MISCELLANEOUS.

(For the Scientific American.)

Heliochromy.

Having seen nothing on the subject of Heliochromy, in your columns, since my former communication, I now present you another on the same subject, which will I hope stimulate artists, and those fond of scientific experiment, to further discovery; I propose briefly to discuss the action of light on the chloridated plate, and to give you the results of a few experiments on it. It is well known to chemists that light produces little or no change on perfectly pure chloride of silver, but that it is rapidly blackened if organic matter be present, and that this organic matter is generally found in the water with which it has been washed, or in the solution from which it has been precipitated. When the chloridated plate is exposed to light, this organic matter is decomposed, oxygen being eliminated, and the free nascent hydrogen reduces the chloride to a metallic condition, and an opposite state of electrical excitement is induced.

Now M. Becquerel and Niepce de St. Victor have proved that if chloride of silver containing a slight trace of copper be exposed to the prismatic spectrum, or to rays of different colors, while undergoing this reduction, it is susceptible of coloration after a protracted exposure. From this it would seem that this process might be much accelerated, if we were careful to aid nature in her operations, instead of trying mere hap hazard experiments, not based on rational theory. I will show by a few experiments that this may be done, and to avoid being too prolix, will, at present, speak of the chloridated silver plate, unaccelerated by iodine, bromine, fluorine, chrome, or their compounds.

If the plate, covered with the enamelled chloride of silver prepared by Niepce's process, be exposed to a current of hydrogen while receiving the image, the process will be much accelerated, and the image will be impressed in from half an hour to an hour; according to the amount of gas passed into the camera, the light, temperature, electric state of the atmosphere, &c., instead of requiring from three to five hours, as in the original process, and the colors of the picture will be impressed on the plate in all their original beauty. This experiment may be very easily performed, it only requiring a few grains of zinc in a small vial, containing dilute sulphuric acid. The vial and its contents may be placed in the camera, and the hydrogen being nascent is in its most active state, and as it is perfectly transparent, it permits the light to act on the plate, while it is itself engaged in reducing the chloride, which it is only capable of doing in sunlight.

The hydrogen, probably from its affinity for oxygen, hastens the decomposition of the organic matter, and assists in reducing the chloride, thus acting as a deoxydating and dechloridating agent. There is, however, sufficient hydrogen contained in the combined organic matter, to effect the reduction of the chloride, hence it is probable that the excess merely hastens the decomposition.

Following this train of investigation, I have tried many other reducing agents both liquid and gaseous. The most important liquid agents tried have been, the proto sulphate and nitrate of iron, ferocyanide of potassium, protochloride of tin, and the fluorides of potassium and sodium. The principal gaseous agents tried are hydrogen alone and in combination with carbon and sulphur, ammonia, sulphuric ether in vapor, chloroform vapor, sulphuret of carbon, chloride of sulphur, hydro-sulphuret of ammonia, and sulphurous acid. As very remarkable results followed from the application of the gases, I will speak of them more particularly. Sulphurous acid has a strong tendency to abstract oxygen from organic bodies, it also unites with chlorine in sunlight, and so do light and heavy carburetted hydrogen, the latter, indeed, without the influence of light. Sulphurous acid abstracts oxygen from organic bodies, with which it combines, forming sulphuric acid, and sulphuric acid renders chloride of silver unchangeable to light by destroying the organic matter with which it is combined. I hence inferred that it might be used for the double purpose of reducing and fixing the picture. That it is a powerful accelerator is certain, the fixing requires further experiment. Pictures may be obtained with this gas in half an hour, by passing it nascent and in sufficient quantity in the camera and the colors are preserved. There is, however, sometimes a little sulphur deposited under the enamel, which gives the light parts of the picture a yellowish cast. This color may sometimes be removed by heating the plate. Carburetted hydrogen acts still quicker, probably from the free carbon which results from its decomposition being a powerful reducing agent, and as the carbon is not left under the enamel it probably passes off under the form of the volatile chloride of carbon. I obtained one picture in five minutes, by passing into the camera the gases generated from the distilling alcohol and sulphuric acid in a retort. The gases formed were olefiant gas and sulphurous acid, mixed with a little light carburetted hydrogen and sulphuric ether. The colors were very fairly represented, but not as good as I had previously obtained; I considered this experiment as very encouraging, but having only lately tried it, have not repeated it by itself without the agency of electricity.

As electricity is a powerful agent in decomposing chemical compounds, it might be naturally inferred that it would aid in this process. I have often tried it but without, until lately, any very important results. Dry chloride of silver is not decomposed by electricity, yet its decomposition by light, and other agents, may by it be much accelerated, and I did not at first use a sufficiently powerful current. I now render the plate a part of the conducting medium which terminates at the positive pole, and terminate the poles in water, to which some saline constitutent has been added, and by the decomposition of the water am enabled to judge of the power of the current. By using the gases at the same time that the plate is thus excited, I have been enabled to take pictures in from four to five minutes, which would otherwise require from three to five hours for their production. These pictures are developed under a hard, tough enamel of chloride of silver, cannot be rubbed out by the fingers, and will even bear considerable buffing, and, if the enamel is thick, are improved by the operation. I have not been able to permanently fix the picture, but it will keep a long time, if not exposed too often and too long, to the light. From the above experiments it seems that a prolonged exposure is not necessary to produce coloration, hence agents of great energy may be employed in reducing the chloride.

That coloration may be produced, it is important, I think, that the picture by whatever process it is taken, be positive, and complete on its removal from the camera. For fixing, it is important that all the organic matter be destroyed, and then, I believe, it will be fixed. I am at present engaged in experimenting with iodine, bromine, fluorine, sulphur, chrome, and copper, and their compounds, deposited on the silver plate by electric action, or otherwise, but have not, as yet, any results sufficiently matured to publish, though I have produced coloration. Great care is requisite in preparing the enamelled plate of chloride, and some experience is required to judge at what state of its preparation it is most sensitive to light, yet any artist can after a few experiments prepare it.

I have had but little time for experiment, owing to the pressure of other duties, and the weather here has been for the last few weeks unfavorable. I am not a daguerrean artist, and am under many obligations to Messrs. Bisbee and Robinson, of this city, for the loan of a camera and other apparatus for my experiments. Having been obliged also to make the greater part of the chemicals used, I have as yet, been able to make, but a very meagre investigation of this interesting subject.

JAS. CAMPBELL.

Dayton, Ohio, Jan. 20, 1853.

[The above communication from the pen of Mr. Campbell is the most important that has ever been published on the subject of "Heliochromy" in this or any other country We advise all our readers who feel an interest in "sun-coloring," to read the article with attention—ED.

Hot Air and Steam.

MESSRS. EDITORS—I have read with great pleasure your criticism on the Hot Air Engine, and greatly admire your frank and honest course about this invention—your course with every thing. You look the naked facts in the face, and speak out what you think, without fear or favor. By this course your paper has become the real guardian of inventions and inventors. I have looked back over all your articles on the Caloric Engine, and in no case can I see that you opposed this invention, but that in every case (it appears to me) you have been actuated solely by a desire of seeing and exhibiting what the thing really is. Yet I cannot agree with you in your conclusions, for I think you have left the relative specific heats of air and water out of your calculation.

So far as your dissertation relates to the vapors of fluids, you are right: you handle Prof. Apjohn correctly, excepting that he is right in saying "that equal volumes of the vapors of different liquids will have the same elastic force at their respective boiling points," for the boiling point is that temperature at which the elastic force of the vapor becomes equal to the atmospheric pressure. But equal bulks of liquids converted into vapor exert a force inversely as the densities of these vapors, hence the vapor of alcohol, ether, &c., cannot do the work of steam. But no comparison can be made between the elastic force produced by that expansion of vapor due to increased temperature, and that due to the making of vapor; unless we take the specific heats in consideration along with the boiling points and latent heats, when the result will be largely in favor of the permanent gas or vapor, or in favor of expansion and against vaporization.

By the doctrine of specific heats, different substances have a capacity or appetite for heat, which is inversely as their atomic weights; a pound of hydrogen will hold as much heat at the same temperature as 100 pounds of gold or quicksilver, 14 pounds of air, or 3 pounds of water: hence a pound of water will require 33 times as much heat to raise its temperature one degree, as a pound of mercury; or the same quantity of heat which will raise the temperature of one pound of water one degree will raise a pound of mercury 33 degrees. The specific heat of water is nearly four times that of air, consequently the heat or caloric which will elevate a pound of water one degree will heat a pound of air four degrees, or four pounds one degree. Now the latent and boiling heat (not the latent and specific, as Mr. Apjohn has it) of water, as steam, combined, are 1150°, or if a cubic foot of water, at 32°, were confined and heated 1150° or to 1182°, then, when released, it would all become 1728 cubic feet of steam at atmospheric pressure, with a sensible heat or temperature of 212°; and the available force would be 1728 feet. But this same heat which raised the water 1150°, and produced a force of 1728, will raise an equal weight of air 864 cubic feet, 4 times 1150° or 4600°, which will expand it 9½ times its bulk, equal to 8200 cubic feet, which is the measure of its available force—equal to 4¾ times the force gotten from water.

The heat which produces a given volume by expansion is always less than that required to make the same volume by vaporization, and this is the case even with steam and water, which have nearly the same specific heat, for if 62½ pounds or 1728 cubic feet of steam at 212 deg. are heated apart from water to 1182 deg., or raised 980 deg., then it will expand to three times 1728; if water at 212 deg. is then let in, the 980 deg. will become latent in producing one volume of steam from the water, and we shall have two times 1728 at 212 deg. instead of 3 times 1728 at 1180 deg. If we have this odds in favor of hot dry steam, what will it make with air which has four times the advantage in specific heat.

Let us take one more view of the question. One cubic foot of water at 32 deg. will give 1728 feet of steam of atmospheric pressure and 212 deg. temperature, by the application of 1182 deg. more of heat. If the cubic foot of water were resolved into its component gases they would occupy 2000 feet. Now if the water and the gases had the same capacity for heat, then the 1182 deg. which produced 1728 feet by vaporizing the water, would make the 2000 feet of the gases increase 4800 feet more for each degree, would expand it 1-491 of its bulk at 32 deg., which will give 2⅖ times advantage in favor of the gases over steam; but the difference of the specific heats will make the advantage about double this; for the specific heat of the steam is so much greater than the gases that, taken with the specific gravity, it is double the gases; for steam, being composed of one volume of oxygen, with two volumes of hydrogen condensed into one volume, makes its specific gravity at 212 deg., and atmospheric pressure, compared with its gases at the same heat and pressure as 24 is to 16, and its specific heat double an equal bulk of the gas: (I use round numbers only for these points about the gravity, and specific heats of the gases cannot be nicely determined).

Hence we see that steam and water will actually hold one-third more heat than the very gases which compose them. Water is a fire-eater, and for this was it made by Infinite Wisdom. How wondrous, then, may be its mechanism; probably it does not consist of two little balls, one of hydrogen and the other of oxygen sticking side by side?

This superior power of expansion over vaporization was first noticed, I believe, by Mr. Frost, who so clearly showed through your paper, that it was the cause of the boiler explosions; and that dry steam (his stame) might greatly economise fuel or increase the power of the engine; and you gave, in the last volume, a letter from a person who says that he saved 25 per cent. by heating the steam (expanding it dry) after it left the boiler. I thought that this was a settled matter-of-fact, by Mr. Frost's experiments and the other things you published in favor of it. I never shall forget the sorrow I felt when I read in your paper that that truly scientific man had breathed his last moments in comparative poverty. How often is this the reward of that friend of man—the Inventor.

I trust that you will receive this in the spirit in which it is given.

I doubt if the "Ericsson" would have a greater speed with larger engines; for the rate of working will be the rate of heating the air, and a larger fire surface will heat no faster—it must be made hotter; or else the motor cylinder must condense into a receiver, and this supply the cylinder which propels the boat. GEORGE MATHIOT.

Washington, D. C., 1853.

MESSRS. EDITORS—In the "Scientific American" of Jan. 8th, in giving the reasons why hot air must continue to fail in competing with steam as a force to move machinery, I think you have fallen into an error in not taking into account the difference in the specific and relative heat of water and air. The specific heat of air, or the actual quantity of heat required to raise the same weight of air and water, each the same number of degrees, is in the proportion of water 1, air 0·2669, and as air is less dense in the proportion of 830 to 1, the quantity of heat for an equal volume, or, as it is called, the relative heat is as 1 to 0·0003215, or as 1 to 1·3110, that is, the same amount of heat that will raise 1 cubic foot of water 1 deg. is sufficient to raise the same volume of air 3110 deg.; or, what raise 1 cubic foot of water 1184 degrees, converting it into steam, increasing its volume 1728 times, will raise 1 cubic foot of air $3110 \times 1184 = 3682210$ degrees, which, divided by 479 (the number of degrees by the books necessary to double the volume of air) gives 7687 as the number of times its volume is increased by the same amount of heat which changes the same volume of water into steam. Divide 7687 by 1728, it gives 4·45 as the ratio of increase in volume by the same amount of heat in favor of air over water. 7687×2160 gives 16603920 lbs., raised one foot high by the air, against 3,732,480 lbs., by the water, or otherwise the heat that will raise one volume of water into steam will raise 7687 volumes of air 479 degrees, doubling its bulk and coming to the same result. You say that it requires 864 in. of air (it should be 1728 in.) raised 491 deg. to equal 1 cubic inch of water raised into steam. Let us see what proportion of heat it will take. What will raise 1 cubic inch of water one degree, will raise one cubic inch of air

3110 deg, or 1728 cubic inches 1·8 deg.; 273 times that amount will double the volume of the air, while it will take 1184 times the same absolute amount of heat to change the water into steam, giving the proportion of 4·34 in favor of air. The difference from the proportion 4·45 is made by using 91 deg. in place of 479, which I think is more correct. It also requires more than 50 per cent. of heat to raise one cubic foot of steam at 212 deg., a given number of degrees, more than it does to raise one cubic foot of air the same number of degrees; that is, the relative heat is, by the books as 1 53 to 1, being as 3 to 2 in favor of applying heat to air rather than steam, and about as 3 to 1 in favor of applying heat to steam rather than to water, to change it into steam. Why, then, has air not been used? I suppose one reason is, that it takes half or more of the power to do the necessary pumping. Mr. Ericsson uses two-thirds nearly, the remaining difference is balanced by the power gained by condensation of steam and the application of the expansion principle applied to high pressure steam, leaving them, perhaps, not far from equal. But when Mr. Ericsson saves five-sixths of the heat, and consequently the same proportion of fuel, that is a different matter, and it becomes evident that if necessary, human ingenuity and power will be taxed to their utmost capacity to insure the success of his experiment. I think you will have to give it up at last.

Akron, Ohio, 1853. S. H. Bass.

[For editorial remarks on the above two letters, see page 189.]

Machinery and Tools as they are.—Saws and Saw Mills.

(Continued from page 179.)

No tool is used in a greater variety of industrial occupations than the saw, and when made in a circular form it is even more useful than when rectilineal, finding alike a place among the minute tools of the optician and among the rough but rapid working instruments of the backwoods. In employing the circular saw to cut lumber, the primary subject of inquiry is concerning its diameter,—as a rule it is generally advisable to employ a saw of as small a diameter as circumstances will permit, for the resistance, the surface friction, and likewise the waste from the thickness of the plate, rapidly increase according to the size. But if the saw is so small as to be nearly buried in the work, the metal becomes heated, the escape of the dust is prevented, and the rapidity of the sawing is consequently diminished. As a general rule it appears best to use that part of the saw which is nearest to the centre, and to allow its diameter to be about four times the average depth of the log. Circular saws are usually fixed on mandrels, which revolve in bearings securely united to the stationary frame-work of the saw bench, the end play of the spindle being prevented by collars, as it is highly important to check any lateral motion. The saw is placed between two plates or flanges, which are firmly pressed against the former by a nut, so that they compel it to accompany their revolutions as the mandrel revolves, and to further ensure the saw's rotation, steady pins are passed both through the saw and the fixed flange. When the diameter of the saw is considerable, compared with that of the flanges, the blade is very flexible and liable to be diverted from the true plane. In order to prevent this, there are many different contrivances; when a wooden bench is employed, the saw works in a narrow groove, which it cuts for itself in the bench, or a metal plate with a suitable slot is sometimes used, but a preferable method is to inlay a piece of hard wood and allow the saw to form the groove. Other methods, namely, to guide the periphery of the saw by rollers, or to employ two small saws in lieu of a larger one, are devices familiar to our readers. Sawing apparatus of both these and of nearly every other description, will be found illustrated and explained in the back and current volumes of the "Scientific American." When it is designed to use this tool for cutting wood at any angle, it is customary to make the platform adjustable, and that to an extent commensurate with the exigency of the case; a more simple way is to use supplementary wooden beds placed to the angles required. A plan for cutting weather-boards out of a sound log, has been proposed, when the timber is placed between centres over the revolving saw, which makes a vertical and radial incision, the tool is then released and the wood shifted on its axis for a new cut, so that the entire tree is sawn into feather-edged boards. In this instance the saw is novel in design, on account of its being buried so deeply in the wood, a circular plate is fitted with four pieces of steel, each having two teeth, while a great velocity atones for the paucity of these latter.

The cutting of veneers is undoubtedly the most remarkable instance of the precision that can be attained in the operation of sawing; for this description of work the saw is generally large, and here advantage is taken of the pliancy of the veneer, which allows the saw to be thick towards the centre, whilst it is thinned away towards the edges. In the large application of the principle, the saw is composed of many segments, and is often 18 feet in diameter. For sawing ivory in thin leaves, the saw is a single plate from 6 to 36 inches diameter, when frequently a block only one inch thick yields thirty leaves. But when a large log of timber is to be cut into veneers, and the saw exceeds four feet in diameter, it is formed of segments firmly secured to an iron plate, whilst the timber has two motions, the one longitudinal and the other lateral, to advance it sideways between each cut. This latter object is effected by adjusting screws and worm wheels moved by a handle, which makes 50 or 60 turns to advance the log one inch, the veneer, as it is cut, being guided off from the saw. There is a mode of superseding the saw in veneer cutting, which has several times been proposed, and probably originated in Russia, where a machine is employed capable of cutting an entire tree into one spiral veneer with a knife, as if the veneer were uncoiled like a piece of silk from a roller. In France, the plan has been applied to iron and sheets obtained measuring 150 by 30 inches. This plan, however, is not adapted for brittle woods, and does not expose the most ornamental section to view, which is the desideratum in veneers, on account of the purposes for which they are always employed, namely, fine cabinet work, and to give a superior appearance to the exterior of furniture. Circular saws have likewise been applied to cut off the ends of railway bars whilst red-hot, the saw making 1000 revolutions per minute, and having the lower ends immersed in water.

Marble has, for several years, been extensively sawn by machinery driven by steam power, although the processes are closely analogous to those pursued by hand. The ordinary arrangement is to form a frame by fixing vertically four strong posts well connected together, within this the block of marble is placed, and over the marble is suspended the saw-frame, which reciprocates horizontally, and rolls on pulleys which slide in vertical guides, and are suspended by chains connected to a counterpoise weight, so adjusted as to allow the saw frame to descend when left to itself, and which supplies sufficient pressure for causing the penetration of the saws. The distances between the saws and their parallelism are adjusted by iron blocks, and every blade is separately strained by its wedge until sufficiently tense. The blades, it must be observed, are merely slips of soft iron without teeth, so that the blade itself does not cut but simply serves as the vehicle for the application of the sand, which acts as the teeth of the saw, and performs the cutting process, the action of the saw being assisted by a small stream of water supplied from above. The introduction of the sand and water at the proper time is the chief difficulty in stone-sawing, to allow the cutting material ready access beneath the edges of the saw blades, the frame is slightly lifted during each stroke, and by the usual system the end of the stroke is the period chosen, but a recent patent points at the central position as most eligible. The traverse of the frame is, perhaps, preferably given by a jointed connecting rod attached by an adjustable loop to a long vibrating pendulum put in motion by steam power. The circular saw is also employed for cutting slabs of marble into narrow pieces, but although termed a saw, in work of this kind it is, in reality only a disc of iron without teeth, several of these being fixed on a revolving mandrel, whilst the marble is placed on a reciprocating bed which travels with a slow traversing movement.

(To be Continued.)

[For the Scientific American.]

Burning Fluid and the Newell Lamp.

As I am willing to avow myself the writer of the article in the "Haverhill (Mass) Gazette," respecting burning fluid, and the Newell Lamp, an extract from which, with some comments thereon, you publish on page 160 of your useful journal, I trust you will suffer me to say a word in vindication of its justness and entire correctness. since it has been called in question by the statements of Dr. C. T. Jackson, Newell, and others.

I wish to be brief, and therefore I will say at once that every statement contained in that article is strictly and entirely correct, and I challenge the parties denying them to prove them otherwise. I am ready to show by proof, which will not be questioned a single moment, that hundreds of gallons of "turmeric colored" burning fluid is sold every week in Boston. I will produce a highly respectable manufacturer of burning fluid, who will testify that he has been provided with a glass measure, and been directed to add it full of tinct of tumeric to each barrel of burning fluid, by a dealer in "Safe Patent Oil." Who will connive at and deny the existence of such outrages? Is this gentleman, who is a "distinguished chemist," willing to meet me on this subject? This gentleman uses a "hydro-carbon fluid, with diluted alcohol, containing 20 per cent. of water, which makes it less dangerous," &c. No chemist would ever make a statement like this. I profess to be somewhat intimately acquainted with the exact chemical nature of all volatile hydro-carbon mixtures used for purposes of household illumination, and do not believe in such a mixture as that, containing 20 per cent. of water. Will he give me the formula for the mixture he uses, I wish to examine it?

I stated in the article in the "Gazette," "that if Newell was to be believed these holes in the cap of his lamp were ordered by Jackson." Gentlemen of the highest respectability in Boston have signified their willingness to testify, under oath, that Newell has stated to them, repeatedly, that Jackson would not give his certificate until the holes were made. It is generally understood that Dr. Jackson proposed them. The holes still continue to be made in the cap, and it is a mild term you use, Messrs. Editors, when you call them a "scientific blunder." You state that you have been unable to find a record of Jennings' old patent for wire-gauze tubes, like Newell's, taken out in 1836. You will not find it in the books; it was, I think, destroyed at the time the Patent Office was burned. A record of the patent is on file at the Department. Any one who has any doubt respecting the granting of this patent can receive positive information by writing to the Commissioner. I have, in my hand, at this time, one of Jennings' gauze tubes probably a dozen years old. There are many of them in existence in Boston at the present time. In respect to burning fluid, I wish to say that I have not, and never have had, any interest whatever in the manufacture or sale of the article.

Jas. R. Nichols.

Haverhill, Mass.

[See some remarks on this letter on page 189.—Ed]

The Tunnelling Machine.

Messrs. Editors—I perceive in your paper of the 5th inst. a paragraph, that, from a similarity of phraseology, seems to have been copied from a paper in this city. It announces with much plausibility that "the Hoosic Tunnelling Machine has proved a failure." To enable you to see how much truth there is in that assertion, I wish to quote the very language used by one of the most distinguished engineers of Western New York, in a conversation between himself and one of our city lawyers of high distinction; in answering the question, "what is your opinion of the machine?" he said, "I have seen the machine operate and have examined it well: it is my deliberate opinion it will cut out more rock in a day than can be removed by any means known to me." If that can be called a failure, what must it be capable of doing to entitle it to the appellation of a successful machine? As I am a constant reader of the "Scientific American," such an expression of opinion on its page must, of course be somewhat annoying to me, as I claim to be the inventor of said machine, and have ever entertained the highest respect for the candor as well as the scientific character of your paper. I take the liberty of sending you an article on the doings of the machine by an eye-witness, who has honestly given the dark as well as the bright side of the matter. If you have not seen this before, it may afford some additional light on the subject, and I cannot yet believe you are one of those who prefer darkness to light.

Chas. Wilson.

Boston, Feb. 9, 1853.

[The article referred to by Mr. Wilson appeared in the "Boston Transcript" of the 7th inst., which confirms the opinion expressed by the engineer mentioned above. We entertain something of a dread to notice anything that appears in some papers, as news, about inventors, for the very reason that nine times out of ten it is incorrect—either wilfully or by mistake.

Basket Willows.

I have lately seen in several papers, articles on the basket willow, and in your last paper you give the amount paid for the foreign article. There is perhaps not a place in the country where the willow could be cultivated to as good advantage as on our alluvial meadows along the Connecticut river. It grows here spontaneous of all sizes and sorts from the fine seedling to the coarse, which is just fit for hampers. There is no attention paid to it here, except to clear it out of the land, which is a work of much labor. I have seen the finest work made from it, of all kinds, from the most beautiful fancy baskets, to the largest and best willow cradles. There is a celebrated basket maker here, who makes all his work from those willows; he has been all over Europe, and he has repeatedly told me that there is no place where he has ever been, where willows grow so fine and good as here. His prepared willows have often been exhibited at our fairs, and as far as I could judge, were of very superior quality. Any quantity can be gathered in our meadows.

Yours, W. Bigelow.

Hartford, Conn., Feb. 14th 1853.

Labor Law in Rhode Island.

The Senate of Rhode Island have passed a bill regulating the employment of minors in factories. The act provides that children under twelve years shall not be employed in any manufacturing establishment in that State, and children between twelve and fifteen shall not be employed more than eleven hours in any one day, nor more than nine months in any one year, and these children must attend school at least three months in the year. The bill provides that ten hours shall constitute a day's work.

Sperm Oil.

The New Bedford, Mass., "Standard" has the following:—"We understand that $1,30 per gallon has been refused for sperm oil during the past week. The last sales that have come to our knowledge were made at $1,28. The quantity in the market is extremely small. The vessels which are to arrive here within the next few weeks will make profitable voyages for the owners."

United States Survey.

The United States Survey in California is rapidly progressing, the base line being already completed seventy miles. It will probably touch the sea coast some four miles north of Los Angeles. Mr. Gray is following Col. Washington, and is surveying a range of townships.

The French Navy.

No less than twenty ships of the line are now building in the French dock-yards, and for the greater number of them screws have been ordered. In addition to these there are eighteen frigates and fifteen other vessels of different classes building, which are to be all propelled with screws.