive appearance there was a huge Japanese umbrella over the table, from which small lanterns hung from every rib; they were lit by electric lamps. At each place there was a tiny canoe, with a very small Zap lantern at the bow. The name of the guest was lettered on the side. Wee kiddies painted white were stacked bayonet fashion at each place and held a small pair of bon-bons. The name flag of the boats were around the room with the Union Jack and the Stars and Stripes. The guests were asked to come in flannels and it was just the jolliest kind of a time. The menu was as nautical as the market could afford, beginning with oysters, fish, lobster salad, etc.

A Wild Aster Luncheon.
The lovely wild aster furnished the key note to one of the prettiest luncheons I ever attended. This dainty flower is very common, and really it is very beautiful. With it always comes the golden rod, as they grow usually in close proximity. For a table centerpiece there was a low green pottery bowl containing a flower holder, so that the blossoms branched out in a charming manner. The dillies were white, with finger bowl and tumbler dillies having embroidered designs in lavender. First we had iced grape juice in tall glasses resting on jollies of grape leaves. Then there was the usual luncheon menu with a delicious grape juice sherbet for dessert, decorated with candied violet leaves, the plates set in a wreath of asters. The rooms were lavishly decorated with golden rod, and the combination of lavender asters and the brilliant yellow was very effective.

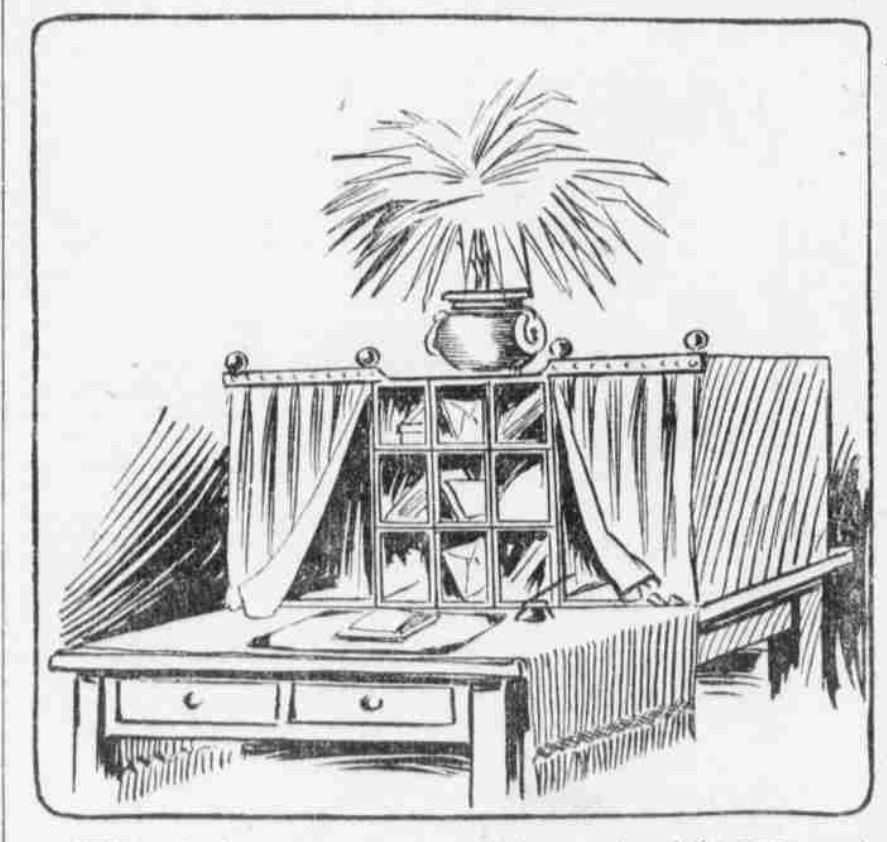
A Pillow Shower.
This was not given for a bride, but for two girls who were going away to school. To furnish their joint sitting room was the idea of the home

girls who gave it. The result was a fine collection of useful and ornamental pillows or cushions, from those for the couch to dainty confections of dotted swiss and ribbon for the dressing table. There were also cushions filled with pins of all sizes and with needles. There were denim cushions large enough to sit on when placed on the floor, and what girl does not adore sitting on the floor in front of the fire and dream long, happy dreams of the days that are yet to come? A bride-elect who heard of the affair said she thought such a downpour would be very acceptable, so the readers who have been asking for something new in the way of showers may adapt this to their needs.

A Novel Amusement for Children.
At a recent party for youngsters from "nine to eleven" they had a soap bubble contest. First the hostess gave each child a sheet of colored crepe paper and a needle and thread. A grown-up took each pipe and quickly drew a face on the back of the bowl and the children were told to make dolls of them. A couple of prizes were offered and it was surprising what attractive creations were turned out. The boys did just about as well as the girls. The pipe babies were taken home as souvenirs. There were favors for the soap bubble contest, too.

MADAME MERRILL

Useful Writing Table



A VERY good scheme for constructing a rough but useful kind of writing table—for the room, perhaps, that is set aside for carpentering and other amusements—is shown in our sketch. It may be quickly arranged and easily taken down again, when not required, and it can be made at a very small cost.

It consists of two strong wooden boxes or packing cases placed on either side of one end of a table. The lids have been removed and curtains hung in their places, fastened on to the upper edges of the boxes with ornamental braids and small brass-headed nails. The two boxes are finished off at the top with four little brass balls, screwed into the corners.

Lace Watch Fob.
They are very dainty. They are also new and a charming adjunct to the light frock. The girl who is deft with her fingers should be able to make one easily at home.

For this remnants of Irish or Cluny insertion may be utilized.

The strips of insertion are folded over the gold or brass catch, which may be bought for fobs and the end is pointed and finished with a white silk tassel.

The girl with a military friend from whom she may beg souvenirs might substitute for the white tassel one of good strands such as is worn on a sword.

Thin lace fobs are lined with white or colored ribbon.

Loose Shoes.
Quite as bad as too tight shoes, against which we are always warned, are too loose ones; they cause corns and bunions and often produce flattening of the arches. The woman with the peculiarly shaped foot, who cannot get shoes exactly to fit her except when made to order, should get them a little too long rather than a little too wide; it is the lesser of two evils.

A Velled Gown.
Rather effective and equally unusual is the gown of two-toned silk velled with chiffon or other shimmering material. The combination is intensified if the under dress is itself trimmed with hand-work or done in the Persian colors of metallic threads.