marine work. A long experience has enabled the Rand Drill Company to bring these drills to such a state of perfection as to perfectly adapt them to the wide range of uses to which they are applied and to give them the qualities of durability and efficiency which are so essential to machines subjected to rough usage and trying conditions.

### Enlarged Stereoscopic Pictures.

The following description of Mr. John Anderton's system for obtaining stereoscopic effect on the lantern screen is given in the *British Journal of Photography:*

"In adapting the stereoscope to the optical lantern, the problem to be solved is, to place upon the screen a pair of ordinary stereoscopic pictures in such a manner that, while the right eye can only see the right hand picture and the left eye the left hand picture, yet the two are combined and conveyed to the brain as one.

"In the invention this problem is solved in an exceedingly simple manner. The pictures on the screen are in full perspective, the various objects forming them standing out as if possessed of three dimensions, and appearing in their correct relative planes. A pair of ordinary stereoscopic transparencies are superposed on the screen as nearly as possible; the pictures not being identical, a perfect registration cannot be obtained. The light from each picture is polarized, one vertically, the other horizontally, and the combined picture is viewed through an analyzer similar to a small opera-glass. This analyzer is so constructed that, while the right eye can only see the image portrayed in horizontally polarized light, the left eye can only see that in vertically polarized light. An important part of the invention is the screen. It is a well known fact that polarized light is apt to be broken up on reflection. The screen employed is faced with dull or matt silver, a long series of experiments having proved this to be the best material."

To this descriptive outline, which is in the nature of a "popular" one, it is only necessary to add that the superposition of the stereoscopic picture is effected by halving the transparency and projecting the halves by means of an ordinary biunial lantern. The polarizers are placed before each objective.

We may at once say that for our own part we consider stereoscopic projection, as worked out by Mr. Anderton, and shown recently, as perfectly successful. Indeed, our expectations never went within measurable distance of what we then realized.

The two pictures, when superposed, show a duplication of outline, due, of course, to the fact that absolute registration of the two dissimilar halves cannot be got. When looked at through the analyzer, however, the blur disappears, the image coalesces in the brain just as when a binocular slide is examined in the stereoscope, and the screen picture becomes at once well defined and truly stereoscopic, objects standing out in apparent relief and solidity with all the charm of reality.

It should be said that, while all the pictures shown yielded stereoscopic effect when viewed through the analyzer, some were less successful than others. Interiors, flowers, landscapes, animals, were shown, perhaps the most realistic being the picture of a tiger in a cage, the paws of the animal reaching, as it were, out of the picture, the bars of the cage separating from the animal beyond them, and the whole effect being remarkably good.

It is claimed that any subject taken with a binocular camera would be suitable for stereoscopic projection, but we are disposed to think that successful effects, not only to a popular audience, but to those not unfamiliar with stereoscopic photography, would be best obtainable by suiting the treatment of the subject to the conditions of the case. Thus, it appeared to us that the most successful pictures shown were those which had been taken with short focus lenses separated rather above the distance which strict theory demands, so as to obtain some little exaggeration of relief. This, however, is only a reflection in passing.

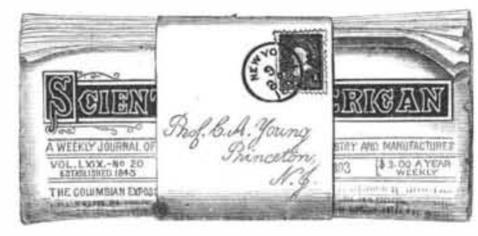
On the whole, Mr. Anderton is to be congratulated upon the undoubted success of his adaptation of certain optical principles to stereoscopic projection. The lantern stereoscope should be widely popular.

### The Cost of Carelessness.

Familiarity with danger seems to breed, if not a contempt for it, an utter carelessness. We have seen, says the Chattanooga *Tradesman*, the "Mohawk Dutchman," the celebrated expert with a band scroll saw, rub the ball of his thumb in dirty grease and then cut the grease off with the rapidly running saw as clean as could be done with soap and water. We have seen a man put his finger under a powerful trip hammer in motion just to show how well he could manage the machine. Many other foolish things are done just to "show off." But most of the accidents happen through a carelessness resulting from familiarity. As long as an operator is afraid of his machine, he is not apt to get hurt. Many human minds are so constituted that they cannot bear a sustained effort in one direction; that is, cannot be always equally on the alert in regard to a certain contingency. A train dispatcher or switch tender may hold a place for years without ever making a mistake, and at last make a terrible one, from some cause he could not explain. The only way to lessen the number of casualties—they cannot be avoided entirely—is to take all precautions. This is required of the owners if they wish to escape costly damage suits, but when all possible precautions have been taken, one can then only trust to luck.

### THE SCIENTIFIC AMERICAN MATCH SAFE.

The readers of the SCIENTIFIC AMERICAN will be interested in the accompanying cut, which represents,



THE SCIENTIFIC AMERICAN MATCH SAFE.

not a copy of the paper, but a silver match safe, which is manufactured in facsimile of the SCIENTIFIC AMERICAN, and represents it as folded in a wrapper and as having passed through the mail. The familiar blue one cent stamp is in one corner and canceled by the New York postmark. The name of the owner may be enameled upon the wrapper and the autograph accurately reproduced. The manufacturers, Messrs. Enos Richardson & Co., of 23 Maiden Lane, New York, have paid us the compliment of selecting the SCIENTIFIC AMERICAN as the most representative and available paper for this purpose, and we take pleasure in acknowledging their courtesy and discrimination.

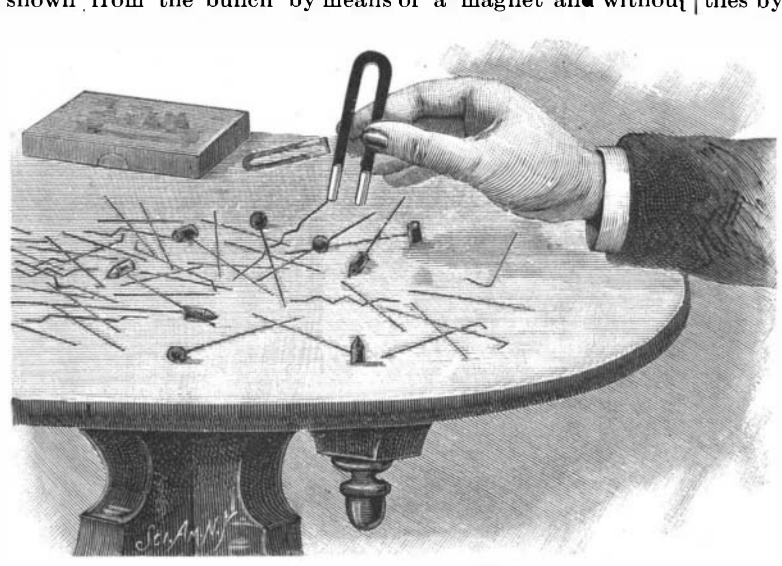
### MAGNETIC JACK STRAWS.

The illustration below shows one of the most ingenious devices for the amusement of children to be found this season among the various toy stores and elsewhere.

It is a game that will not only amuse children, but affords an endless source of amusement to adults as well, and can be played by any number of persons.

The game is put up in a neat little box, and contains a large number of metal straws of various colors, crooked, and angled, and crimped, and some of them having little heads of colored wood in various forms, together with two magnets.

The object of the game is to withdraw a single straw from the bunch by means of a magnet and without touching or disturbing the other straws. The game is manufactured by E. I. Horsman, of 341 Broadway, N. Y.



MAGNETIC JACK STRAWS.

### The Simplon Tunnel.

It is announced from Berne that the contract for boring a tunnel through the Simplon has just been signed and has been given by the Jura-Simplon Railway Company to Messrs. Brand, Brandau & Co., of Hamburg, and Locher & Co., of Zurich. Both these firms have some experience in mountain railway work, the former having joined in the boring of the Arlberg tunnel and the latter having constructed the line up the Pilatus. The Mont Cenis tunnel, the first of the Alpine tunnels constructed, took 13 years in its completion; the first blast (at that time the only method known for boring tunnels) was made with gunpowder in 1857, and it was not till four years later that machine drilling was introduced, while the subsequent application of compressed air drills came almost too late for the engineers to profit fully by them. The average rate of advance during the thirteen years' work was 2·57 lineal yards per working day of 10 hours, each lineal yard costing £226. In boring the St. Gothard tunnel the engineers could profit by past experience; it was commenced in 1872, and, though two miles longer than the Mont Cenis tunnel, was finished in 1881. Turbines of 2,000 horse power compressed the air for working the Ferroux drills, and the rate of advance was 6·61 lineal yards per day, at a cost of £143 per yard. Further advance was made in the boring of the Arlberg tunnel, which is 6⅓ miles in length, and took only three years to construct. In this case the average rate of advance was 9·07 yards per day, at a cost of only £108 per yard. We have no doubt that a further advance will be made in the boring of the fourth of the Alpine tunnels, and we hope that this advance will be due to electrical methods. We have now at our command most efficient electrical drills and can work these drills by electromotors. Motive power in mountainous regions can easily be derived from some of the numerous waterfalls to be met with in these regions, and the locality of the central stations, thanks to the progress of electrical power transmission, can, within the prevailing limits, be pretty nearly chosen at will. We feel sure that the enormous advantages of an electric installation will not be overlooked by the contractors, and in this case the stipulated time for the completion of the work of 5½ years will prove more than ample. It is contemplated to construct at first only a single line of rails; a gallery, however, will be made at the same time, and will afterward be widened to enable a second line of rails to be constructed after four more years. The cost is estimated for the first enterprise at fifty-four and a half million francs (£2,180,000), and for the addition, fifteen million francs extra.—*Electricity.*

### The Year's Progress in Naval Ordnance and Armor.

The annual report of the Chief of the Navy Bureau of Ordnance gives a good summary of the year's work in the bureau, as well as an estimate for the next fiscal year, which is $7,145,801, of which $6,500,000 is for arming vessels already authorized. Of 453 guns of calibers from four to thirteen inches which have been ordered, 298 are completed, including twenty-five 10 inch, eight 12 inch and five 13 inch; 188 are afloat; and forgings for 368 guns have been delivered. The 13 inch guns have not been tested as yet, owing to delays in mounting. Progress is being made on 8 inch nickel-steel guns and on the Hurst 8 inch guns. Cartridges will hereafter be supplied for the 6 inch guns. Of the small guns for the secondary batteries, 480 Hotchkiss and Driggs guns, 360 are finished. Two hundred and thirty-seven gun mounts have also been completed.

Smokeless powder is not yet suitable for regular use, but large quantities of brown powder are supplied by the California Powder Company, of Santa Cruz, and by Du Pont & Co., who have also supplied 50,000 pounds of gun cotton. The treatment of small caliber projectiles by the Harvey process has proved very satisfactory. Experiments are being conducted in firing shells from high-power guns charged with gun cotton and fulminate.

Contracts for 6,489 tons of armor have been made during the year and the plants have been enlarged to admit of delivering the armor more rapidly. By the new arrangements armor can be supplied as fast as needed to the vessels in the shipyards. The armor, both the nickel-steel and the Harveyized, continues excellent in quality. A number of new Howell and Whitehead torpedoes have been received. The difficulty with the main valve of the pneumatic guns of the Vesuvius has not been overcome and Commodore Sampson recommends that the $450,000 appropriated for a similar vessel be used to build four torpedo boats instead. The report shows that the Bureau of Ordnance is making substantial progress.

### Edison on Flying Machines.

Once I placed an aerial motor on a pair of Fairbanks scales and set it going, says Thomas A. Edison. It lightened the scales, but it didn't fly. Another time I rigged up an umbrella-like disk of shutters and connected it with a rapid piston in a perpendicular cylinder. These shutters would open and shut. If I could have got sufficient speed, say a mile a second, the inertia or resistance of the air would have been as great as steel, and the quick operation of these shutters would have driven the machine, but I couldn't get the speed. I believe that before the air ship men succeed they will have to do away with the buoyancy chamber.

A ROCHESTER man has devised a plan by which a trolley street car can be stopped almost instantaneously, or within a space of three feet, while the car is going at full speed. As he omits, however, adds *The Railway Review*, to provide for stopping the passengers, it is only fair to presume they will object.

### The Launch of the Battle Ship Oregon.

The battle ship Oregon was launched at the Union Iron Works, San Francisco, October 26. Technically the Oregon is known as an armored coast-line battle ship of the first class and is one of three the bids of which were opened October 1, 1890. The sister ships are the Massachusetts and Indiana, both built by the Cramps in Philadelphia. Congress appropriated the sum of $12,000,000 for the three ships and provided that one should be built on the Pacific coast.

The length of the Oregon is 348 feet, beam 69¼ feet, draught 24 feet, displacement 10,200 tons, maximum speed 16·2 knots, sustained sea speed 15 knots. The coal capacity is 1,800 tons, making the radius of action at full speed 5,000 miles, or at a speed of ten knots per hour, 16,000 miles. It is protected by a belt of armor seven and one-half feet wide—three feet above and four feet below the water line—and eighteen inches thick. Over the belt is a steel protective deck 2¾ to 3 inches thick. Rising from the armor belt at each end are redoubts 17 inches thick, giving an armored freeboard of 15 feet 2 inches. In these redoubts revolve the great turrets, which are 17 inches thick on the incline and 20 on the horizontal. Forward and aft of the belt are heavy protective decks and the coal is stowed to give additional protection. The steel conning tower is 10 inches thick and will be provided with signals, speaking tubes, etc. One military mast is provided carrying two tops for rapid fire and machine guns, the ammunition being sent up through the mast. The engines are of the twin screw, vertical triple expansion, direct acting, inverted cylinder type, stroke 42 inches, diameters of cylinders 34½, 48, and 75 inches respectively. There are four double-ended and two single-ended auxiliary steel boilers of the horizontal return fire tube type. The centrifugal circulating pumps are driven independently.

The battery is composed of four 13 inch breechloading rifles, eight 8 inch breechloading rifles, four 6 inch rifles, twenty 6 pounder rapid-fire guns, two Gatlings and 6 torpedo tubes. The secondary battery is very heavy and would annihilate any small vessel which came within range. The 13 inch guns are 18 feet above the water and sweep through a training arc of 270 degrees. The ammunition will be hoisted through armored tubes. The magazines are specially well protected. Altogether the Oregon is a model battle ship.

### The Planets for December.

*Mercury* will be morning planet during December and will be visible to the unaided eye during the middle of the month. One must look toward the southeast about an hour before sunrise in order to see it. Mercury will be at greatest elongation, west from the sun 21° 23′, Dec. 14, at noon.

*Venus* will be evening planet during December, setting in the southwest between seven and eight P. M. Although so brilliant to the eye it will not, on account of its low altitude, be in good position for telescopic observation in northern latitudes. Venus will be at greatest elongation, east from the sun 47° 29′, Dec. 6, at 3 h. 36 m. P. M. In the southern hemisphere this will be a very favorable opportunity to study the surface markings of Venus, and it is to be hoped that Prof. W. H. Pickering and his assistants at Arequipa will be able to add much to our knowledge of this subject and of the rotation of the planet.

*Mars* will be morning planet, but is getting farther south all the time, so that its position will be unfavorable for northern observers. In the southern hemisphere the conditions will be much better. There will be quite a close conjunction of Mars and Uranus December 6 at 4 h. 9 m. central time, when the former will be only 8′ north of the latter. Observers in Australia and Japan should be able to see the two planets in the same field of view of the telescope. The ruddy color of Mars and the green hue of Uranus will present a striking contrast. Eighteen hours later Mars will pass close to the wide double star α Libræ, the components of which Webb puts as third magnitude, pale yellow, and sixth magnitude, light gray. Mars will pass 11′ north of the brighter star.

*Jupiter*, having but just passed opposition, will be in excellent position for observation during December. We have had a few good views of the planet this year, when much of fine detail was seen upon the surface, notably a large number of very small dark red spots. We have not happened to look at the time when the "great red spot" was visible and cannot say what its appearance this year is. The apparent diameter of Jupiter during December diminishes from 46″ to 44″. His brilliancy will be greater than that of any other object in the evening sky, excepting the moon, so that none can mistake him. His course is slowly westward in Taurus.

*Saturn* will be visible in the morning, but at a low altitude, so that for northern observers there will be no satisfactory observations. Saturn is in the constellation Virgo, just a little north and east of the star Spica. The planet is the brighter of the two. The rings of Saturn are pretty well opened now, the angle of their plane to the line of sight being now about 12°, and increasing to 14° at the end of December. Saturn and the moon will be in conjunction December 3 at 3 h. 20 m. P. M., and December 31 at 1 h. 41 m. A. M. Saturn will be about 3° north of the moon in both instances.

*Uranus* is in Libra, very close to the star α, referred to above in the note on Mars. At 5 h. 32 m. on the morning of December 16 Uranus will be in conjunction with the star, only 3′ north. The conjunction with Mars has already been mentioned.

*Neptune* will be at opposition December 3, and therefore in best position for observation during December. Its motion during the month will be 53′ west and 6′ south. The position December 1 will be one-third of the distance on a straight line from ι to ε Tauri. A photograph taken at Goodsell Observatory, October 18, shows no star as bright as Neptune within 1° of this position.—*Astronomy and Astro-Physics.*

### BROOKS' COMET OF 1893.

The announcement of the discovery of this comet on the morning of October 17 has already appeared in the SCIENTIFIC AMERICAN, with the promise of further particulars when sufficient observations had been secured.

The comet was observed on four succeeding mornings, before clouds and the full moon interfered, and these observations showed that the comet was moving in a northeasterly direction, with a rate of three-quarters of a degree daily.

The comet passed perihelion about September 20, so that theoretically its brightness should be decreasing, but it is holding its light well, and on the morning of October 22 it appeared brighter than at any previous observation. The tail then had a slight curve near the head and a faint auxiliary tail was seen branching from the main tail at an angle of thirty degrees.

THE BROOKS COMET OF 1893.

The accompanying drawing shows the normal appearance of the comet when the tail was straight and as viewed with a power of forty diameters in the telescope. The tail could be traced to a length of three degrees.

As the comet may be followed for some time with moderate sized telescopes, I send herewith a few positions, from which the course of the comet can be plotted to the end of the month or longer.

| | R. A. | | Decl. North. | |
|---|---|---|---|---|
| | hour. | m. | deg. | m. |
| Oct. 19 | 13 | 24 | 40 | 20 |
| Oct. 23 | 13 | 35 | 44 | 40 |
| Oct. 27 | 13 | 50 | 49 | 12 |
| Dec. 1 | 14 | 05 | 53 | 33 |

From the above it will be seen that toward the end of November the comet becomes circumpolar, and hence observable all night, and on November 27 it is just at the end of the tail of the Great Bear.

WILLIAM R. BROOKS.

Smith Observatory, Geneva, N. Y., Nov. 8, 1893.

### Remedy Against Epilepsy.

S. A. Siminoff (*Med. Obozr.*, xxxix., 1893, No. 4, pp. 391-2) details three cases of epilepsy cured by him by the administration of an infusion of common tansy. He has also used this decoction with good effect in cases of neurasthenia, where valerian had ceased to be effective. A glassful of the infusion of the herb (either fresh or dried) is given to the patient at night and in the morning.

## Correspondence.

### A Family Dough Kneader.

*To the Editor of the Scientific American:*

Would you kindly draw attention of those of inventive ability to the great need of a machine for kneading dough for family use ?

Such an article that would be self cleaning, and not too expensive, would secure a fortune for the inventor. Every one in the country likes good bread, and the principal cause of failure comes from not being properly kneaded, which a good machine would remedy.

JAS. A. MCCAFFREY.

### How to Make an Egg Stand on End.

*To the Editor of the Scientific American:*

My method of standing an egg on end is not by cracking it, but by taking the egg in one hand and striking it in the other three or four strong licks, which readily breaks the thin membrane separating the air from the end of the egg; it also breaks up the yelk of the egg; the parts of the contents of the egg being thus free to move among themselves, the heavier ones settle at the bottom, the lighter ones above, and the air at the top. This is done by placing the egg on end a few seconds and holding it perpendicularly. The center of gravity is thus easily brought within the base and the egg stands readily on either end. I find that this is a fact that is known by but few. It is sometimes used by jugglers who pretend to conjure by incantations. I would like to know if this is generally known.

W. M. GRAYBILL.

[*Ans.*—A common mode of detecting the condition of eggs is to try to stand them on end. If good, it cannot usually be done. If bad, it can easily be done.—ED. S. A.]

### Welsh Anthracite Coal.

The price of the screened Welsh anthracite, free on board at Cardiff or other shipping port, as named in a recently proposed contract, is 3s. 6d., or say 85 cents per ton of 2,240 pounds, while it is counted that the cost in New York harbor will not exceed $2 per ton. There is no import duty on anthracite. The contract calls for deliveries of 500,000 tons a year and as much more as is wanted is to be supplied, subject to the usual reservations in case of strikes, etc. The Welsh anthracite has, when dry, an average composition of 87 to 92 per cent fixed carbon, about 5 per cent of volatile matter, and 3 to 6 per cent of ash. It is an excellent steam coal, and no doubt would, at the prices mentioned, make serious inroads into the market for anthracite and even bituminous coal used in steam making. It would not, however, become as popular a domestic fuel as our sized and clean anthracite, though a marked difference in price would open many doors to it.

The presence of this fuel in our market will cause the managers of our coal roads to consider more favorably the demands of the anthracite miners for lower tolls to tidewater, and the low prices at which it can be sold will be of interest to the holders of the coal road stocks.

It is rather curious that while we are arranging for the importation of Welsh anthracite at such extremely low prices as will make it a formidable rival to our own coal, we could ship our Virginia, Maryland, and Pennsylvania bituminous coals to London at a large profit, owing to the high price ($11 to $12 a gross ton) which coal now commands there on account of the coal miners' strikes in the north of England.—*Boston Journal of Commerce.*

### Round Shoulders Cured.

A woman physician has recommended to the Boston *Herald* the following simple exercises, requiring little time and no apparatus, for the cure of all except very severe cases of round shoulders, when braces are also sometimes a necessity : "1. Raise arms before your shoulder high, extend arms sidewise, throw head back, straighten head, move arms forward, lower arms, repeat ten times. 2. Stand erect, raise arms before you, rise on tip toes, then throw arms as far backward as possible, sink again on heels and drop arms to side, repeat ten times. 3. Raise arms with elbow bent shoulder high, bringing palms together in front of face, then with elbows still bent swing both arms vigorously backward as far as possible even with the shoulders, palms looking forward. This should be repeated several times, but as the position is somewhat fatiguing, rest or change of exercise may be made between the movements."

Another simple movement designed to bring about a correct position of the shoulder blades consists of holding a cane or wand in both hands, throwing the head back and carrying the stick from "above the head back and down the hips."

As the clothing, if too tight or unyielding about or over the shoulders, may help to produce round shoulders, both the under and outside waist should be comfortable and bands over the shoulder of garments made of elastic.