Correspondence.

Harmony of the Planetary System.

To the Editor of the Scientific American:

Allow me to remark that the so-called new harmonic law existing between the planetary distances and motions, published "to the world" in your issue of March 21, 1874, page 131, by Mr. Alfred Luther, as superior to Kepler's third law, is only a deduction from the same, as is easily proved by expressing it in a formula.

The rule given by Mr. A. Luther is this: "The square root of the quotient arising from dividing the distance of any exterior planet by the distance of any interior planet, multiplied by the velocity of the exterior planet, shall equal the velocity of the interior planet." Calling the distances D and d and the velocities V and v, then the formula corresponding to the rule is this: $\sqrt{D \div d} \times V = v$. From this we deduce successively

$$\sqrt{\frac{D}{d}} = \frac{v}{V}, \text{ or, by squaring, } \frac{D}{d} = \frac{v^2}{V^2},$$

giving the proportion $D : d :: v^2 : V^2$, which means that the distances are inversely proportional to the squares of the velocities.

According to Kepler's third law we have (calling the times of revolution R and r) $R^2 : r^2 :: D^3 : d^3$, or, by extracting the square root, $R : r :: \sqrt{D^3} : \sqrt{d^3}$ .... (1).

As the time of revolution is, for equal velocities, in the ratio of the distances, and for equal distances in the inverse ratio of the velocities, we have $R : r :: D \div V : d \div v$ ...... 2)

By combining the proportions (1) and (2), we obtain

$$D \div V : d \div v :: \sqrt{D^3} : \sqrt{d^3}. \text{ Multiply with}$$

$V : v :: V : v$; we obtain $D : d :: V\sqrt{D^3} : v\sqrt{d^3}$, or

$$D : d :: \sqrt{V^2 D^3} : \sqrt{v^2 d^3}.$$

Squaring this equation, to eliminate the root sign, we have: $D^2 : d^2 :: V^2 D^3 : v^2 d^3$, a deduction from Kepler's third law, in which velocity is substituted for time of revolution. Dividing this proportion by $D^2 : d^2 :: D^2 : d^2$, we have $1 : 1 :: V^2 D : v^2 d$. Hence $V^2 D = v^2 d$, or $D : d :: v^2 : V^2$, showing that the statement that the distances are inversely proportional to the squares of the velocities is nothing but one of the disguises in which it is possible to clothe Kepler's third law. From this proportion, it follows directly that:

$$V^2 = \frac{D \times V^2}{d} \text{ and } V = \sqrt{\frac{D}{d}} \times V^2,$$

which is the identical formula expressing the rule given by Mr. A. Luther.

P. H. VANDER WEYDE, M.D.

New York city.

Calming the Sea by Means of Oil.

To the Editor of the Scientific American:

I have a suggestion to make which may be of much importance to navigation in steamers. Although I have never tried my plan on so large a scale as is now proposed, I have tried it successfully on a small scale. It is simply to use oil in subduing or mitigating the force of the breaking wave. Some seventeen years ago, I fitted out a small iron steamer to go to the La Plata. She was of light construction and shallow draft of water, and was temporarily rigged as a three masted schooner. Her paddle wheels, *minus* one half the buckets, were shipped and lashed; the deck or covering of the guards was omitted, so that nothing save the iron arms of the wheels and the supports of the guards, also of iron, remained to interfere with the sailing qualities of the vessel. She left Boston about January 12, and arrived in the La Plata in sixty days, during which time the floats were occasionally shipped in full to carry her over calm spots. She had a keel put on with tap bolts, so contrived as to be taken off on arrival without docking, if required. Considering the stormy season of the year, and ignoring the fact that her officers and crew might more reasonably expect to be hanged rather than drowned, I made every provision for her safety; and among these, I lashed a half barrel of oil on the tafril rail and one on each side, and ordered the captain to allow a little to escape from the first in scudding, and a little from the one on the weather side in laying to. She had some rough weather on the coast and in the Gulf, and this afforded ample opportunity to test the calming effect of oil poured upon the waters. It answered the purpose admirably, no sea ever breaking on board.

Now let me suppose a large cask of oil, stowed securely some ten feet, more or less, above the water line, on deck or under deck in an ocean steamer; attach to this a suitable hose of vulcanized rubber, with a small orifice, perhaps half an inch, and let this be fitted to rig out by means of a spar something like the bowsprit of a cutter; have it fitted with guys and topping lift, and shove it out ahead thirty to fifty feet; to the hose attach a cock, to be under command of the officer of the deck, and let him discharge oil on the water whenever he sees a wave coming. Steamers going head to a heavy sea, as is well understood, must reduce their speed materially and thus consume much time, or run the risk of getting heavy seas on board. Keen competition and the demand for rapid runs cause the risk to be frequently incurred, and we hear of serious disasters every day. While I do not imagine that pouring oil on the troubled waters would keep absolutely dry the forecastle of a powerful steamer going head to a gale, I do religiously believe that it would do much to keep down the crest of a breaking wave, and that it would enable steamers to go directly against the sea, when, without the oil, they might be compelled to take the sea "on the shoulder." No one ever heard of a whaler with blubber about decks being boarded by a sea.

It would be certainly effective when the steamer is obliged to slow down to three or four knots, and also when laying to for repairs or cooling off bearings.

For light ships riding in exposed places, such as Nantucket South Shoal, Sandy Hook, and many other localities, the oil would be very satisfactory.

The only question in my mind is whether at high speed (for a gale and large sea), say nine or ten knots, the oil could be dropped far enough ahead to have the desired effect. The experiment can be tried very easily and at no great cost, by squirting out oil by a force pump, and if it should prove successful a more economical plan can be adopted. The idea will, by some who have never thrown grease over in scudding off the Cape, be deemed somewhat Quixotic, and it may be derided by some old salts who think they have nothing to learn. Let these go down to the Jersey coast and run a lifeboat off or on through a sharp surf, and they, being supplied with a bucket of oil, can be convinced of its efficacy in keeping the sea from breaking.

Milton, Mass. R. B. FORBES.

The Greatest Mine in the World—Ten Millions and a Half in One Year.

The Belcher gold and silver mine in the Comstock lode, Nevada, is without doubt the greatest bullion-producing mine in the world. It has produced in the last two and a half years the immense sum of $16,772,965. In 1873 it produced $10,779,171 and paid out as dividends $6,760,000 during the year, a large surplus being carried forward. By adding the dividends under the old organization and deducting the assessments levied, we have the following results up to March, 1874:

Dividends, June 1864 to May 1865 inclusive	$ 421,200
" to 1872	2,184,000
" " 1873	6,670,000
" in Jan. and Feb. 1874	1,040,000
Total dividends	$10,405,200
Assessments Dec. 1865 to April 1871	660,400
Stockholders' profits	$ 9,744,800

The cost of crushing the ore was $12.10, and the cost of mining was $8.51 per tun; total $20.61. The number of tuns worked in 1873 was 154,664; the total receipts of bullion in 1873 were $10,779,171.07; the average yield per tun in 1873 was $69.69.

The bullion statement is as follows, from the stamped value of bullion as per assay certificates: Value in gold, $5,725,247.50; value in silver, $5,009,520.51; assay grains, $44,403.06; total, $10,779,171.07. Number of ounces of refined bullion, 4,173,535·74-100. Average fineness of gold, 66½ thousandths; average fineness in silver, 0·929 thousandths. Value per ounce in gold, $1.37 19-100; value per ounce in silver, $1.20 2-100. Value of bullion per ounce, $2.57 21-100; average value per tun in gold, $37.16; average value in silver, $32.53; total value per tun, 69.69. This statement will appear strange to those who suppose the Comstock lode produces nothing but silver, as it shows that in this, the greatest producing line on the lode, the gold predominated.

This mine has no parallel in the world, the Crown Point, adjoining it, being the only one approaching it in richness. The mine produced in two and a half years nearly seventeen millions of dollars, and since its opening has paid nearly ten millions of dollars as dividends above all assessments. The success of this and the Crown Point has encouraged mine owners on the whole Comstock to pursue developments at greater depths. The circumstances connected with the development of the Belcher into a first class mine furnish an example for other mines in similar circumstances. After their ore gave out, they worked systematically and uninterruptedly until they developed the largest ledge ever opened in any mine in the world.—*Scientific and Mining Press.*

Pacific Ocean Deep Sea Soundings.

At a recent meeting of the California Academy of Sciences, Professor Davidson announced some of the results of the soundings made by Captain George T. Belknap, of the United States steamer Tuscarora, during last year, with reference to the projected laying of a telegraphic cable from this coast to Japan. This work had accomplished a remarkable development of the depths of the Pacific Ocean, which had no parallel in the plateaus of the Atlantic. The Tuscarora first started in her line of soundings from the entrance to the Straits of Fuca, across that portion of the North Pacific designated as the Gulf of Alaska, toward the Asiatic coast. After leaving the entrance to the straits, the bottom slopes gradually to a depth of 100 fathoms, and then a sudden descent occurs, which reaches a depth of 1,400 fathoms, at a distance of 150 miles from the coast. The temperature of the water at the greatest depth on this line of survey was 34 degrees.

Commander Belknap then returned, prosecuting off and on soundings all along the coast to the entrance of San Francisco Bay. This work determined the fact that the sudden descent at the bottom of the Pacific to a great depth is continuous down the entire coast, varying from twenty to seventy miles out. In the latitude of San Francisco Bay, the great bench is reached a short distance off the Farallones, where the bottom suddenly descends to a depth of two miles. Off Cape Foulweather, the bottom descends precipitately from 400 fathoms to a depth of 1,500 fathoms, and then the plateau continues westward for hundreds of miles, and comparatively as level as a billiard table. Off Cape Mendocino, where shoals have been erroneously supposed to exist, from the seaward jutting of the mountains, a depth of 2,200 fathoms is reached eighty miles from the shore. Thirty miles off the Golden Gate, the bottom is reached at 100 fathoms; at 55 miles, it has descended to 1,700 fathoms; and 100 miles out, the enormous depth of 2,548 fathoms has been measured without reaching bottom.

Improved Shifting Engine.

A new improvement on the shifting engines on the Pennsylvania Railroad has been introduced, which is in great favor with those running them, and fully meets the expectations of the company, at whose shops in Altoona they were constructed. The ordinary tankless "dinkey" has to be supplied three times a day with coal and water, while enough fuel can be stored in the tank of the improved engine to last three days, and water enough to supply the necessary steam for a day and a half. The engine is also supplied with the steam bell, an invention perfected at the shops of the Pennsylvania Railroad Company. By pulling an apparatus in the cab by the engineer, the bell rings and continues to do so until he pushes it back to its natural position. The tank of the tender connected with the engine has a capacity of 1,200 gallons of water and about three tuns of coal. The engineer is also enabled from his position to see the brakeman while coupling, which has a tendency to diminish accidents.—*American Railroad Journal.*

Tunnels.

The completion of the Hoosac tunnel and the rapid progress of the Sutro have caused the miners both in the East and in the West to look with interest upon what has been and is projected in connection with tunnel driving. It is in Germany, says the *Mining Journal*, that the great tunnels have been constructed, and these have been made exclusively for mining. There is the great tunnel at Freiberg, twenty-four miles long; the Ernst-August and the Georg at Clausthal, thirteen and a half and ten and three quarters miles respectively; the Joseph II. at Schemnitz, nine and a quarter miles; the Rotschonberg at Freiberg, eight miles; the Mont Cenis, seven and a half miles, which about completes the European list. In the United States we have the Hoosac, in Massachusetts, five miles long; the Sutro, in Nevada, for opening up the celebrated Comstock lode: this tunnel, although only four miles long, will, with its ramifications to the various mines of the district, prove one of the most important in America: the Sierra Madre tunnel at Black Hawk, commenced during the present year, and which will be twelve miles long, as well as San Carlos and Union Pacific tunnels, which are under two and a half miles. The Ernst-August tunnel was driven at the rate of a mile per annum, and it will be interesting to notice how long it will take the Americans, with all the approved appliances at present at command, to complete the nearly similar Sierra Madre tunnel.

The New Geyser Basin.

That a new and most important geyser basin has been discovered in Eastern Montana, seems now unquestionable. It was visited last fall by the well known mountaineers Jack Baronett, John Dunn and John Allen. It is represented as much more extensive than any of the already explored basins, and to contain geysers of much greater force and volume than any yet described by tourists. One of these newly discovered geysers is estimated to throw a volume of water forty feet in diameter over five hundred feet high, and to continue in eruption from ten to fifteen minutes. It is also reported that in this newly discovered basin there are "mud volcanoes" far surpassing in volume and eruptive force those on the Upper Yellowstone. This unexplored spot of the most wonderful of all our natural wonders is about twenty-five miles southeast of the summit of Mount Washburn, from which point the greater geysers, when in action, when the air is clear, are visible to the naked eye.—*Avant Courier.*

IN a recent article upon "Swindling Patent Sellers," allusion was made to a concern styled the Western Michigan Patent Agency, formerly of Albion, Mich. Messrs. G. L. Jocelyn & Co., of Grand Rapids, proprietors of an establishment at that place entitled "Western Michigan Patent and General Collection Agency," write to us, requesting that our readers may not confound their enterprize with any of the swindling concerns intended to be exposed by our article. The similarity in name, they fear, may lead to misapprehension, and they wish it understood that theirs is an honest and reliable concern, in proof of which they send us certificates from leading citizens of Grand Rapids. These documents speak well of the personal and business merits of the Messrs. Jocelyn, and indicate that they are engaged in a useful line of operations. Individuals who can so fully command the confidence of their fellow citizens as do these gentlemen have, we think, little reason to fear that the public will couple them with the professional cheats against whom our former article was especially directed.

OBJECT FOR THE POLARISCOPE.—Rev. William Law informs the *English Mechanic* that the following are two of the finest subjects for the polariscope which animal tissues can supply: Thin slices of the upper part of a pig's claw, cut transversely, and of the paw of the polar bear. Both are indescribably beautiful. They are, when cut, dropped into strong spirits of turpentine and mounted in Canada balsam. The bristles of the hedgehog also form very beautiful objects for the polariscope.

THE OPTIC NERVE.—By a microscope examination of the retina and optic nerve and the brain, M. Bauer found them to consist of globules of $\frac{1}{2800}$ to $\frac{1}{4000}$ of an inch in diameter, united by a transparent viscid and coagulable gelatinous fluid.—*E. Lovett.*

Loiseau's Artificial Fuel Manufacture.

Mr. Emile T. Loiseau, of Mauch Chunk, Pa., the inventor of a very complete and, we believe, efficient process for the manufacture of artificial fuel out of coal waste (which, it will be remembered, was not long ago illustrated and described in these columns), has recently obtained five patents through this office which cover the essential points of his improved machinery and system.

Mr. Loiseau, we also notice, has lately delivered an excellent and able lecture on the subject of "Artificial Fuel" before the Franklin Institute in Philadelphia, which has been printed in the Journal of that association. The subject has created considerable interest among those practical coal miners and owners of mines who realize the important problem of utilizing the immense quantities of coal dust which now cumber the ground in the vicinity of our mines.

The first of the patents above referred to relates to the entire process of manipulating coal waste to convert it into a convenient fuel form by first mixing it with clay, then molding into blocks, drying, and finally applying a waterproof coating. Mixing and molding separately is the subject of a second patent, which covers machinery used to combine the coal dust with clay and lime water in suitable proportions, introducing it into a pug mill in a plastic state, and then delivering it to compressing cylinders in a broad sheet. Within the cylinders, it is divided and pressed into blocks or lumps convenient for use and passed to an apron to be dried and further prepared for use. The mixing apparatus, consisting of a tub in which are a number of arms and shafts constituting a movable spider in combination with a stationary one, is made the subject of a third patent. The various arms in this machine are so arranged that they revolve without interfering with each other, while every portion of the material is submitted to their action. The fourth patent refers to the drying oven in which are a number of belts arranged one above the other, and connected by a system of gearing to carry the material back and forth and finally deliver it near the bottom. The belts are strengthened by ropes which carry a series of metal balls which engage in recesses in drums, serving as cogs to propel the belts.

The last patent covers the waterproofing device, by means of which the fuel is coated with a material which renders it impervious to moisture. The machine has an endless belt which dips in a tank, and is guided therein by balls entering suitably inclined grooves. The lumps delivered on the apron are carried through the liquid and are thus covered with a waterproof covering which dries upon exposure to the air.

Mr. Loiseau has also obtained foreign patents on his inventions, and parties interested in mines at home or abroad are invited by the inventor to examine into his system of utilizing what is now a waste substance.

The experimental trials, conducted some time ago to test the heating powers of the product, indicated a very fair rate of power, and considerable cohesion. These qualities were fully tested at the exhibition of the American Institute, and with very favorable results. As to the important question of cost, the inventor states that the article can be manufactured for about one dollar per tun.

The Early Education of Children.

In a lecture, Professor Walter H. Smith, of Boston, Mass., said that the want of accuracy in children should be no source of sorrow. He considered it more desirable that they should be dull and stupid at first, that their process of education might be more gradual and thorough. A rapid development should be checked rather than encouraged. One plan of instruction which was followed with success was a course of study of lines and forms, requiring the pupils to draw from description and dictation. Simple forms and objects should be selected first; and when the pupils are sufficiently advanced, more difficult and complex forms could be substituted, each step being so gradual that no perceptible improvement is shown at the time, but which, when looked upon afterward, will denote rapid progress. This plan, he said, insured perfect attention on the part of the pupil, and developed an absorbing interest in the work.

New Process for Iron Making.

F. W. Gerhard has completed a new process which is attracting considerable notice. The invention consists in the manufacture of puddled iron direct from the ore, the use of the blast furnace being dispensed with. Instead of using pig iron, Gerhard uses a compound which he calls "iron coke," and which consists of a mixture of ore (or any substance containing iron), the necessary fluxes, and the equivalent of carbon. A lump of this compound is put into the furnace, and by the single process known to the puddler as "balling," a "heat" may be obtained in considerably less time and with considerably less labor than under the old method; the process of "melting" and "boiling" being entirely dispensed with. The most important feature of the invention is the great saving which it effects in fuel. Bell estimates that 5½ tuns of coal are required to produce a single tun of bar iron, but Bennett Aitkins puts the amount at six tuns seven hundredweight. Taking the average at six tuns, it may be reckoned that two tuns are consumed in the blast furnace, and the remaining four tuns in the finished iron works. The protoxide of iron containing 77·78 per cent requires 21·43 of carbon. The magnetic oxide containing 72·41 per cent requires 32·17 of carbon. Admitting that the three descriptions of iron ores were employed in the making of cast iron, by the new process, then 30 lbs. of carbon would suffice to produce 100 lbs. of cast iron; or a tun of iron, weighing 2,400 lbs., would require 750 lbs. carbon, a saving of 3,760 lbs. carbon as compared with the ordinary method. It is obvious that when heavy pieces of solid pig iron are placed in a puddling furnace to be melted, the greater portion of heat is wasted, and after it is liquefied a much longer time is required to eliminate the carbon which it contains and other extraneous elements of which it is composed, with a continuation of an immense waste of fuel. On the contrary, when the "iron coke" is thrown into the heated furnace, the carbon which it contains immediately acts upon the oxygen contained in the ore. Even the Barrow hematite—one of the most refractory of ores—is ready for "balling" with a much less expenditure, of time, labor, and fuel, than by the old process. These statements have been abundantly verified by experiments made in the presence of practical ironmasters and ironworkers, who speak very highly of the merits and importance of the invention.

Launch of the Cable Ship Faraday.

The new cable steamship Faraday, which has been built by Messrs. C. Mitchell & Co., Newcastle, England, for the Messrs. Siemens Brothers, for the purpose of laying their Atlantic cable, was launched on the 17th of February last.

The vessel has been built to the order of Messrs. Siemens Brothers, London, for the purpose of laying their Atlantic cables, and in every requisite the ship is certainly one of the most perfect of its kind. The steamer is 360 feet long, 52 feet beam and 36 feet deep. Her gross register tunnage is about 5,000, and her dead carrying weight about 6,000 tuns. The iron hull, built under the inspection of Lloyds' agents, will be accorded the highest certificate of classification. From her peculiar structure, the vessel receives enormous strength, in addition to the usual requirements of Lloyds' rules. Supporting the sides of the vessel are three enormous cable tanks, constructed of plate iron, and forming a series of double arches. These are united together, and attached to the general fabric of the vessel by five iron decks. For the comfort and convenience of those on board, the upper and main decks are supplemented by the usual decks of wood. The Faraday is double bottomed, and in the space below the two bottoms is a net work of iron girders for carrying the cable tanks, and these give also a longitudinal strength to that portion of the hull. Water ballast is also carried in this space, by which the ship may be trimmed as the paying out of the cable is carried on. This arrangement has likewise the advantage of dispensing with cargo or other dead weight beyond fuel. For the purpose of filling and emptying single compartments of the double bottom, or for flooding any one of the cable tanks, a complete and well devised system of valves, cocks, pipes, and auxiliary engine power has been introduced; and the system, which is worked from the engine room, is under the control of the engineer. The bow and stern of the vessel are of the same form, and in this respect she is unlike other vessels in outward appearance. Rudders are provided at each end, and she can thus be navigated ahead or astern, as may be desired when paying out or picking up a cable. Each rudder, to provide against accident, is supplied with strong screw steering gear, worked in the usual manner by manual power, and the steering is accomplished by means of a steam engine placed amidships. Harfield's steam windlass works the anchors and cable chains, and steam apparatus, placed in various positions along the deck, performs all the heavy labor about the vessel. The rigging is after the most approved manner of ocean steamers, and accommodation is provided of the most complete nature, for the large staff of officers, electricians and crew, numbering about 150 persons. In addition to the multifarious appliances of a cable ship, the vessel will be fitted up with all the cabins and appliances of a large passenger steamer, and will be propelled by machinery of the compound, surface-condensing principle, which has been constructed by Messrs. T. Clark & Co., of Newcastle. To obtain increased steering or manœuvring power—an important condition in cable laying—the steamer will be provided with two propellers, commonly termed "twin screws," which will be worked by two separate sets of engines, placed vertically over the shaft, each with two cylinders, one at high and the other at low pressure. By this means great regularity of motion will be obtained, and by a high degree of expansion, in working the system, fuel will be greatly economized, to an extent that would have been considered impracticable a few years ago. The deck machinery for the paying out of the cable is being manufactured by the Vulcan Foundery Company, who are experienced in this branch of work. It is needless to say that the Faraday has been called after the great English chemist and natural philosopher of that name.

English and American Railways.

The London *Railway News* has some interesting comparisons of English and American railway returns, and in the matter of rolling stock and train earnings is surprised to find the American roads more economically run than the English. Taking four roads in each country, aggregating about 4,000 miles, it is found that the American road has only 0·33 of a locomotive and 6·72 freight cars per mile, while the English has 0·93 of a locomotive and 28·83 cars. The New York Central, with a heavier traffic than the London and Northwestern, has half the locomotive per mile. The English refuse to believe that the superior size and strength of American locomotives account fully for this difference. The earnings, for instance, of an American locomotive are 70 per cent more than those of an English, and the entire rolling stock, which in England barely pays for itself in a year, in this country pays for itself and 65 per cent more. The *News* also discovers that, while passenger fares are 30 per cent lower than in England, the earnings per train here are 4 per cent more, and on freight trains 15 per cent more, than on the English roads.

Pipe Way Transportation.

Pipe way transportation is coming into favor in the oil regions of Pennsylvania, to carry petroleum from the wells to stations on the railway. The longest pipe way is 15 miles, overcoming 400 feet of elevation by steam pressure at the entrance to the tube. This system of transportation is so independent of weather and bad roads, and so preventive of leakage, and gives such thorough satisfaction without any drawbacks, that public attention is directed to many other practical applications of the same system.

Twenty-five years ago, on the national road between Cumberland and the bituminous coal field beyond, we saw a small rivulet turned to similar account in the cheap transportation of coal. A zigzag, ½ inch board flume followed the tortuous course of the petty stream and carried 6 inches depth of water and 12 inches surface. A dam collected water enough to make two runs of coal a day. Each run bore in its current 30 tuns of coal, fed from a chute with a rake. The distance is under 5 miles; the fall was at least 20 feet to the mile. The coal floated along with ease, carrying with it chunks of slate and conglomerate rock. There were chutes for its reception on the turnpike. These had screens, over which the coal passed, being perfectly cleansed and polished before entering. All day long wagons were self-loading under these chutes. The cost of transportation over the water way was merely nominal. It was an easy step for invention to suggest pipe ways for similar transportation of fluids, and for mails and packages, by pressure of condensed air, as now used in London.

It is not generally known that, in France, the pipe way system has been used for ten years past in transporting beet juice from the field to the sugaries. The sugaries at Cambria work up annually 246,000 tuns of beets; they are supplied with beet juice through 62 miles of pipe, now being extended to 100 miles, in many ramifications.

At points central to cultivation, works are erected for rasping beets and expressing juice. Milk of lime is immediately added to prevent decomposition; and after inspection and measurement, the saccharine stream is turned into the pipe way and delivered at the terminal sugaries, the long contact with lime and the thorough agitation purifying the juice more perfectly than usual. It is estimated that, during 1874, there will be a total length of such pipe ways of 560 miles, doing service between the scattered beet fields and the condensed sugar works of France.

The pipes are placed two feet eight inches below the surface, and steam engines compress the air as desired. All degrees of elevation are thus surmounted. The juice has a gravity of one degree Baumé on entering, and the same when discharged.

This pipe way system so economizes sugar making that it wonderfully multiplies the sugaries. No investment excels that concerned in this production. Farmers find it far better than other crops. Pipe way stocks are in high favor, and sugaries pay best of all.

If new industries are needful to the future progress of California, here is one that should be considered. It offers a wide field for expansion, without risk of oversupplies; and if the right soil be selected, the crop is sure, and the profits of sugar-making are more than usually reliable.—*Mining and Scientific Press.*

Norwegian Antiquities.

At a recent meeting of the California Academy of Sciences, R. E. C. Stearns read an interesting translation from the reports of the Society for the Preservation of the Norwegian Antiquities. It described the excavation of an ancient vessel, of the Viking period, found in the parish of Tane, Norway. It was the custom of the Vikings to convert one of their vessels into a sarcophagus, on the death of a great warrior. The vessel was conveyed inland, the remains of the hero deposited in the hull, with his armor, weapons, the bones of his war chargers, and the whole covered with earth. These tumuli have been discovered and excavated in various parts of Norway, and the peculiarities of ancient marine architecture exposed for inspection.

Good Work in Canada.

Mr. A. Davis, of Belleville station, on the Grand Trunk Railway of Canada, forwards us a list of twenty-one subscribers, obtained among the 132 workmen under his charge. This is an excellent showing both for our correspondent and his men, as it indicates on his part a desire to benefit those in his employ, by placing within their reach information of practical value in their callings, while the workmen themselves exhibit good sense and intelligence in availing themselves of the advantages offered.

Mr. Davis tells us that more names are yet to come, and adds: "I take much pains in having my men first class." We think, from the fact of his obtaining so many subscribers out of the comparatively small number of men under him, that Mr. Davis supports his claim for the good qualities of his men.

PRESERVATION OF WOODEN LABELS.—The following method of preserving wooden labels that are to be used on trees or in exposed places is recommended: Thoroughly soak the pieces of wood in a strong solution of sulphate of iron; then lay them, after they are dry, in lime water. This causes the formation of sulphate of lime, a very insoluble salt, in the wood. The rapid destruction of the labels by the weather is thus prevented. Bast, mats, twine, and other substances used in tying or covering up trees and plants when treated in the same manner, are similarly preserved. At a recent meeting of a horticultural society in Berlin wooden labels, thus treated, were shown, which had been constantly exposed to the weather during two years without being affected thereby.