THE

SCIENTIFIC AMERICAN;

AN ILLUSTRATED

Journal of Art, Science & Mechanics,

HAVING FOR ITS OBJECT THE

ADVANCEMENT OF THE INTERESTS

OF

MECHANICS, MANUFACTURERS, AND INVENTORS.

VOLUME IV.

NEW-YORK:

PUBLISHED WEEKLY, BY MUNN & CO.

128 FULTON STREET, SUN BUILDING.

Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

Vol. 4. New York, September 23, 1848. No. 1.

THE
SCIENTIFIC AMERICAN:
CIRCULATION 11,000.
PUBLISHED WEEKLY.
At 128 Fulton Street, New York (Sun Building,) and 13 Court Street, Boston, Mass.
By Munn & Company.
The Principal Office being at New York.

Poetry.

WHAT IS LIFE ?

The day grows pensive at its close,
  And wears a sober grey,
And on its face the langour shows,
  Of autumn's yellow ray;
Soon night will spread its sable pall,
  The day is dying fast,
How ghost-like are the shadows tall,
  That on the ground are cast!

Like pilgrims to the shade of night,
  The shades are hast'ning on,
To where the brightest grows the light,
  When day begins to dawn:
A deeper, softer sadness shows,
  In gentle evening dew,
And night o'er every feature throws
  A sad and sombre hue.

And now the sound of streams and floods,
  Becomes a hollow moan;
The rushing of the trees and woods,
  Hath now a wailing tone,
And plaintive through the air is heard,
  The night-hawk's piping call,
There's not a leaf by zephyr stirred,
  But hath a dying fall.

An emblem of our life below,
  In every passing day,
More thoughtful at its end we grow,
  When we are growing grey,
Like pilgrim shadows in the shades,
  We soon shall hence be gone;
But when life's day the soonest fades,
  A brighter day will dawn.

The darkness of the silent tomb,
  To which we are consigned,
Will cast a sad and solemn gloom,
  O'er those we leave behind,
And tears will then bedew the cheek,
  And fall upon the bier;
And sad will be the words they speak,
  To friends who loved us here.

WAITING AND WATCHING.

Be waiting and watching
  The signs of the times,
And daily keep thundering
  At prevalent crimes:

The evils will lessen
  With every stout blow;
The brighter the weapon
  The weaker the foe.

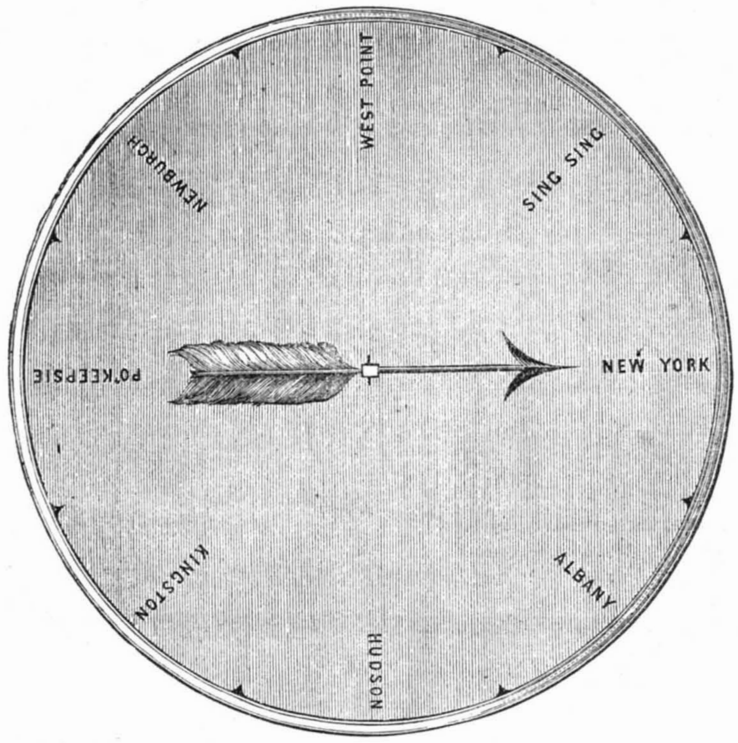
Till totter and crumble
  The pillars of Wrong;
'Tis Justice that maketh
  Weak instruments strong.

The Right! it must prosper,
  Whatever oppose;
However malignant
  Or stout be her foes;

Like the steps of the morning,
  Majestic and free,
She'll onward and triumph,
  How gloriously!

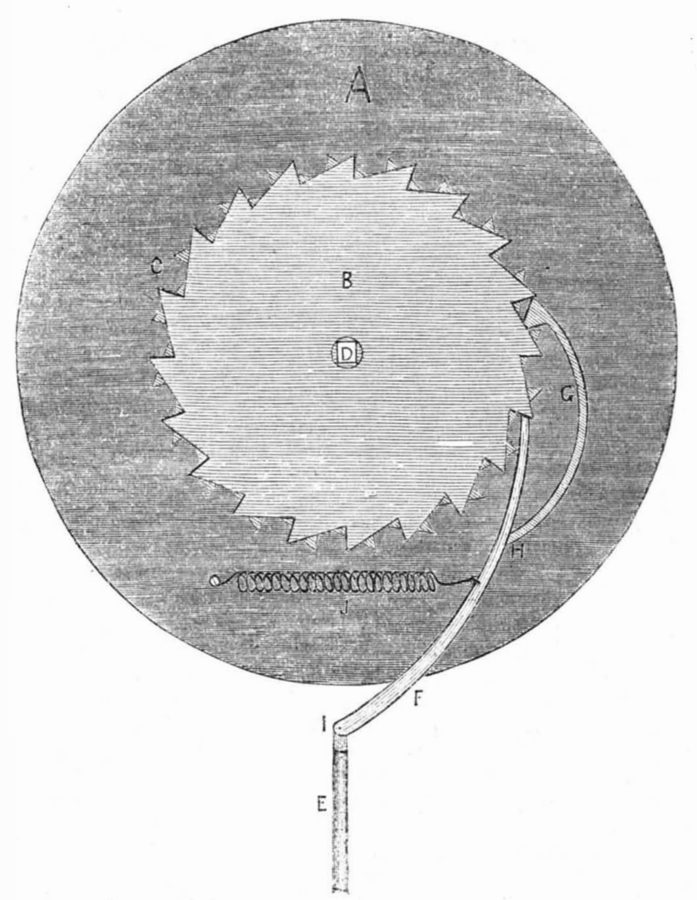
ELY'S RAILWAY STATION INDEX.

Figure 1.



It is the general custom upon most of our Rail Roads, for the conductor of a train on its arrival at a station, to call out through each car the name of the place reached, in order that passengers destined to any particular station along the route, may know when to leave the cars. Two or three minutes only is the usual stopping time at each place, barely long enough for passengers to get in or out of the cars, and then the train proceeds. In the bustle and confusion caused by the arrival of a train at a station it frequently happens that

Figure 2.



passengers misunderstand, or cannot hear the conductor's voice, and ignorant of the place reached are carried beyond their destination, thereby suffering a most vexatious and often-times expensive delay. Others likewise, from the same cause, frequently leave the cars too soon, and suffer the same inconvenience, while accidents of a serious nature are not of rare occurrence where passengers through mistake of the station, endeavor to get on or off from the cars while in motion. The great convenience and utility of the invention which we now present to our readers will be at once apparent to every one. It consists [Fig.1.] of a large dial having the names of all the different stations of the route, plainly marked thereon, with an arrow, or other suitable pointer to indicate a given place. One of these dials is placed at each end of the car. They are so made to operate that on the arrival of a train at any station, a gong behind each dial is

(*Continued on page 4.*)

RAIL ROAD NEWS.

The Ogdensburg Railroad.

This road is in such a state of forwardness that it is expected will be ready for travel in the fall of 1849. The engines and cars, of the most approved kind, are in the hands of the makers. The distance between the lake and the river St. Lawrence is 118 miles; the rails are of the same description as those on the Portland road, and the cars will be enabled to pass over them with great rapidity.—Before long this road will be linked with others now in progress, and form an uninterrupted chain to the city of New York.

Vermont Central Rail Road.

This great Railroad is now open to Roxbury, about eight miles this side of Northfield and sixteen from Montpelier. It will be opened to Northfield in October. The rails on the Windsor division are now about to be laid. About forty-four miles are now run daily, with good business.

Georgia Rail Road.

Very few railroads in this country can show greater per centage of increase in their receipts for the last six months than the Macon and Western Railroad, Georgia. From a statement just published, it appears that the total receipts for August 1848 were $12,-476, 59; for August 1847, $9,440,95, showing an increase of $3,035,64 in favour of the former month.

Railways in England.

The extent of railways open for public travel in Great Britain and Ireland on the 1st of July last was 3,830 miles, and the total produce of trafic upon them within the first six months was £4,477,000, averaging £1,-169 per mile. The length of all the roads open on the first of July, 1847, was 3,150 miles, and the produce for the six months about four millions or £1,270 per mile, showing a diminution of income per mile of about 9 per cent, but an increase in the agregate of 11 per cent

The reduced rate of increase is attributed in part, to the depressed state of the trade of the country, and in part, to what must have been anticipated, that the newly constructed roads, consisting in great part, of branches and extended lines over parts of the country of comparatively small population and business, are far less productive, and continue to be so, than the routes which were first occupied.

It does not follow from this view of these improvements, that they may not be extremely useful, although their promise of remuneration to the proprietors is less flattering.

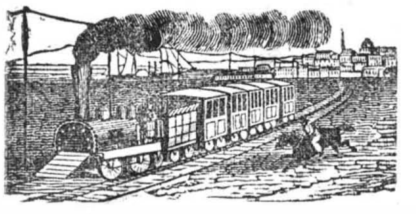
A Great Rope.

A new rope has been manufactured for the inclined plane of the Columbia, Pa. Railroad, which is eight inches thick, over a mile in length, and required more than thirty thousand pounds of hemp for its manufacture. It was made in five parts, and, of course, is to be put together at the plane. There is, in the manufacture of such a rope, beside the large amount of material used, a vast deal of labor, and, altogether, it is a piece of work, which, without machinery, could never be accomplished.

Another Diving Bell.

A correspondent of the Easton, Pa., Sentinel says that a company of gentlemen from Boston are now at work near Grand Menan, with an apparatus invented by a gentleman who belongs to Boston. The operator has to descend to the depth of one hundred and twenty feet from the surface, where he is enabled to remain one hour, or longer.

The British government have established a regular line of mail steamers between Singapore, in the East Indies, and Australia.



Gold, Gold.

News has reached us from California, of the discovery of an immense bed of gold of *one hundred* miles in extent, on American Fork and Feather rivers, tributaries of the Sacremento, near Monterey. Mr. Colton, the Alcalde of Monterey, states that the gold is found in the sands, in grains resembling squirrel shot, flattened out. Some grains weigh an ounce each. It is got by washing out the sand in a vessel, from a tea saucer to a warming pan. A single person can gather an ounce or two in a day, and some even a hundred dollars worth. Two thousand whites and as many Indians are on the ground. All the American settlements are deserted, and farming nearly suspended. The women only remain in the settlements. Sailors and captains desert the ships to go to the gold region, and laborers refuse ten dollars a day to work on the farms.

If the crops should fail around Monterey, the golden sands would make fine pudding.

Another Gold Mine.

The Frederick (Va.) News, noticing there-cent retirement of Mr. Heiss from the Washington Union, who has acquired a large fortune in that establishment, says that in connection with Commodore Stockton, he has become the purchaser of the White Hall Gold Mine in Spottsylvania, within eighteen miles of Fredericksburg. It learns that a vein was struck a few days since, of incalculable value, so valuable that a large standing guard is employed to protect it against depredations.

This mine is nearer home than the one in California, but it is a real anti-republican concern in comparison,—for in California every decent man can dig that chooses.

Copperas a Disinfectant.

If the sulphate of iron be disolved in water and thrown into cesspools it renders them pure, even where the gas is in such quantity as to be oppressive to the lungs and irritating to the nose. The rationalia of the process is this. The sulphuric acid of the salt combines rapidly with the ammonia, forming a sulphate of ammonia, and the iron is thrown out as an oxide. This salt of ammonia (sulphate) is very soluble in water, and to a great extent inodorous. In addition to this, the ammonia-cal gas is most rapidly absorbed by the water of the solution and thus arrested until the sulphuric acid has time to leave the iron and unite with the ammonia.

Turnip Meal.

A kind of meal made from turnips has been introduced in Scotland. It is made by passing Swedish turnips through a potato starch mill. After having been passed through the washing machine, they are ground down by the rasping apparatus, and the pulp is passed between rollers which squeeze out the greater part of the moisture. The squeezed fibre is then dried on a kiln and ground into meal by mill stones. The liquid which is expressed is evaporated, and the dry solid part is mixed with the meal. The meal therefore contains nearly all the solid parts of the turnip in a state which prevents decay, and in a light and portable form. It is confidently expected that this article will prove a good substitute for grain for feeding stock in that country. — Prof. Johnston, analysing it, found it to contain 13.68 per cent. of protein compounds, 48.72 of sugar, 4.14 of gum, and 1.11 per cent. of oil.

Zoudon says that a distance of 25° of latitude occasions a total change not only of vegetable production, but of organized beings. Each separate region, both of land and water, from the frozen shores of the polar circles to the burning region of the torrid zone, possesses some peculiarity of its own. Botanical geographers have divided the globe into 27 botanical districts, differing almost entirely in their specific vegetable productions.

New Locomotive Boiler for using Anthracite Coal.

The American Railroad Journal of the 9th inst., contains a beautiful lithograph drawing of an improved Locomotive Boiler for using anthracite coal, invented by Mr. S. Norris of Philadelphia The idea of using anthracite coal for any purpose that wood is now used as a heat generator, has never appeared to us problematical and we hope this invention will demonstrate this fully. We have in some instances seen anthracite adopted successfully in place of wood, in the face of much doubt.

The difference between wood, bituminous and anthracite coal, for generating steam for locomotives, is this. The two former generate a more volatile, the latter a more concentrated heat, and the present locomotive boilers are constructed to use wood in the most perfect manner for the quick generation of steam (the only limit we may say to the speed of the engine.) To render anthracite as available for locomotive purposes as wood or bituminous coal, Mr. Norris constructs a far larger grate surface, and brings it closer to the absorbing surface of the boiler. This is correct undoubtedly, and he will thus render available in the highest degree all the radient heat of the anthracite. Mr. Norris intends to have the blast pipes of larger diameter than those now used, so as to have a smaller amount of artificial draft than the boilers now in use have. We could not give an opinion on this point—practice will alone test its virtue.

Hydrophobia—Important Theory.

The Philadelphia Ledger says that Dr. G. Spackman, of that city, from a recent discovery and the confirmation of an indulged opinion in several cases, as to the cause of this dreaded and incurable malady, is induced to offer a theory which may prove of inestimable benefit to science and humanity generally. He suggests that it arises from the deposit of a poisonous virus introduced by the perforation of the animal's teeth; that it remains latent for a time, by the absorbents is taken up, and by a combined chemical action with the blood, generates a gaseous or aeriform fluid, which results in congestion, producing the usual spasmodic action terminating in death.

Secrets of Ventilation.

Let the air enter the house freely by a large aperture, like a common window, and capable of regulation in the same way. Let it enter a stove-room, and be there completely warmed, and then let it pass freely through the whole house, and enter all the apartments either at the doors or by express channels.—Take off the used air by the chimney and an open fire; or for crowds, provide a larger and express opening—there is no more to be done. Houses that we have seen ventilated in this simple, unpretending, unmysterious manner, are the best ventilated we have ever entered. It is too often the fate of the mysterious little pipes, funnels, tubes, and valves by which ventilation is frequently symbolized, rather to indicate ventilation than to effect it.

The Ring of Saturn.

The ring of Saturn is not visible at the present time. This phenomenon takes place once in fifteen years. A writer at the Cambridge observatory, says: " with the Cambridge telescope the ring was constantly seen whenever the state of the atmosphere was favorable. While the Earth continued above the plane of the ring, the unilluminated side was presented to us, and appeared like a dark belt stretched across the body of the planet, and extending on each side as a delicate thread of light, with, generally, two minute beads on the preceding side. The same beaded or broken appearance was also noticed on several occasions on the right, or following side of the planet. The distance of these points of light from the limb of the planet, were repeatedly measured; the result showed no change of distance. They were in comparison with the smaller, quick moving satellites. The conclusion derived from these points of light were occasioned by the reflection of the sun-light from the inner edges of the outer and interior rings. The disc of Saturn, as seen with the Cambridge telescope, has extensive dark spots, indicating a variety of surface similar to what is seen on the nearer planets."

Quince Marmalade.

Let the fruit hang on the tree till one falls to the ground, then gather the crop. Pare, quarter, and core them; but scrupulously save every pip. The pips of quince abound in mucilage as may be perceived by taking one into the mouth and chewing it well it will make the lips stick together as a piece of gum arabic would. Put the quinces with pips into a stew pan, with a sufficiency of lump sugar, and just enough water at the bottom to keep them from burning. As the sugar dissolves and the liquor boils continue stirring the whole mass. When the fruit becomes tender, break and mash it well with a spoon. In about an hour from the commencement of the operation it will be cooked enough. It may then be turned into preserve jars; a portion should be put into shape, to be used at dessert in the same way as Bullace and Damson cheese. The next morning it ought to be perfectly stiff and gelatinous, from the strong mucilage of the pips having been thoroughly incorporated with the whole mass. The quantity of sugar used may be rather less than is necessary for other preserves. If tied down the usual way it will keep good for a long time. The medicinal qualities of this preparation are applicable to those cases in which mucilage is administered internally; and a pot of quince marmalade would be as agreeable a prescription to a dysuretic patient, as a dish of roasted onions or a dose of linseed jelly.

Everybody whose garden or orchard is above the very smallest size ought to have at least one quince tree, particularly it it contain any low moist corner. To such a situation they may be removed at a considerable size; their cost at the nursery is trifling, and many a useless shrub, such as the Snowberry or the Privet, might advantageously be uprooted to make way for them. Few low growing standards are more ornamental. In a small space they exhibit all the members and proportions of a full sized tree; something like the Chinese Koo-shoo, or artificially dwarfed Oaks, Hornbeams, &c., that are grown in pots; there is the old looking trunk, the pendant and grotesquely contorted branches; there is the scattered foliage, like the natural day, dark one-half and light the other; in the spring there are large, delicate blossoms, and in the autumn drooping fruit.

Irish Trade since the Union.

It appears from Parliamentary returns that the tonnage of shipping three years before the union was 112,333, while in 1842 it reached 569,304, showing an increase of 456,971 tons. In 1823 there were no steam vessels in the coasting trade of Ireland, but in 1836 which is the date of the last official returns, the tonnage entered inward amounted to 579,395; since that period there can be no doubt that the increase has been very considerable. It is not true that the linen trade was destroyed by the union. It appears from Moreau's tables, that from 1781 to 1800 there were exported 678,798,721 yards of linen, while from 1802 to 1821 the quantity was 832,403,860 yards, showing an increase of 153,605,139 yards.

Chinese Barber.

The itinerant barber's apparatus is complete, the water always boiling on a fire over his head, while in his rear, on a pole balanced over his shoulder, are water, basin, razors, towels, &c.; if he be in requisition, he picks out a convenient spot, shaves the head, cleans the ears and eyes, cracks the joints and shampoos the body, in an incredibly short space of time. Hair is only worn on the crown of the head in shape of a queue. The shaving is a matter of necessity to the mandarin and gentleman, while scarcely a laborer goes more than three or four days unshorn. This trade is in constant exercise, but the death of an Emperor is a sure holyday to the barber, shaving and mourning being inconsistent with each other.

Tinker, tailor, and shoemaker, each has his pack, and, basking in a sunny spot, plies his trade, finishes off one job, and utters his peculiar cry for another.

It is said there is a farmer in North Carolina, whose corn crop is about 200,000 bushels a year.

Chalk in the United States.

It is a generally received opinion that there are no chalk formations in the States, all of that article used in this country being brought from England. A communication from John Pickell, to Professor Silliman, however, controverts this opinion. The writer says that in 1831, being engaged under the direction of the Topographical Bureau, to determine the practicability of the construction of a ship canal across the peninsula of Florida, it became necessary to sink several shafts. At the head of a small stream running into Black creek, and near the Santa Fe river, an excavation was carried to the depth of fifty-five feet, a stratum of chalk was perforated, containing flint *nodul re* of various sizes. The chalk was perfectly white, and by short exposure to the atmosphere indurated to the hardness of the foreign article.—The writer expresses the belief that this chalk formation continues through Georgia and the Carolinas, and perhaps to the coal region in Virginia.

Salt Water and Fresh.

The London Emigrant says: " We have just had the pleasure of drinking a goblet of water taken from the sea at Margate, as sparkling and aqueable as if drawn from the best pump in London; indeed, it was impossible to tell the difference. The water had been previously distilled in the usual way, and then treated by the simple galvanic process, as patented by Mr. Crosse. The invention, for emigrant ships and others on long voyages, will be invaluable.

Optical Illusions.

On looking out of the window of a railway carriage, for instance, if the eye be fixed on a row of stones or of palings, the image seems confused and to be rapidly moving away; but if the axes of the eyes be suddenly turned to some nearer spot, then the stones or palings are for an instant distinctly seen stationary. Sir David Brewster said he could not yet account for this phenomenon.

A treatise on Campanology published in Norwich (England) states according to an accurate calculation, that the number of combinations of definite sounds, that can be produced on 24 bells, is so great, that at the rate of 2 in a second it would require to strike them 117,000,000,000,000 years.

Mercury.

Mercury, is quite pure, is not tarnished in the cold, by exposure to the air and moisture; but if it contain other metals, the amalgam of those metals oxidizes readily, and collects as a film upon its surface. It is said to be oxidized by long agitation in a bottle half full of air.

The receipts at the State Fair in Buffalo amounted to $6,114 96. It is estimated that at least fifty thousand persons visited it during the two days it was open to the public.

When gutta percha is immersed for a few minutes in water above 150° Fahrenheit, it becomes soft and plastic, so as to be capable of being moulded to any required shape or form, which it retains upon cooling. If a strip of it be cut off and plunged into boiling water, it contracts in size, both in length and breadth. This is a very remarkable phenomenon.

The sunflower is a valuable crop. Its oil burns well, and it does very well to mix with linseed for some kinds of painting. Nineteen bushels of seed make twenty three gallons of oil. It makes good guano when mixed with ashes.

The root of the yellow poplar, or American tulip tree, made into a strong decoction applied outwardly and taken inwardly, is said to be a sure cure for the most venomous snake bite.

In some newly-opened coal mines at Northhope, England, a live caterpiller was discovered in a piece of coal, and lived two days after being taken out. The insect and the coal were sent to King's College, London.

White huckleberries have been found growing in Ipswich upon the lands of Capt. Michael Loard, quietly fraternizing with the blacks.

The Dead Sea Expedition.

Lieut. Maury has given a brief description of the expedition to the Lake of Asphaltus from which we select the following deeply interesting extracts. Lieut. Lynch was the person who planned and proposed the expediton and the Secretary of the Navy received favourably the proposition. Having to send a store ship to the Mediterranean squadron, and as, after her arrival, she would have no employment for months, the Secretary determined to send Lieut. Lynch and his party in her; so that, after meeting the wants of the squadron, she could proceed up the Levant, and land Lieutenant Lynch and his companions. This was done. The storeship " Supply" was provided with two metallic boats, one of copper, the other of iron; the former named "Fanny Mason," and the latter " Fanny Skinner." On their arrival at their destination their troubles began, and in their march to Lake Tiberius their boats had to be transported over the most formidable mountain gorges and heights, and to be lowered down precipices with ropes. But these difficulties were surmounted with true sailor's skill and perseverance, and on the 8th of April the two Fannies, each with an American ensign flying, were afloat upon the beautiful blue waters of the sea of Galilee. " Emblematic of its Master, it alone of all things around them remained the same. Just as the Apostles saw it when our Saviour said to it, 'Peace, be still,' this little band of rovers now beheld it.

The navigation of the Jordan was found to be most difficult and dangerous, from its frequent and fearful rapids. Lieut. Lynch solves the secret of the depression between Lake Tiberius and the Dead Sea by the tortuous course of the Jordan, which, in a distance of sixty miles winds through a course of two hundred miles. Within this distance Lieut. Lynch and his party plunged down no less than twenty-seven threatening rapids, besides many others of less descent. The difference of level between the two seas is over a thousand feet.

The water of the Jordan was sweet to within a few hundred yards of its mouth. The waters of the sea were devoid of smell, but bitter salt, and nauseous. Upon entering it, the boats were encountered by a gale, and "it seemed as if the bows, so dense was the water, were encountering the sledge hammers of the Titans instead of opposing waves of an angry sea. The party proceeded daily with their explorations making topographical sketches as they went, until they reached the southern extremities of the sea where the most wonderful sight that they had yet seen waited them.

In passing the mountain of Uzbom (Sodom) unexpectedly, and much to our astonishment, says Lieut. Lynch, " we saw a large, rounded turret-shaped column, facing towards southeast, which proved to be of solid rock salt, capped with carbonate of lime, one mass of crystallization. Mr. Dale took a sketch of it, and Dr. Anderson and I landed with much difficulty and procured specimens from it." The party circumnavigated the lake, returned to their place of departure, and brought back their boats in as complete order as they received them at New York. They were all in fine health. This is a specimen of the skill, system, discipline of the American navy. No nation in the world has such a service. The time is coming when it will give proofs of that fact palpable to the most dull understanding. Thanks to the good management of Lieut. Lynch, the whole cost of this scientific exploration of the Dead Sea, [except, of course, the cost of the equipage and maintenance of the crew of the ship,] was but seven hundred dollars.

From the letters of Lieut. Lynch, quoted by Lieut. Maury, we transcribe the following facts elicited by the exploration:

" The bottom of the northern half of this sea is almost *an entire plain.* Its meridianal lines at a short distance from the shore scarce vary in depth. The deepest soundings thus far, 188 fathoms, (1128 feet.) Near the shore the bottom is generally an incrustation of salt, but the intermediate one is soft mud with many rectangular crystals—mostly cubes—of pure salt. At one time Stellwager's lead brought up nothing but crystals. The southern half of the sea is as shallow as the northern is deep and for about one-fourth of its entire length and depth does not exceed three fathoms (18 feet.) Its southern bed has presented no crystals, but the shores are lined with incrustations of salt, and when we landed at Uzbom in the space of an hour, our footprints were coated with crystalization. The opposite shores of the peninsula and the west coast present evident marks of disruption. There are unquestionably birds and insects upon the shores, and ducks are sometimes upon the sea, for we have seen them—but cannot detect any living thing within it; although salt streams flowing into it contain salt fish. I feel sure that the results of this survey will fully sustain the scriptural account of the cities of the plain."

He thus speaks of Jordan: " The Jordan, although rapid and impetuous, is graceful in its windings and fringed with luxuriance while its waters are sweet, clear, cool, and refreshing."

After the survey of the sea, the party proceeded to determine the height of mountains on its shores, and to run a level thence via Jerusalem to the Mediterranean. They found the summit of the west bank of the Dead Sea more than 1000 feet above its surface, and very nearly on a level with the Mediterranean.

" It is a curious fact," says Lieut. M." that the distance from the top to the bottom of the Dead Sea should measure the height of its banks, the elevation of the Mediteranean, and the difference of level between the bottom of the two seas, and that the depth of the Dead Sea should be also an exact multiple of the height of Jerusalem above it."

Another not less singular fact, in the opinion of Lieut. Lynch, is, " the bottom of the Dead Sea forms two submerged plains, an elevated and a depressed one. The first, its southern part of slimy mud covered by a shallow bay; the last, its northern and largest portion of mud and incrustations and rectangular crystals of salt—at a great depth with a narrow ravine running through it, corresponding with the bed of the river Jordan at one extremity and the Wady, 'el Jeib,' or wady within a wady at the other."

" The slimy ooze," says Lieut. Maury, upon that plan at the bottom of the Dead Sea will not fail to remind the sacred historian of the 'slime pits' in the vale, where were joined in battle "the four kings with five."

Wire Fence.

Chesnut posts are first planted in the ground about eight feet apart and of such height as may be desired; the first one being much larger and set deeper in the ground than the succeeding ones, because of the great resistance it has to make in stretching the wire. After the posts are properly arranged grooves are sawed into the side of each post for the wire to lay in. The wires are placed one above the other from six to seven inches apart. The fulcrum and lever is then placed at the extremity of the extremity of the wires to draw and tighten them. When they are sufficiently tight, they are secured firmly into the post by small staples made of wire. This fence sufficiently resists the encroachments of all kinds of stock but hogs, and they never should be allowed to run loose.

This fence may be capped with board, which would make it more solid. The wire should be No. 10, boiled in linseed oil and then dried. Or the fence may be put up and the wire coated with varnish afterwards at but little expense. Coarse varnish will do and then there would be no fear of rusting. The ends of the posts should be dipped into a hot liquid of the sulphate of copper and then into boiling pitch. This might be a little troublesome, but the post prepared thus, although of poor timber, will endure for an almost incredible space of time. Wire fence must yet supersede all other kinds owing to its cheapness and portability.

The power and weight on an inclined plane balance each other, when the former is to the latter, as the height of the plane to its length. In estimating draught up a hill, if the hill rises one foot in four, one fourth part of the weight must be added to the draught on level ground.

For the Scientific American.

Sympathetic Inks.

Sympathetic, or secret Inks, are those fluids, which when written with on paper, are invisible when dry, but become visible, and acquire color, by simply heating the paper, or by applying to the invisible writing another chemical agent. The writing with these inks may be made to become visible or invsible successively, by treating as directed.

GREEN INK.

If letters be traced on paper with muriate of cobalt, the writing is invisible; but by holding it before the fire the characters speedily assume a beautiful green color, which again disappears as the paper cools. A very pretty effect is produced by drawing the trunk and branches of a tree with a fast ink in the ordinary manner and tracing the leaves with the sympathetic ink as above. The tree appears leafless till the paper is heated, when it suddenly becomes covered with a foliage.

BLUE INK.

This ink which may be used like the preceeding, may be prepared in the following manner:—

Take one ounce of cobalt reduced to powder, put it into a Florence flask and pour over it two ounces of pure nitric acid. Expose the mixture to a gentle heat; and when the cobalt is dissolved, add, by small quantities, a solution of potash, until no more precipitate ensues. Let this precipitate subside; decant the supernatant fluid, and wash the residuum repeatedly in distilled water, until it passes tasteless; then dissolve it in a sufficient quantity of distilled vinegar, by the assistance of a gentle heat, taking care to have a saturated solution, which will be known by part of the recipitate remaining undissolved after the vinegar has been on it for some time.

SILVER INK.

Write on paper with a dilute solution of sulphur acetate of lead of commerce; the writing will be invisible. To make the characters legible, hold the paper whilst the letters are still wet, over a saucer, containing water impregnated with sulphuretted hydrogen gas; the characters then assume a brilliant metalic and iridescent color.

YELLOW INK.

Write on paper with a dilute solution of muriate of copper; the letters when dry will be invisible; but if the paper be warmed before the fire, the writing will assume a yellow color, and disappear again when the paper is cold.

BROWN INK.

Write on paper with a solution of nitrate of silver, sufficiently diluted, so as not to injure the paper; the characters, when dry, will be invisible, and remain so, if the paper be closely folded up, or it the writing is, in any other way, defended from the light; but it the paper be exposed to the rays of the sun, or merely to the common light of day, the characters speedily assume a brown color, and lastly turn black.

Animal-shaped Mounds of Wisconsin.

They consist of elevations of earth, of diversified outline and various size; for the most part constituting effigies of beasts, birds, reptiles, and of the human form; but often circular, quadrangular and of oblong shape. The circular or conical tumuli differ from those scattered over the whole country in no outward respect excepting that they are much smaller in their average dimensions; the lagest seldom exceeding fifteen feet in height. Those in the form of parallelograms are sometimes upward of 500 feet in length, seldom less than 100; but in height they bear no proportion to their otherwise great dimensions, and may probably be better designated as walls, embankments, or terraces, than mounds. These works are seldom insolated, but generally occur in groups or ranges, sometimes, though not always, placed with apparent design in respect to each other. In these groups may be observed every variety of form—the circular, quadrangular and animal shaped structures occurring in such connection with each other as to fully justify the belief that they are of contemporaneous origin. At first glance, these remains are said to resemble the sites or ground-plans and foundation-lines of buildings; and it is not until their entire outline is taken into view, that the impression of an effigy becomes decided. This is not surprising, in view of the fact that they are usually of inconsiderable height varying from one to four feet; in a few cases, however, rising as high as six feet. Their outlines are, nevertheless, represented to be distinctly defined in all cases where they occupy favourable positions. Their small altitude should cause no doubt of the fidelity of representations which have been made of these figures; since a regular elevation of six inches can be readily traced upon the level prairies and "bottom-lands" of the West, especially when covered with turf.

Preserving Fruit.

In the first number of the Transactions of the Massachusetts Horticultural Society, there is an accout of the new mode of preserving apples and pears. The inventor of the mode, M. Paquet, of Paris, has received from the Royal Society of Horticulture, a medal. He presented on the 12th of June, one hundred pears and apples, which it is stated not only preserved their beauty, freshness and flavour, but even their perfume. His fruit-house is described as a circular building, with an outer and an inner wall—the size of the building being whatever is convenient. The distance between the outer and inner wall is about three feet six inches. There are windows in both walls, a diffused light being preferred to darkness. The inner room, which is the depository of the fruit, is kept at a constant temperature of 50 degrees; (fahr) as low as 39 would not be injurious, but 66 to 73 destructive. Boxes are made with drawers of oak; that wood being easier to be cleaned from the remains of fruit which might decay. "In these drawers," says the account, " the fruits are placed with small intervals between each, on a slight bed, one-sixth of an inch thick, of saw dust, (not pine, which would communicate an unpleasant flavour,) highly dried in an oven, eight parts, and one part of very dry pulverised charcoal; and with this mixture the interstices between the fruits are filled to about two-thirds of their height, leaving one third exposed." This mode is deemed greatly preferable to keeping fruits in moss, cotton, paper or other substances.

The fruit should be gathered with the greatest care, and not in the least bruised; the fairest and finest specimens selected. It should be gathered ten days before it is ripe. After it is gathered, it is directed to leave it in an open airy situation for about fifteen days, to sweet, and on no account be wiped previous to being disposed in the fruit-house.

On the proportion of Nutriment to the Means of Living.

According to a memorial presented to the French minister, 100 pounds of wheat bread on an average contains 30 pounds of nutritive elements—gluten and starch. Black bread much less.

100 pounds of flesh on the average 31 pounds of nutritive matter, (according to Wohler) fresh flesh seventy per cent water, the remainder solid substance—fibrine.

100 pounds of French beans, on an average, contain eighty per cent nutrition.

100 pounds of peas twenty three per cent.

100 pounds of lentils ninety four per cent.

100 pounds of beets pulse eight per cent.

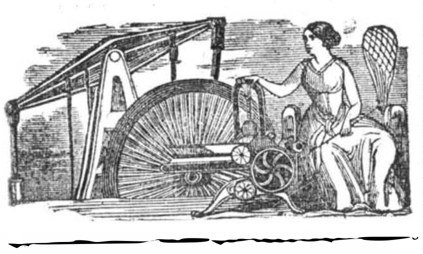
100 pounds of carrots fourteen per cent.

100 pounds of potatoes twenty five per cent.

Small Critics.

This class of men are as profoundly impudent as they are ignorant. Their chief glory lies in the practice of assailing men who are infinitely their superiors in every respect—men who deem it beneath them to treat such individuals in any other manner than with silent contempt. Such creatures are so vain (for egotism and ignorance go hand in hand,) that they deem the silence of superiority always as an effectual triumph. These *small critics* are the turkey buzzards—the vermin—*the Mexican rancheros* of literature—they not only torment but live on the life blood of genius and worth. As Burns has it, they are " horse leeches in the path of fame."

Beautiful iron bedsteads are now made in this city.



New Inventions.

Improved Lifting and Force Pump.

We have seen the model of an improved Lifting and Force Pump, the invention of Dr. N. Dodge of this city, which we think will unquestionably take the place of the common force pumps now used. Some of its advantages are the cheapness of construction, the small amount of power required for operation, together with great simplicity and durability. As we intend to present our readers with an engraving of it in the course of two or three weeks, we shall withold a more detailed explanation until that time, as we are certain it will attract much attention and wish all to understand it fully.

A New Instrument.

A new kind of instrument has lately been exhibiting at Mr. Atwill's Music store in this city. It is named the Keyed Violin, and is played like the parlor organ, by means of a pedal and keyboard, and its structure may be simply described as follows.—There are forty strings (five octaves) stretched upon a horizontal frame, and brought to the proper tension by means of the same apparatus as that employed in tuning the piano. At right angles with these strings, are forty horse hair implements, each resembling that part of an ordinary violin bow, which comes in contact with the strings; these are all attached to and stretched upon a frame, and by ingenious machinery are worked up and down with a steady motion, each bow continually passing within a minute distance of its corresponding string. The motion of the perpendicular frame and bows is caused by the use of the pedal, and the music executed in the same manner as upon the organ or piano. The pressure upon a key causes a simultaneous pressure laterally against one of the bows, bringing it in contact with its neighbouring string, and thus producing a sound similar to that made by bowing and fingering upon the violin now in use.

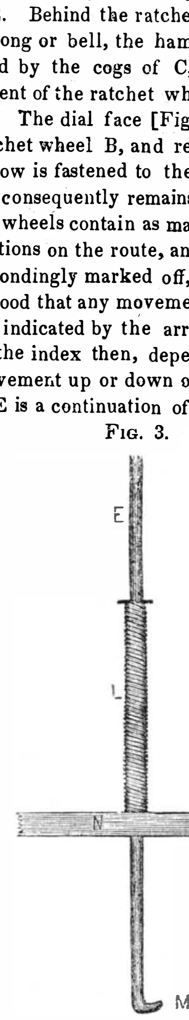
Ely's Railway Station Index.

(Concluded from first page.)

struck, thereby calling the attention of passengers to the index, while the arrow points with unfailing certainty to the name of the place at which the cars have arrived. No matter how much the cars may stop or go backwards, between the stations, the Index, as if endowed with instinct, will always point out the correct name of the station.—The cost of constructing and putting up this invention, is about $7 per dial, or $16 per car. We trust that every rail road company in the United States will forthwith have their cars furnished with this very needful invention, as it will greatly add to the comfort and convenience of their passengers, and save themselves from the imputation of much blame and many curses. It should form as necessary a part of every car as do the seats, and since the expense is so trifling, we hope ere long to see it universally adopted. Munn and Co., proprietors of the Scientific American, are the appointed agents of the invention, to whom all applications relative to it may be made. Railroad companies are informed that they can obtain the right to use it for a very small sum, or they can have as many dials put up as they wish at the above rates, upon short notice. Rights for several of the states are not yet sold, and if applied for soon, can be purchased on reasonable terms. An enterprising man may here find an opportunity to realize a large sum from a small capital.

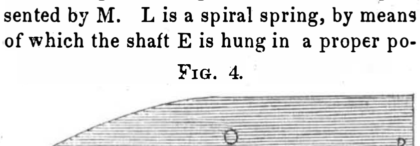
We shall now proceed to explain the internal arrangement of the Index, referring the reader to fig. 2 on the front page. A is the back of the dial case. B and C are two ratchet wheels, *fastened together*, and turning upon D, a stationary axle, which projects through the face of the dial, and upon which the arrow [Fig. 1,] is affixed. F is an arm or ratchet which meshes in the teeth of B, and is attached by a pinion at I, to the perpendicular shaft E. J is a coil spring, one end of which is attached to F, the other is screwed on to the case A. This spring serves the purpose of holding the arm F in contact with the ratchet wheel B. G is a branch of F, to which it is attached on the back side at H, and meshes into the other ratchet wheel C.—By lifting the shaft E, the arm F, it will be seen pushes against a tooth of B, at the same time raises the arm G which is attached to it, thus forcing around together the two ratchet wheels B and C to the distance of one cog.—A contrary motion is produced by drawing down the shaft E. The arm or ratchet wheel G is thus made to mesh into the ratchet wheel C, causing both the wheels B and C, being fastened together, to revolve in a direction contrary to that produced by pushing up the shaft E. Behind the ratchet wheel C is placed a gong or bell, the hammer of which is operated by the cogs of C, so that by any movement of the ratchet wheels the gong is struck. The dial face [Fig. 1] is fastened to the ratchet wheel B, and revolves with it.—The arrow is fastened to the immovable axle D, and consequently remains stationary. The ratchet wheels contain as many teeth as there are stations on the route, and the dial being correspondingly marked off, it will be easily understood that any movement of the dial face will be indicated by the arrow. The operation of the index then, depends wholly upon the movement up or down of the shaft E. In fig. 3, E is a continuation of said shaft, pass-

FIG. 3.



ing down through the floor N, of the car, and terminating near the ground in a foot, represented by M. L is a spiral spring, by means of which the shaft E is hung in a proper po-

FIG. 4.



sition. Fig. 4 represents a cam which projects an inch or two above the rail, in order to move the shaft E up or down, when they come in contact. One of these cams must be placed on the track about ten rods on each side of every station house. As a train comes up, the shaft E, [Fig. 3] projecting down through every car, comes in contact with cam O [Fig. 4] at the point Q, which being curved causes the shaft to rise, thus moving the index which points out the name of the place. On the return of a train the foot of the shaft M [Fig. 3] catches on the edge at R, [Fig. 4] and by the under edge, P, of the cam is drawn down, thus likewise moving the index. The shaft E having passed the cam, is liberated and returns to its position by means of the spring L [Fig. 3]. The shaft and connections being placed in the partition of the car, nothing is exposed to the eye except the dial. which may be beautifully ornamented, according to fancy. There are a few other particulars connected with the invention which it is unnecessary here to explain.

Perpetual Motion.

The Delaware Republican says one of the ingenious mechanics of that place flatters himself that he has invented a machine that creates its own power, and that it will run, when once set in motion, as long as the material of which it is composed may last. He says he can construct a machine of one man power up to a hundred horse power, and that it may be used for driving all kinds of machinery.

Another mechanic in this city has just published that he has also discovered this power. So has another in Georgia, another in Missouri and another in Michigan.

There is no man who has studied the principles of mechanics—the composition of forces—that ever wastes time and talent in searching after an *ignus fatus*.

An Air Navigator.

A series of experiments have lately been made beneath an immense tent in Cremorne Gardens, London, by a Mr. Stringfellow—a fine name for suspension. The inventor marches through the air by a machine which sustains and propels itself through the cicumambient fluid. The machine excited considerable attention and surprised all the spectators by its wonderful performance. The next expedition that is fitted out by the British government to explore the Niger and the country through which it winds its sluggish and pestilential way, should employ this Mr. Stringfellow with a number of his machines to make a flying exploration, untramelled with their heels in mud or water.

Prevention of Steam Boiler Explosions.

A late number of the London Mining Journal states that " Mr. Joseph Spencer, of the Bilson Iron Foundry, England, has invented a steam whistle to be attached to stationary boilers, to give notice when the water was getting low. It is very simple, and, we should say, effective and secure; consisting of a common steam whistle, placed on the top of a boiler—the passage of the steam to which is closed inside the boiler by a valve opening downwards, having an open link attached, and kept close by a balance lever. The float lever works in this open link, and as the water gets low it pulls down the valve, and admits the steam to the whistle immediately giving notice to the attendants. The works being all inside cannot be tampered with."

We must beg leave to tell our respected contemporary across the water, that a patent was granted for this very invention by our Patent Office last year. We have seen both the drawings and specification of it.

This is not a British invention with a Yankee name tacked to it, but vice versa.

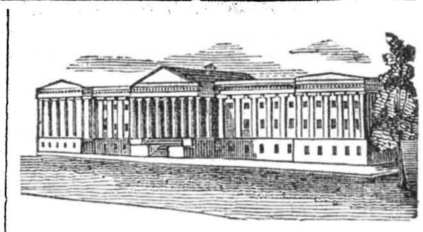
That Engine.

We would inform the many persons who have written to us in regard to the 12 horse power engine and locomotive boiler, that they are now sold. A gentleman in Virginia was the lucky purchaser. We are constantly filling orders for engines and machinery of every description from all parts of the Union — Our extensive acquaintance among the principal machinists, and a long experience in mechanical matters enables us to select *the best* machines at the lowest prices.

The 2½ horse power engine and boiler which we advertise are not yet sold. They are bran new, made in a very substantial manner, and operate beautifully. The engine is attached to the boiler, rendering the whole so compact that the purchaser on receiving them would only have to make a fire in the furnace to put them in operation. Price $250 cash. Any one at the South or West who would like them, may send us a draft for the amount, and we will have them promptly forwarded at *our* risk, and delivered in perfect running order.

The Great Britain.

This heretofore ill-fated steamer, having been regenerated, is advertised for sale by auction in Liverpool in September. With her present engines, she is capable of carrying from 800 to 1000 men for a fortnight's voyage; with smaller engines, by which her coal stowage could be reduced, she could accommodate 1000 emigrants for a distant voyage.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending Sept. 12, 1848.

To William Stephenson, of Cincinnati, Ohio, for improved Door Lock. Patented Sept. 12, 1848.

To Josiah Kirby, of Cincinnati, Ohio, for for improvement in machines for cutting Bungs. Patented Sept. 12, 1848.

To Isaac Baker, of Warwick, Mass., for improvement in machinery for dressing Chair Seats. Patented Sept. 12, 1848.

To William Bumford, of Ipswich, Mass., improvement in Needles for Knitting Looms. Patented Sept. 12, 1848.

To Miles R. Payne, of Waldo, Ohio, for improvement in Shingle Machines. Patented Sept. 12, 1848.

To Christian Sharps, of Cincinnati, Ohio, for sliding breech pin and self-capping Gun. Patented Sept. 12, 1848.

To Stephen Baldwin, of Williamson, N. Y. for improvement in Washing Machines. Patented Sept. 12, 1848.

To William Stephenson, of Cincinnati, Ohio, for improvement in Door Locks Patented Sept. 12, 1848.

Frederick E. Sickels, of New York City, for improved method of controlling motive power. Patented Sept. 12, 1848.

To J. C. Kneeland and George M. Phelps, of Troy, N. Y. for improvement in machinery for cutting and arranging paper. Patented Sept. 12, 1848.

To William Smith, of Bangor, Me., for improvement in machinery for sawing Shingles. Patented Sept. 12, 1848.

To Job Arnold, of Freeport, Illinois, for method of applying a Governor to a Horse Power. Patented Sept. 12, 1848.

To Deshon & Webster, of New London, Conn., for improvement in double bellows Pump. Patented Sept. 12, 1848.

INVENTOR'S CLAIMS.

Straw Cutters.

L. A. Harper, Russelville, Ky. for improvement in straw cutters. Patented Aug. 15, 1848. He claims arranging the fly wheel and the line of its shaft, and the parts for operating the feed rollers with respect to the knife and feeding box.

Ditching Machine.

B. T. Stowell, Wadham's Grove, Ill., for a ditching machine. Patented Aug. 22, 1848. What he claims is the combination of the adjustable side ploughs with the central plough, the inclined endless revolving floor, and the depositing apron.

Water Wheels.

Lewis Wertz, Chambersburgh, Pa., for improvement in water wheels. Patented June 20, 1848, reissued Aug. 15, 1848. What he claims is the combination of the cap with the inner ends of the converging buckets and the collar for the purpose of forming a pocket or channel to prevent the water from spreading out laterally when it first acts against the wheel, and keeping it in a solid compact current until finally discharged. He likewise claims the combination of auxiliary converging shutes with the principal shutes and the wheel.

Regulating Motion.

Henry Allen, Brattleboro, Vt., for governor for regulating motion. Patented Aug. 22, 1848. What he claims as his invention is a wind wheel or fan.

Who shall I get to take out my Patent?

This is the enquiry of almost every inventor, and for an answer we would advise them to read our advertisement of Patent Agency in another column. Patents may be secured through the Scientific American Office on better terms than elsewhere, as our facilities for attending to such matters are unequalled.

NEW YORK, SEPTEMBER 23, 1848.

Progress and the Press.

When the art of printing was discovered, it thrilled upon the ear of slumbering Europe as the voice of Divinity thrilled upon the ear of the dead, " awake thou that sleepest and arise." From that moment the march of freedom and knowledge has been steadily *onwards*. Old systems of false philosophy have crumbled away and new and true systems have been firmly established. Bigotry no more rears up her frowning battlements to oppose knowledge and overawe truth. Science is no longer confined to the college and cloister, and the useful arts are no more despised. War and eloquence still captivate and charm the proud and ignorant, but they are not now the exclusive objects of popular regard. The prosperity of nations is found now to depend on worth, industry and intelligence. By what chemical composition have these great reforms been brought about—by what mighty lever have " the valleys been exalted and the mountains brought low," to make a highway for knowledge among men ? The Press—the Press. By it, the discoveries and investigations of the most noble and powerful minds have become public property, and the poor workman who can read, can now hold communion with the most gifted and learned.—And such is the nature of the human mind, that " as iron sharpeneth iron," so doth the thoughts of one man sharpen the mental powers of another. This leads to investigation, creates new desires, yea oftentimes opens up a hidden fountain of pure and dazzling genius. In all likelihood James Watt never would have directed his attention to improvements in the steam engine, if he had not been employed to repair a rude model. The wind that " bloweth where it listeth," affects not alone the atmosphere. The mighty ocean is disturbed and lake and pool that long lay still and motionless, are roused into action, sweetness and health. It is the same with the great mind of the world. The Press is the wind that stirreth up into healthful heavings its often languid and thoughtless heart—a hint, a word, a paragraph, often suggests ideas that are fraught with golden import. It has been remarked, that after some invention or discovery has been made public, others of great value have quickly followed after. Ether and chloroform pressed rapidly on the heels of one another. This is one of the great benefits of the Press—the importance of a newspaper—one or more in every department, each powerful and beneficial in its own sphere.

The field which we occupy is one of great importance to the progress of arts and sciences in our country, and widely is this now felt and acknowledged. Weekly from a hundred different sources is collected into our columns the peculiar matter which is sincerely designed to instruct and elevate. This requires much labor, care, and experience, and yet for all, mistakes and errors will be committed—perfection does not belong to man, but he must aim at nothing less, if he wishes to come near the mark. If he would progress he must have the mind of Newton " ever learning—yet to learn."

The Scientific American has been much indebted during the last year, to her many able and powerful correspondents, for the valuable and thoroughly practical character of their communications—this has constituted their crowning beauty, felt and acknowledged. We mention no names in praise, but we say this much, that there is not another paper in the world that can exhibit more original and useful correspondence. Our correspondents are still ready with their minds and pens to communicate, and will communicate with us for the benefit of science. Many new correspondents have come forward and tendered their services, which will appear terse, clear and instructive in our columns. From the means at our command volume 4 of the Scientific American will be rendered the most useful and instructive repository of science and art ever published in America—our motto is, and always has been " *progress*."

Opposition to Improvements.

There was a time when the opposition to improvements was not confined to the humble and lowly, but was most bitterly and unrelentingly displayed by those who were the most enlightened. There seems to be something in the human mind that resists encroachments on established customs or usages, let those customs be as brutal and foolish as they may. So difficult is the task of converting even the most depraved and profligate, that it is compared to the " removing of a mountain." And truly when we reflect upon the determined opposition that has always been displayed against improvements in science and art, and reflect for a moment upon what improvements have been made, we will be ready to attribute an overruling hand guiding man to a nobler destiny and a higher civilization. The " times of ignorance " the Creator winked at, is a singular expression, but it can apply no longer to us, no excuse will suffice for us to be ignorant or to oppose improvements in our day and generation.—Nay more, he that does not form a spoke in the mighty wheel of universal improvement, is culpable in the highest degree. We regret to say that there are too many who are ignorantly or selfishly culpable to improvements, be those improvements in the shape of moral or inventive reform. If there springs up an invention to lighten labor and to triple produce, it is sure to meet with opposition, and by those from whom we might expect something better. We remember with pain the bitter and contemptuous language that was used towards the telegraph when the first line in our country was in the course of erection. We blush for our race when we reflect upon the see saw wise men that despised Robert Fulton and all other great inventors, when first their inventions were brought before the public.

The success of so many inventions, that were looked upon as chimeras of madmen, has made for a time inventions somewhat popular. Seizing upon this feeling, some have unworthily for selfish objects, proclaimed with trumpet voice some nostrum which has deceived and disgusted many with a patent seal. This is to be expected—there will always be tares among the wheat, but on that account no man should oppose improvement. There can be no doubt but that there are many pretended improvements that are quite the reverse of what they pretend to be, yet for all this, let every man reflect twice before he speaks once against any measure or machine that is brought forward to reform an abuse or improve a manufacture. Had the cities of Albany and Brooklyn exhibited a true spirit of improvement, they would long ago have been supplied with an abundance of water which would have saved more property from destruction at the recent fires in those cities, than would need to have been expended for *the* improvements in ten years. Yet for all this, we would not be surprised if those cities would still be " deaf to the voice of the charmer," common sense and cammon interest. Two steam engines of 50 horse power each, could supply Albany with water from the river, which could be forced to the top of the highest street, there filtered and made available for domestic use or fires.—Brooklyn could be supplied with water for fires by one engine of 60 horse power, or less.

The press is the great mouth-piece of modern improvement—a hint—a word universally disseminated does wonders in stirring up the public mind to objects of utility.

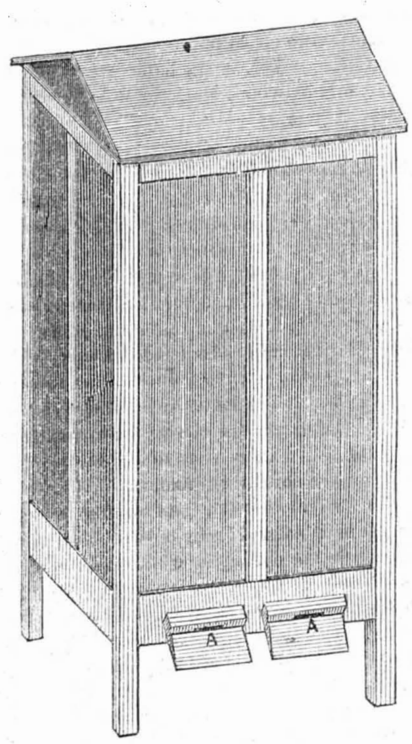
All projected improvements should be well discussed before they are acted upon, but far better that ten schemes should be tried and fail, than one good scheme should be overthrown by nothing but a spirit of opposition.

Copper.

One million three hundred and sixty two thousand pounds of Copper, have been shipped during the present season from Lake Superior.

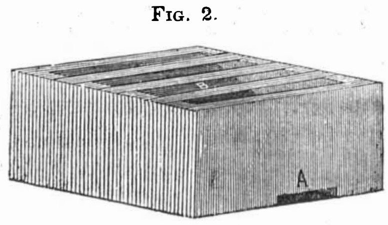
Spurgin's Palace Bee Hive.

FIG. 1.



This is an engraving of a new Bee Hive, invented by Jeremiah Spurgin, of Poplar Plains, Fleming County, Kentucky. It consists of an outer box or case and the boxes to contain the bees are placed inside, three or more on the top of one another and in direct communication. Figure 1, is the outer case or box. It has folding doors in front to be thrown open and closed at pleasure to protect the bees from the ravages of insects or inclement weather, and to allow a person to arrange and shift the boxes at pleasure. A A, is the entrance for the bees at the back of the palace at the lower part. The bottom of the box is some distance from the ground so that no slugs, &c. can find an entrance, as the bees light on A, and have to ascend an incline plane to get to their cells. This is shown in

FIG. 2.



This is the lower box in the palace. It is a square box fastened to the floor. A, is the entrance, and B is the incline board up which the bees have to travel to get to the cells. On the top of the box are nailed cross slats and there are three other boxes of the same form as this, with the exception of the incline board B, placed one above another The incline board serves not only to keep out injurious insects, but serves to carry away impurities that are thrown down from the boxes above, thus tending in a simple manner to cleanliness and health. Two tier of boxes are arranged in the inside of the outer case with a gangway between them, and each box has a glass front with folding doors also, so as to inspect the cells, &c. The great evil complained of in the hives at present in use, is this The bees have to breed and make their honey in the same box, and as the bees prefer to breed always in the lower combs and deposit their honey in the upper combs, there is no good way of taking out the honey, and cleaning the boxes without injury to the brood. All hives require a clean box in a few years, because if they are forced to breed in the same place, they leave a gummy lining behind and the new combs decrease in size, and therefore the bees reared therein become small, feeble, unable to work and finally die out, as they are a short lived insect. Mr. Spurgins' hive, for which he has taken measures to secure a patent, provides against this evil. By the arrangement of the boxes, he can remove the honey and clean the boxes at pleasure and with great ease, and he can either increase his cells or hive the bees at pleasure. By his palace bee hive, he has two families of bees, and after the first year, he will raise about 100 pounds of honey in the season—with very little trouble and almost for nothing. The plan is good, simple, and highly creditable to the inventor.

Fair of the Franklin Institute.

The eighteenth exhibition of the Franklin Institute in Philadelphia will open on the 17th of next month and close on the 28th, which will make the exhibition to be open two weeks instead of two days, as noticed by us in No. 51 of last volume. The old Franklin will no doubt have (as she always has had) an excellent exhibition this year.

The regulations will be substantially the same as those by which former exhibitions have been governed. The rule requiring that goods intended to be submitted to the examination of the judges, and to compete for a premium, shall not be deposited later than on the day previous to the opening, which was adopted for the first time at the last exhibition, was found productive of such convenience to the depositors and the managers, that it will be hereafter continued.

The Institute has purchased a steam engine of sufficient power to drive all the working models of machinery which may be presented; and no disappointment will in future result from the heretofore necessary dependence upon engines of faulty construction or inefficient power.

The exhibition rooms will be prepared for the reception of goods on Friday, the 13th of October.

No premium shall be awarded for an article that has received one at any former exhibition of the Institute.

Three grades of premiums will be awarded, styled, a first, a second, and a third premium. When an article shall be judged worthy of a first premium, in case the maker has received a first premium for a similar article at a former exhibition, a certificate may be awarded referring to the former award, and stating that the present is equal or superior in quality : unless the improvement over the first award may be judged worthy of another first premium.

Proof of origin must be furnished, if required, for every specimen offered for exhibition, and the strictest impartiality will be displayed.

The Telegraph Law Case, which was recently decided in favor of Mr. Morse, at Lexington, Ky., is to be carried up to the Supreme Court, which will of course confirm the decision of the Court below. It is idle to contend against Morse's claim. It is as just as the claim that any man has to his own legal property.

To Inventors.

Those who wish to have engravings of inventions inserted in the Scientific American during the three weeks of the great Fair of the American Institute, in this city, next month, are requested to forward their models or drawings to this office as soon as possible. Models may be sent by express ; drawings by mail. During the continuance of the Fair we shall issue extra editions of our paper for circulation among the many thousand visitors who annually attend. Those who can should embrace this opportunity, for it is a rare one, of having their inventions illustrated and noticed. There is no doubt that a great many rights may in this way be disposed of. The Scientific American is about the only paper upon which people depend for information about mechanical inventions.

THE

SCIENTIFIC AMERICAN.

Persons wishing to subscribe for this paper have only to enclose the amount in a letter directed (post paid) to

MUNN & COMPANY,

Publishers of the Scientific American, New York City.

TERMS.—$2 a year; ONE DOLLAR IN ADVANCE—the remainder in 6 months

Postmasters are respectfully requested to receive subscriptions for this Paper, to whom a discount of 25 per cent will be allowed.

Any person sending us 4 subscribers for 6 months, shall receive a copy of the paper for the same length of time

Boston Water and Lead Pipes.

The Commissioners appointed to report upon the best material to convey the water of Lake Cochituate into the private houses of Boston, have reported in favour of lead pipe. They have gathered up a mass of evidence to prove its perfect safety in the conducting of water, and some strong testimony against it, but on the whole they recommend lead pipe for being the cheapest, and that it is perfectly safe to use for domestic purposes.

As this has been long a vexed question, the report is of more than common interest. They referred the subject principally to Prof. Horsford of Harvard University.

The grounds on which lead is preferred for the composition of small distribution pipes are, that the metal is cheap ; it is easily formed into pipes, of any convenient size or length ; flexible and easily adapted to all situations, in which it is desirable to place it ; it is of sufficient strength to bear the pressure of an ordinary head of water, and if made of a suitable thickness, and provided with proper guards against the effects of a sudden check of the current, it is capable of resisting the extraordinary shock thus produced. It moreover preserves the water in a state of purity, and is itself durable, unless dissolved by the action of substances foreign to the source from which the city is to be supplied. Pipes of this material may be laid in a much shorter space of time, and at less cost, than those of cast iron.

Attempts have been made to discover the nature and source of the mixtures which impart to water the power of acting more energetically upon lead. It is observed that nitrates possess this power, and that they are frequently found in well water. The observations of Professor Horsford led him to the conclusion that the unequal proportion of these salts constitutes the chief distinction between different waters, in their relation to lead. These salts are often, if not uniformly found in the water of wells and springs so situated as to be replenished by the filtration of water through a soil enriched from the stable or by the wash from collections of animal substances, of any description. A small solution of saltpetre, or of a nitrate of any description, in water, is found to impart to it the property of dissolving lead, and thereby forming the nitrate of lead. This substance renders the water undoubtedly deleterious and dangerous to the health of those who drink it or use it in the preparation of their food. This explanation, which seems to be fully confirmed by ample experiments, accounts sufficiently for the fact, that the water of wells situated as are a large portion of those in towns, and cities, and of springs situated in the midst of richly cultivated fields, or in the vicinity of animal deposites of any description, may produce the chemical effect here described upon the leaden pipes used to conduct it, while the waters of rivers and lakes, not particularly exposed to contact with substances of that nature, will be destitute of any such power.

Of the harmlessness of the New York and Philadelphia waters, and others of a similar class, we have abundant testimony, of which we cite, by way of sample, the following statements. In regard to the New York water works, which have for several years supplied many thousands of families, Dr. Griscom in a letter to Dr. Webster, dated Dec. 14, 1847, and appended to the report of the consulting Physicians, says, " nothing but lead pipes is now used in this city for the conveyance of water into, and within the residences of the citizens."

The water works of the city of Philadelphia have been in successful operation more than twenty five years, and they have afforded a wide field of experience, which has been of great value to directors of other similar works.

The water of the London water works is distributed from the houses in leaden pipes, and is usually preserved for use in tanks lined with lead, and without complaint of any injurious effects from the metal. On this subject, Professor Graham of the London University, an eminent chemist, in reply to an inquiry by Professor Horsford, says, " The point upon which you desire information is one which has been settled here by long experience. It is, that lead alone is used to conduct the water from the street main into the houses, or for service pipes. No evil is experienced in London, either from these pipes, or the leaden cisterns. Yet, as the latter are filled in general only twice a week the water must remain in them for several days."

Dr. McNaughton, of Albany, N. Y. where leaden pipes are partially used for the distribution of water, states that his own family have, for a period of sixteen years, freely used, for all purposes, water introduced to his house, a distance of at least one hundred and seventy-five feet, through a leaden pipe, and they have never had, in that time, a case of lead or other colic. He has known no case of lead poisoning from the use of the Albany Water Works, and he has been informed, on inquiry of some of the oldest physicians of the city, that they know of no such case.

OPPOSITE PROOFS.

On the other hand, a great number of cases might be cited, and many of them been made known to the public, in which the water of wells and springs either conveyed through leaden pipes, or received into cisterns lined with lead, has not only rapidly dissolved the lead, but has proved seriously detrimental to the health of persons who have habitually used it with their food. Repeated cases of both these descriptions have occurred, from the use of the water of certain wells in Boston, and in Worcester, Dedham, Cambridge, and other places. It is not possible to prove in reference to all these cases, what ingredient the waters contain capable of producing the effect, which is not contained in the water of rivers and lakes. The water of two wells in Cambridge, situated near each other,—(those of Rev. Dr. Walker and Mr. Buckingham,) drawn through leaden pipes, were subjected to experiment by Professor Horsford. In the former, a trace of lead was discovered, and in the latter none. The use of the water of the former had also proved injurious to the health of the family. On subsequent inquiry, it was ascertained that the well of Dr. Walker was shallow, and was supplied from springs near the surface of the earth, and above the clay substratum. The well of Mr. Buckingham; after a discovery that the surface springs were insufficient, had been sunk deeper, and the water at the time of the experiment was drawn from a depth below the clay, which is impervious to rain water.

Dr. Chilton, a most practical chemist of this city stated that he had been called on to analyse water taken from leaden pipes, in a house in the city which had been closed for some time previous, several persons having been made seriously ill from drinking the same water, and that he had detected the presence of lead in it. He was also of opinion that the effect of lead from drinking Croton water under such circumstances is of frequent occurrence, but not recognized as such by the physicians.

The question then seems to be settled that river water at least exerts no deleterious influence upon lead pipes for domestic purposes.

Investigation of Science.

Few people are aware of the extreme difficulty of the art of simple observation. That art consists not only in the ability to perceive the phenomena of nature through uncolored eyes, but also of the talent to describe them in unobstructed and transparent words. To observe properly in the very simplest of the physical sciences requires a long and severe training. No one knows this so feelingly as the great discoverer. Faraday once said that he always doubts his own observations. Mitscherlich, on one occasion, remarked to a man of science of his acquaintance that it takes fourteen years to discover and establish a single new fact in chemistry. An enthusiastic student one day betook himself to Baron Cuvier with the exhibition of a new organ, we think, it was a muscle, which he supposed himself to have discovered in the body of some living creature or other ; but the experienced and sagacious naturalist kindly bade the young man return to him with the same discovery in six months. The baron would not even listen to the student's demonstration nor examine his dissection, till the eager and youthful discoverer had hung over the object of inquiry for half-a-year ; and yet that object was a mere thing of the senses ! In a word, the records of physical science are full of instances in which genuine researchers, men formed by nature and trained by toil for the life of observation, have misstated the least complicated phenomena. Nor would the intelligent public not be amused, as well as astonished, if they only knew how very few of the noisy host of professing men of science, in even this matter-of-fact country, ever discover a single new fact ; ever describe with irreversible fidelity a new phenomenon of any significance ; ever add one true word to the written science of the world.

If, however, it be one of the hardest of problems to make observations with unbiassed simplicity, and useful accuracy on inorganic nature, the difficulty is greatly enhanced when there are superadded the phenomena of vitality to those of chemical affinity, mechanical cohesion and celestial gravitation, as is the case in the science of physiology.—Mechanics is the science which was first brought to something like perfection ; and the reason is obvious, for the phenomena with which it is conversant are not only the nearest to the senses of the observer, but they are the least complicated ones in creation. Then followed astronomy in the process of time ; and then chemistry, the phenomena of which are still more complicated than those of the science of stars : and it is clear to every thoughtful and competent mind that physiology is now awaiting the consummation of chemistry. When the vast complexity of the science of physiology is considered with thoughtfulness, and when it is remembered that chemistry is still so far from perfection that the chemist cannot construct a particle of sugar, or any other organic substance, although he knows the exact quantities of charcoal and water of which it is composed, the reader will not be astonished to find that M. Comte, the amplest yet the most severe representative of positive science that European influences have yet produced, speaks of the former department of knowledge as hardly set within the bounds of positive science. — He characterizes it as just emerging into that sphere.

Theory of Vision.

At a late meeting of the British Association for the advancement of Science, a paper was read by Sir David Brewster, entitled "An Examination of Berkeley's Theory of Vision." Sir David endeavored to overthrow the established theory that the idea of distance is obtained merely by experience, and that all objects appear to the uneducated eye, as on the same plain. He mentioned several facts connected with pinocular vision to show that there is a line of distance impressed naturally on the retina ; and all the instances to the contrary, derived from the observation of those who had received sight for the first time, Sir David considered unsatisfactory, inasmuch as the eyes of such persons were not in a natural state immediately after having undergone the operation of couching. Experience proved that children had ideas of distance, for they did not attempt to reach the sun and the moon, and as regards animals, this fact was more striking, for the duckling, on coming out of its shell, ran to the distant water, and did not try to get into it as if it were within reach. He also mentioned some curious facts in connection with vision, which he thought militated directly against the Berkelyan theory. When for example, a person takes hold of a cane-bottomed chair, and directs the axes of his eyes through the pattern to some point on the floor, the pattern of the woven cane is seen in a position where it is not, and by no effort of the mind can it be seen where it really is. The same illusion occurs when the eyes are directed steadily to the paper of a room, when the pattern is regularly placed in vertical stripes. Dr. Whewell defended the Berkleyan theory, contending that the facts stated by Sir David confirmed instead of overthrowing the theory. With reference to the vision of animals, he said, that could not be adduced against the Berkleyan theory, as it was an exhibition merely of instinct, of the nature of which we know nothing. It might as well be said that children do not walk by experience and practice because some animals run about from the moment of their birth. Dr. Whewell maintained that experience showed that children have little or no idea of distance, for if they do not try to catch the sun or the moon, they frequently attempt to take hold of the flame of a distant candle.

Starch a Cure for Scurvey.

Dr. J Porter in an interesting article in the American Journal of Medical Science adduces much proof in favor of starch being an excellent anti-scorbutant. He says " Experience has long shown that a diet consisting solely of potatoes is capable of affording nourishment, and of preserving the body in perfect health." Certain nations, it is well known, subsist almost entirely on rice, arrow root, and similar kinds of vegetable food. These are all of the starch class ; and it may be that therein, as well as the potato, resides their chief value. These articles—rice, arrow root, sage, tapioca and starch—may be made into excellent puddings with lemon juice and spices, and make a luxurious article of diet at sea. Arrow root may be purchased in any quantity in the islands of the Pacific and elsewhere and often as low as two or three cents the pound.

Conversing a few days since, with one of our oldest shipmasters in the whaling fleet, I mentioned to him the theory in relation to starch, as being the chief ingredient in the potato. His crew had suffered most severely from scurvey in his last voyage. I inquired if he had any arrow root on board. " No," was his reply, " for I was disappointed in obtaining it at the island, as it is my custom to do for puddings, &c." On my informing him that arrow root was almost entirely a form of starch, after some reflection, he said:—" I cannot but think that there is truth in the theory you have named, for, on looking back, I find that during those voyages when I took most arrow root on board, I had the least scurvey. Besides," he added, " I was perfectly well during this last voyage, while all were sick around me, and two men died; and I know not what to attribute it to, unless it be to a practice which I have followed for years, of having, while at sea, a bowl of arrow root gruel at my breakfast."

There is much truth in the above view. Starch is excellent for the purposes set forth applied both outwardly and as an article of diet—this we know from the testimony of individuals who have used it. The information is important to many.

Cause of Waves.

The friction of the wind combines with the tide in agitating the surface of the ocean, and, according to the theory of undulations, each produces its effect independently of the other. Wind, however, not only raises waves, but causes a transfer of superficial water also. Attraction between the particles of air and water, as well as the pressure of the atmosphere, brings its lower stratum into adhesive contact with the surface of the sea. If the motion of the wind be parallel to the surface, there will still be friction, but the water will be smooth as a mirror ; but if it be inclined, in however small a degree, a ripple will appear. The friction raises a minute wave, whose elevation protects the water beyond it from the wind, which consequently impinges on the surface at a small angle : thus, each in pulse combining with the other produces an undulation which continually advances.

Pride.

I never saw pride in a noble nature, nor humility in an unworthy mind. Of all the trees, I observe that God hath chosen the vine, a low plant, that creeps upon the helpless wall : of all beasts, the soft and patient lamb : of all birds, the mild and gentle dove. When God appeared to Moses, it was not in the lofty cedar, nor the sturdy oak, nor the spreading plane ; but in a bush—a humble, slender, abject bush ; as if he would by these elections check the conceited arrogance of man. Nothing procureth love like humility ; Nothing hate, like pride.

TO CORRESPONDENTS.

"M. P. of Conn;" "H. D. C. of Mass.," and "N. G. H. of Me."—Your specifications have all been forwarded to Washington, and the models deposited with the forwarding Agent of this city.

"D. E. S. of Mass."—There would be a difficulty, if you do as you say, before making application. If your invention is of the least value, better not run any risk as the cost of securing it is trifling.

"D. W. of Pa."—The engine is sold.

"W. O. of N. J."—Incubation by means of artificial heat is a very common thing now a days.

"C. M. M. of Penn."—Your plan for a condenser is not new. Application for a patent for the same was made last spring by another gentleman, of Connecticut.

"J. N. of N. Y."—We fear your plan for propelling Canal boats would not be of any benefit. The paddle wheel, is in our opinion superior to any thing. Your plan is entirely new and we could without difficulty obtain a patent for you. $1, O. K.

"W. R. Y."—The whole amount for the engine must be paid in cash.

"S. G of Mass."— The difference in applying for a Patent is this ; the longer you delay the more chance there is for others to supercede you. Lose as little time as possible. The Patent Laws will be sent in a day or two. $1, O. K.

"J. S. of Md."—A good substantial engine for the purpose you name will cost $250. The power will be 2 horse. We would not recommend less power as engines below are not easily managed nor do they work well in the long run.

"G. W. D. of N. Y."—The brass can only become harder by the addition of more copper in the composition.

"R. W. of Vt."—The man who makes the improvements, has the sole right to them, whether hired or not. No person can use them without his consent—if hired to make a machine and he makes an improvement on it without being consulted, it shows that he gave consent to its use—but only that machine. The manufacture of Woad is kept somewhat private.

Webster's Unabridged Dictionary.

Below we copy an article from the New York Tribune, which shows the vast celebrity this work has received even in the most distant parts of the globe.

"The publishers of Webster's Unabridged Dictionary, in crown quarto, received an order for 12 copies of that work lately from Ceylon. Its fullness precision and accuracy renders it an indispensible aid, not only to the student at home, but to the Missionary abroad as he opens the treasures of the English language to the dark mind of his heathen scholar, or moulds to order and system the ruder elements of his native tongue. The revised edition has already been published in England."

See advertisement of this work in another column.

Mechanical Principia.

This is a new work by Charles Elbridge Leonard, containing all the various calculations on water and steam power and the different kinds of machinery used in manufacturing with tables showing the cost of manufacturing different styles of cotton goods. It is just such a work as is required at the present moment. It contains tables of beltings, speed and every calculation required in almost all kinds of machinery.

There are likewise introduced at the end of the work some two hundred Problems, showing the application of the different tables. These Problems show that the tables contain all the necessary information required to perfect any problem that is connected with the subject of manufacturing.

On the subject of Cotton Manufacturing there are several problems introduced, showing the number of spindles with looms required to manufacture the estimated production of cotton of the United States into certain styles of goods ; the number of operatives required; the amount paid them per year ; and also the amount paid out per year, including all expenses except the cost of cotton.

The plan of this work differs very materially from any before published—the calculations being so condensed and arranged, that those who possess but very little mathematical knowledge will be able to obtain the solution of the most intricate problems in mechanical science. From its scientific simplicity, it is believed that the work will prove very valuable and satisfactory to all who are interested in any of the subjects upon which it treats.

The author Mr. Leonard, has had excellent opportunities to produce an accurate and interesting work—selecting the best materials and arranging them in the most instructive and simple order. The volume contains 197 pages, price $1,50. We will send copies to any person who remits the above amount.

Life and Writings of Hogarth.

J. S. Redfield, publisher, Clinton Hall, has favoured us with a copy of a new edition of the life and writings of that inimitable humorist, Hogarth, which we recommend to every one that has not read his works. It is embelished with numerous cuts representing his master pieces, which of course are very amusing.

Cliff Copper Mine.

The shipment of copper this season by the Cliff Mining company, (Lake Superior,) will yield at least $256,000, and will enable the company after discharging its old debts, and paying for its island, to divide to its stockholders $180,000.

Sending Receipts.

It is impossible for us to enclose receipts to our subscribers in the paper without violating the Post Office laws and thereby rendering ourselves liable to be fined. But all persons who receive the paper may take it for granted that their money has come to hand, or that the time for which they have formerly paid has not expired, for in no case do we continue sending unless the pay has been received in *advance*.

For the Scientific American.

New Chemical Law.

No 1.

In surveying the present state of chemical science, now so rapidly advancing, it cannot but be perceived, that there is a great deal of confusion and misunderstanding in relation to the composition and classification of chemical substances, and more particularly in the department of Organic Chemistry, about which but comparatively little is known. It is true that chemical analysis gives us the empirical composition of these substances; but what new idea does this teach? We know that the composition of almost all organic substances, consist of the three elements, Carbon, Hydrogen, and Oxygen, united in different proportions, but this is not sufficient, something more is wanted; we want to know the true arrangement of the atoms which compose these substances? and until this is accomplished, but little advancement will be made, in this department of Chemistry.

An analysis of a substance is not complete although we way know its exact composition. In order to have it complete, it is necessary, that we should also know the true arrangement of its atoms. This is of far more importance than most chemists suppose, at least it appears, that but little attention is paid to it by them, as most all analysises of organic substances laid down in chemical works, merely give the empirical formula, but pay not the least attention to the arrangement of the atoms. For instance the composition of Quinine is given as C20, H12, N, O2, now what great benefit is derived from this mode of stating the analysis? It certainly gives us but a very small amount of knowledge. If however the true arrangement of its atoms were also given, then our knowledge of it, would become complete, and we should be enabled to classify it with other substances of a similar composition.

It is evident that a knowledge of the material substances which compose a building, as brick, stone, wood &c., could give us no possible information as to its plan and arrangement, nor of its general appearance. The same is the case with a chemical substance; and although we may know its composition by analysis, as generally given; we do not understand the true arrangement of its atoms. It is therefore of the utmost importance to chemical science that the mode of the arrangement of the atoms of matter should be ascertained. It may be asked, does such an arrangement or order among the atoms of substance exist? Who is there that has ever studied the Laws of Nature, and observed the constant order and regularity, with which they are always attended, but will affirm without any doubt, that such a law does exist. The material universe was founded upon order, consequently no law of nature can exist independent of it. It is this which leads us to affirm, that all future discoveries in science must necessarily be accompanied by this order. When therefore we seek to explain the law of the arrangement of the atoms of matter, we should look for it with the expectation of finding it governed by perfect order. The theory of Types, by Dumas, is an instance of this order, and beautifully shows how a substance may retain its Types, although every element in it, may be substituted for another: the number of elements in it remaining the same.

The new chemical law which I am about to describe, is an instance of an order among the particles, of matter which when correctly understood and applied will do more for the benefit of mechanical science than can ever be imagined at the present time. While it shows the true arrangement of the atoms of matter, it leads to other important laws, which when properly understood, may be applied to the calculation of specific gravities, boiling points, and the affinity of substances for each other, also to many other properties which are at present regarded as mysteries. It may also be employed in its perfected state, to find the composition of a regularly formed substance without the aid of chemical analysis, by having the specific gravity of its vapour, boiling point, its own specific gravity, and its chemical properties given. This may appear ideal, and strange to many, and perhaps doubted; this however will not alter its truth, as the nature of the law is such, that its chemical composition is dependent upon the specific gravity of its vapor, boiling point, &c. The results which the application of this law gives, are recorded, and its truth may be seen by any one, who will take the trouble to examine it, Even in its infancy as it is now, it may be employed to approximately calculate the specific gravity and boiling points of substances whose chemical properties are known. It is a subject therefore which admits of proof, and although many may consider it unworthy of examination, yet it is capable of standing by the results it produces, whoever may assail it.

Bridgeport, Conn. S. N.

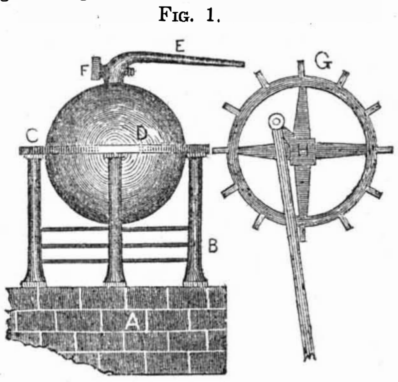
For the Scientific American.

History of the Rotary Engine.

In commencing a history of the Rotary Engine, we must first state, that it is not owing to rotary motion, " in the adaptation and arrangement of machinery," that the moderns excel the ancients, as has been asserted by an eminent author. The first steam engine of which we have any record was a rotary one—therefore in point of primogeniture the rotary steam engine is the father of the family.—The early history of steam is involved in much obscurity, but the first individual on record who applied it to produce any effect was Hero, the elder, who lived in Alexandria, in Egypt, 130 years before the Christian era.—Hero's engine was propelled by steam from a kettle, and motion was produced in the same manner as water propels the well known Barker's Mill. During the dark ages which succeeded the overthrow of Greece and Rome by the Goths and Vandals, all was indeed dark in practical mechanics. Six hundred and seventy years elapsed, after Hero made his rotary engine, before any other attempt was made to apply steam to useful purposes. In 1560 an engine similar to Hero's was proposed by Mathesius of Leipsic, to propel a turnspit. It was not, however, until 1615, that particular attention was directed to the steam engine. In that year a famous French engineer named De Caus, published a work with a drawing exhibiting the application of steam to propel machinery. De Caus also knew that a vacuum could be produced by condensing steam, but he never applied it to any useful purpose.

In 1629 Giovanni Branca, a mathematician at Rome, published an account and the following drawing of his steam engine.

FIG. 1.



BRANCA'S ENGINE.

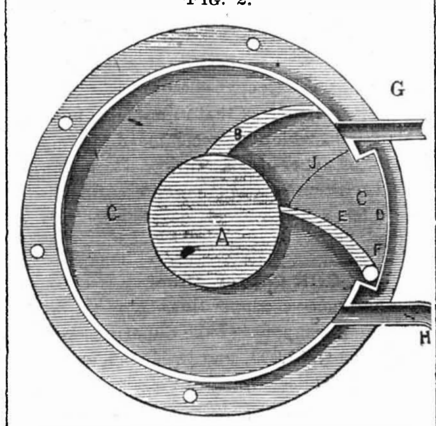
A, is the boiler platform. B, is the fire grate. C, is a frame to secure the boiler D. E, is the steam pipe provided with a stop cock F. G, is a wheel furnished with vanes, and H, is a crank secured to a connecting rod. The steam that was generated in the boiler was ejected against the vanes of the wheel, and thus operated the crank and connecting rod to propel other machinery. It is needless to notice the defects of this engine—it was not equal to that of Hero's, but it shews the modern state of the steam engine in 1629 only two hundred and nineteen years ago.

In 1663 appeared the famous " century " of inventions by the ingenious Marquis of Worcester, and he describes his steam engine, which however was not a rotary, but simply to fill a cistern with water by steam.

The first patent that was secured for a rotary engine, was that of James Watt, the famous engineer. This was in 1769. There is no drawing accompanying the first specification, which is very complex. The invention was a poor one, and the great inventor laid it entirely aside. There can be no doubt but it was very ingenious as described by Mr. Farey, in Ree's Encyclopedia, but taking it altogether it was a failure.

In 1782 he secured another patent for a rotary engine, of which the following is an engraving, and which has been brought forward within a few years as a new invention.

FIG. 2.



JAMES WATT'S ENGINE.

C C, is a cylinder about 3 feet in diameter and 1 foot deep. A, is an axle passing through stuffing boxes in each lid or end of the cylinder. B, is a piston which is nicely ground to fit in the cylinder, and fixed to the axle. E, is a curved flap valve. which turns upon a pivot F. The concave side of it, is a segment of a circle of the same radius with the cylinder and extending through its whole length, and when shut back into the cavity D, becomes as it were a part of the cylinder. G, is the steam pipe, and H the exhaust pipe. Steam being admitted from the boiler through G, presses equally upon E and B, (let inventors of the rotary engine look at this) but E being stopt against the axle, the piston B recedes or moves by the pressure and turns the axle A. The piston then continues the motion until it comes in contact with the concave side of the valve, which is kept to the axle by a lever or spring L, working through a small stuffing box. At this point then the momentum of the axle, on the other end of which was a fly wheel, was required to drive back the flap valve, at least a great part of the momentum. The valve was then driven into its recess D, and when the piston had passed G, it received again the action of the steam—the valve springing back to the axle. This plan was never carried into effectual operation, nor could it. The violent working of the valve was enough to condemn it, and as he used packing in his piston, it was torn away in passing over the steam pipe. He used no cut off, and therefore there was a great loss of steam, but we must say, that this is the only point of difference between it and a *new* one that we have examined not long ago, and which would have saved the inventor much time and money had he been acquainted with the many different kinds of rotary engines that had previously been brought before the world.

All living inventors and patentees of rotary engines, who are desirous of having their invention's included in this history, should embrace this opportunity, Neat drawings will be required. We have collected a mass of drawings on this subject, and this will be the only single and best history of the rotary engine ever published.

Test for the purity of Magnesia.

The common magnesia of the shops (which is a carbonate) is frequently adulterated with chalk; this may be detected by adding a little diluted sulphuric acid, which, with magnesia forms a very soluble salt, but with lime, a very insoluble one. Pure magnesia (called calcined magnesia, in the shops) dissolves in diluted sulphuric acid entirely, and without effervescence.

By the last news a case of cholera had appeared in London. The free use of spices and a generous diet was recommended.

Analyses of Milk.

The chief component parts of milk are those, which, when separated, are known as forming butter and cheese; the residue of which is called whey. These are distinguished by scientific persons as the *butyraceous*, or oily substance producing cream, of which butter is composed; the *caseous* matter, of which cheese is formed, and *serum* or whey:

Cream forming	:	4.5 parts of 100.
Chease	: : :	3 5 do
Whey	: : :	92.0 do

This can only convey a general idea of the component parts, for they must necessarily vary according to the quality of milk.

The analysis of skimmed cows' milk is stated by chemists to be:

Water : : : :	918 75 of 1000
Cheese, with a trace of butter	38.00
Sugar of Milk : : :	35.00
Muriate of potash : :	1.70
Phosphate of potash : :	0.25
Lactic acid with acetate of potash	6.00
Earthy phosphates : :	0.30

Instruments have been invented, called lactometers, for ascertaining the richness of milk in nearly the same manner as that employed for trying the strength of spirits. The difference in the quality of milk between particular cows may thus be determined, but it does not show whether the caseous or butyraceous matter predominates.

Zinc.

Zinc forms the link between the brittle and the malleable metals. It is a modern discovery that at a temperature of from 210° to 400° of Fahrenheit, it yields to the hammer and may be drawn into wire, or extend into sheets. At a very elevated temperature it may be pulverized, and, when in fusion, be minutely divided, by pouring it into water. In filings or small particles, it is used to produce those brilliant stars and spangles which are seen in the best artificial fire works.