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THE UNERRING SUN

It Is Uncle Sam's Most Reliable Lighthouse Keeper.

NEVER FALTERS IN ITS WORK.

By the Aid of the Wonderful Sun Valve It Lights the Acetylene Beacons as It Sets at Night and Extinguishes Them as It Rises In the Morning.

The sun is the most trustworthy of lighthouse keepers. The sun or the heat from it lights many hundreds of beacons along our coasts and waterways evening after evening and extinguishes them punctually every morning. They are guides on land and sea that are never touched by human hands from one month's end to another. The way in which the United States government, through its lighthouse board, has utilized the services of the sun and made that great lamp of heaven a faithful and unerring servant is most interesting.

The discovery of acetylene gas was the first step toward retiring the lonely keepers of the little lights in faroff places. Modern magic was not slow in recognizing the fact that by the application of certain well known scientific principles the lighting of the great chains of beacons that girdle the coasts of the two seas and the gulf and cover the great lakes and every navigable stream in our huge country could be much simplified.

The United States did not become interested in the acetylene light and its automatically generating gas buoy until about the year 1906 and did not adopt it until 1908. Then the engineers of the lighthouse board devised some wonderful improvements, among them the utilization of the sun.

The self lighting and self extinguishing acetylene beacon is a very simple thing, but it depends almost entirely on the "sun valve," which is one of the most wonderful but least complex of the achievements of modern science.

In the first place, the source of light for these lone beacons is dissolved acetylene, which is stored under pressure in steel cylinders. One of these cylinders can be charged with enough gas to last a small beacon three years. Usually, however, in the case of floating buoys, a six months' supply is all that is necessary, as such buoys are overhauled and painted twice a year. Knowing the size of the flame and its hourly consumption of gas, it is very easy to compute how long a cylinderful will last and how often it will need to be visited. That is all the care the light will need. The sun valve does the rest.

The scientific principle upon which the sun valve depends is that light waves become transformed in different degrees, according to the nature of the intercepting body. Sunlight upon dark surfaces is converted into heat, and heat produces expansion. This expansion is especially perceptible in certain metals.

In a carefully sealed and substantially mounted glass jar nearly a foot high and about one-fourth that in diameter a thick black rod is placed perpendicularly through the center. It is supported by three slenderer rods of highly polished copper. The big black rod is of copper also and is coated with lampblack to make it absorb light to the greatest possible degree. The supporting rods reflect light without absorbing it and do not expand or contract to the same extent as the largest rod.

The thick black piece of copper in the center of the jar is extremely sensitive to light and heat. As the sun appears and the atmosphere grows warmer in the morning this rod lengthens. It pushes down into the metal chamber in which the glass jar rests and touches the end of a lever. It presses down on this lever, which is controlled by a spring and cuts off the flow of the gas to the lamp.

When the sun disappears from view in the evening and the temperature of the air falls the process is reversed. The rod contracts and releases its pressure on the lever, allowing the gas to flow upward to the lamp. The gas is ignited by a little pilot flame that is never extinguished. Thus the beacon is lighted at the proper time and is put out when it is no longer needed, although along desolate coasts it may never gladden the human eye for months at a time.

The engineers of the lighthouse board say that the precision of this device is almost incredible. It can be used with equal certainty in equatorial heat and in polar cold, for it responds with the utmost accuracy to small variations in temperature. It is used on lonely islands in the Pacific. There are nearly a hundred of these sun valve beacons in Alaska. In summer they are aids to navigation, and in winter they guide the travelers on dog sledges over the frozen wastes.—Harper's Weekly.

Deadly.

"I understand that a number of women have learned to smoke cigars," said the frivolous observer.

"I don't believe it," replied Mr. Meekton. "The kind of cigars that women buy nobody could smoke."—Washington Star.

Sarcastic.

Softly—I'd have you to understand, sir, that I'm not such a fool as I look. Sarcast—Well, then, you have much to be thankful for.

Riches are like sea water, the more you drink the thirstier you become.—Schopenhauer.

New Year's Calling

How It Originated and Is Carried On

NEXT to Christmas the most joyous annual festival has been the advent of the new year. This has been so ever since the Christian era. As far back as the history of man can be traced the New Year day has been an occasion of feasting and rejoicing. From the oldest authentic record it has been transmitted down to our times and is still observed. The feast was instituted by Numa and was dedicated to Janus, who presided over the new year Jan. 1, 713 B. C.

In the middle ages it was religiously observed by the flow of wine and the eating of baked meats. The chieftains of the European tribes appointed it as the day of receiving their captains and vassals. Their chief was not adverse to receiving some token of regard from his people to remind him of them during the remaining 364 days. The people soon learned to consider it good form as well as good policy to bring with them a substantial remembrance.

Queen Elizabeth made New Year's day a general court occasion, in which she greeted her loyal subjects and received their gifts. It was customary to present Queen Bess with the finest raiment procurable. All the courtiers tried to outdo each other in selecting the most magnificent textures for their royal mistress. Sir Walter Raleigh one New Year's morning outstripped them all by presenting her majesty with a pair of woven silk hose, the first ever worn in England.

In northern climes the New Year has always been one of the chief gala days of the season. The town folks always call upon the chief magistrate and drink his health. The idea of paying New Year calls in this country in a general way for years was confined to New York state, though other states adopted it and practiced the custom to a moderate extent. The early settlers of jolly old New Amsterdam made the advent day of the coming year the happiest of the annus. In those primitive times everybody knew each other from one end of Manhattan Island to the other. After paying their grave respects to the governor they visited each other.

When the English came to New York they continued the ancient custom, which helped to cement the good fellowship that has since prevailed between the two races. For years the popularity of New Year as a day of feasting became so prominent that Christmas was lost sight of. Year by year the calling custom grew in favor. The young women would try to outdo each other in the sumptuousness of their table and elegance of their toilets. In the beginning of the last century the young maidens took pride in the fact that the clothes they wore and the tables they set were the work of their own hands. The gallants would start out early and go over a list of a score or more, paying their respects to the matrons first and winding up at the home of their chief attracter. Everybody who was anybody in those days drank.

In fact, it was considered a duty he owed to society and to his hostess to drink whenever he was asked and fill the bumpers up to the brim. As the city increased in size the custom increased in popularity and the calling acquaintances of the people in magnitude. The fair New Yorkers entered into friendly rivalries with one another as to who should receive the largest number of callers.

A NEW YEAR'S CALL IN OLD NEW YORK.

The "upper crust" celebrate New Year at their country homes. Occasionally a solitary caller may be seen walking through a fashionable avenue anxiously looking for a house where he once was a welcome visitor in order to pay his annual respects, but nothing greets him but closed doors and windows.

Because the fad has become passe with the fashionables it does not follow that there is no calling done. The so called common people keep up the ancient custom and look forward to it for half the year.

In times gone by it was one of the pleasantest of customs, and many who wonder it secretly hope that it may yet be revived with the unpleasant features left out.

A BIG GOLD BRICK

The Trap That Jernegan Baited With Salt Sea Water.

SCHEME OF A CLEVER ROGUE.

The Smooth Swindler and His Accomplice Showed How Easily They Could Extract Gold From the Ocean—Fleeced Their Dupes and Then Decamped.

Various inventors have been working for years on the theory that there is plenty of gold in sea water if only some process of extraction could be developed.

Some years ago the Rev. Prescott J. Jernegan was the salt water wizard of the hour. From the day his bubble burst and he left for Europe nobody seems to know what has become of him. Jernegan, who posed as a clergyman, and C. E. Fisher, once a floorwalker in a New York department store and before that a diver, got together in the fall of 1896 and for a whole year carefully considered the problem of extracting gold from salt water. It is true, their whole field of thought compassed the use of salt water as an accessory only, the real material from which the gold was to be extracted being the American people.

Very artistically Jernegan, to whom was left the matter of publicity, permitted some vague rumors to leak out. "A leading clergyman had a marvelous money making device. The world was soon to be stunned by a fact that would make the possessor of the original secret so rich that all the multimillionaires would be paupers in comparison." When they had stirred up public curiosity Jernegan and Fisher went to New England and there set up some mysterious machinery.

On Narragansett bay was an old hulk dismantled wharf, and at the sea end of this the two erected a cheap frame shanty about 8 by 10 in size, with a square hole cut through the floor and looking directly down into about fifteen feet of water. An electric wire from a small battery was run along the piling of the wharf and attached to a mysterious box, with heavy iron clamps and holes all through to permit of free passage of the water back and forth.

Finally the great secret was divulged. These two men had discovered a way of taking all the gold they wanted from the salt water at a cost so trifling that it was ridiculous to mention it. Two wealthy persons, one a Providence jeweler and the other a New York florist, were approached by Jernegan with what seemed to be such a trustful and childlike proposal that they both embraced it eagerly. It was that, all his apparatus being ready for experiment, they would come to the shanty on the wharf prepared to go through a night's vigil and witness the result, accompanied by any scientific friends they cared to bring along.

The idea, as outlined by Jernegan was to send a current into a pan of mercury held within the box, the receptacle then being sent to the bottom of the sea and drawn up after several hours, when it would be found that the mercury had absorbed gold from the ocean.

When the night of the experiment came the box was prepared in the shanty, two chemists, friends of the capitalists, bringing their own mercury with them. The box was lowered to the bottom, and then the party of five began their wait. Soon after daylight Jernegan announced that it was time to draw the box up again. This was done, and the whole party eagerly set to work to find out whether any gold had been received. When the chemists announced that gold to the value of $14 was found mixed with the quicksilver all were stunned by the discovery and realized at once the vast possibilities in more extensive operations, the original experiment having been practically made with a toy apparatus.

The story spread like wildfire, and the modest Jernegan was prevailed upon to organize a company. Stock was sold, and after getting possession of thousands of dollars the promoter sailed away to Europe. The success of the great experiment was explained afterward. Fisher, the diver, had gone out from the shore in his diving suit, opened the box and, taking out the mercury that had been brought by the chemists, substituted a vial of his own that had been strongly impregnated with gold.

Both before and since the Jernegan fraud many attempts have been made to extract gold from salt water, some of them fraudulent, some genuine and based on scientific grounds that have from time to time appealed even to deep students. But all so far have failed dismally. Though traces of gold are to be found in salt water, commercial application is practically impossible.—New York Press.

THEY WERE VERY RICH.

What Else They Were Was Quaintly Told by Mary Lyon.

When in 1837 Mary Lyon founded Holyoke college she collected the money required for its first building in sums that ranged from 6 cents to $1,000. She got 1,800 persons to subscribe. Her feat gave the new enterprise an unusually wide foundation in the public interest, but she did not accomplish it without much hard work or without gaining wide experience of human nature.

One evening Miss Lyon arrived in the village of Ashfield, Mass., at a home where she was always welcomed, gladly. She was full of hope and enthusiasm. Would the squire take her at once to W., where, she had learned, there was a family of wealth that might give liberally toward the seminary building?

"Supper and a good night's rest, Miss Lyon," was the reply, "and then my horses shall take you there."

The next morning as they were starting the squire's wife laid a gentle hand on Miss Lyon's shoulder, with the warning: "Do not expect too much, my dear Miss Lyon. We know the people. I fear you will not be successful."

With a beaming face Miss Lyon replied: "Oh, I am told they are very rich. I am sure they will help liberally."

When she entered the house on her return Miss Lyon went quickly to her friend, and, grasping her arm, while conflicting emotions played over her face, she said:

"Yes, it is all true, just as I was told. They live in a costly house, it is full of costly things, they wear costly clothes"—then, drawing nearer and almost closing her eyes, she whispered with unforgetable emphasis, "but, oh, they're little bits of folks!"—Youth's Companion.

A Constant Sufferer.

"Is your mother a suffragette, Robert?"

"Yep, she's always suffering. If it ain't with her shoes or her corset it's because somebody that owes her an invitation had a party and didn't ask her to it."—Chicago Record-Herald.

Wilson is the best equipped man nominated for the presidency since Lincoln.

THE EARTH CRUST

Its Density, Its Thickness and the Pressure It Exerts.

A BAR TO WORLD EXPLOSION.

The Reasons Why This Old Planet of Ours, With All Its Pentup Fiery, Volcanic or Gaseous Forces at Work, Could Never Be Blown to Fragments.

Some writers have accounted for the asteroids on the theory that they are the fragments of a world that from some unknown cause has been exploded in its orbit. Similarly, many have thought that perhaps at some distant time, when the seas shall have been drunk up into the cracked and thickened crust of the age shrunken earth and the volcanoes—those vents of the fiery interior—shall have become choked and extinct, the pentup gases generated from the descending moisture by the still great internal heat may actually explode the old earth like a veritable bombshell.

But that can never happen.

In 1883 Krakatoa, a sleepy old volcano on a small island in the strait of Sunda, between Java and Sumatra, began to show marked signs of uneasiness. Round the volcano the quaking earth opened enormous fissures in the bottom of the sea, down which rushed Niagaras of water. Then the fissures closed and confined the engulfed flood in the hot subterranean depths. The water was quickly converted into steam, the steam into dissociated gases, without room for expansion. It exerted a pressure equal to that of the strongest dynamite.

The great chimney of Krakatoa, sealed since the memory of man, barred the normal path of escape. Higher and higher mounted the pressure under the huge mass of the volcano; then, of a sudden, came a blast that actually shook the earth. Never before in historic time had there been such a shock. The whole top of the old mountain was blown into the sky. The recoil was distinctly felt clear through the terrestrial ball.

This great cataclysm has been cited as an indication of the power of the pentup forces that may some day disrupt the earth itself. Let us examine the underlying principles that must guide us in passing judgment on the correctness of this theory.

An explosive compound is a combustible combined mechanically or chemically either with oxygen or with an oxidizing substance that will burn without the help of atmospheric oxygen.

Among the most powerful high explosives are nitrogelatin and picric acid, each of which has a density more than one and a half times that of water. The products of their combustion are nearly all gaseous, whereas the products of the combustion of ordinary black gunpowder are less than half gaseous. The larger part is the solid matter that makes the smoke.

The energy that a high explosive can exert depends on the volume of the gases liberated and the temperature to which the heat of the explosion can raise them.

The exact temperature of the gases liberated by a high explosive at the instant of detonation is not absolutely known, but may be approximately learned through chemical experiment. Nor is the amount of pressure known with absolute certainty. It is probable, however, that nitroglycerin, nitrogelatin and picric acid, when detonated in a confined space, exert a pressure somewhere between 300,000 and 500,000 pounds to the square inch.