Correspondence

The True Plan for a Flying Machine.

MESSRS. EDITORS:—Heretofore all efforts to navigate the air have failed. True, balloon ascensions bave been made, but that is not what is wanted. We need a machine or craft that can be guided at will, even as the birds fly. Let none despair, for it can be done, and with safety; for the steam-engine, as we now have it, is able to exert double the power, in proportion to its weight, tbat any of the feathered trioe can; and all know that an eagle will rise and soar away with an additional weight equal to its own. An eagle will spread about one square foot of wing for every four or five lbs. of its weight. As there is no fulcrum to act against but the weight of the body, it is evident that the wings can not be forced down with any more power than would lift the body, and as the motion is reciprocating, and no labor is done by the upward motion, it is equally evident that there can not be exerted more than half of the weight on an average. As any large bird will fly moving the wing half of the time, it is plain that such birds fly by exerting a mechanical force equal to a continuous pressure of one-fourth the weight of the body. The whole secret lies in the shape of the wing, and its arrangement. When the same principies that are now so well understood in water navigation are as scientifically applied to aerial navigation, by those having the facilities and funds to build and test a suitable machine, the result will astonish the world. But let none attempt to try even a model with one pair of wings, for they will fail; but rather use two, or some even number, and connect the first pair with the next, so that when one descends the other ascends; then the strain or weight hanging upon the wing is balanced, and if moved slowly they move easily, but would press heavily if moved quickly. Let the shape be as nearly as possible that of a turkey's wing, and of such size that the whole will spread about one square foot to every three or four lbs. of weight to be borne. See that the most of the weight is below the fulcrum of the wing far enough to keep the machine from upsetting. Such a machine will be sustained with much less power than is generally supposed, as I have tested.

Any person that ever saw a flock of turkey buzzards on a frosty morning will remember their "slow and easy" motion, and that it is easy to approach very near to them at such times. Some years ago I lived in the Shenandoah Valley of Virginia, near a noted roosting place, and observing these birds' extreme slowness of action, I thought it a good opportunity to ascertain some of the principles involved in flying. I tried to ascertain the set of their wings for different lines of flight. Of course it was impossible to be perfectly exact, but for a horizontal flight the front edge would be elevated above the back edge, and I tried to get the elevation with a quadrant. I had some good opportunities, and made it about ten degrees. From close observation and comparison I think that the wings of other large birds do not vary much from the same angle. I also ascertained that the motion or stroke of the wing was always at right angles to the line of elevation, thus proving that birds do not fly by pushing the wing back against the air, as is generally supposed, but purely by the glance of the wing which is always forward, upon the principle that a ship goes forward when the wind blows from one side. Let none attempt aerial navigation unless they thoroughly understand the principles of sailing a ship against the wind, for upon the same principle the whole is based; and the wing is really a horizontal sail, that makes its own wind by beating the air. If some of your readers who have the time and facilities will take accurate measurement of the wings and tails of different large birds, especially of those that move slowly and strongly, as the eagle tribe, the goose, Guinea fowl, crow, also the exact weight, the concave of the wing, with such other items as may suggest themselves, and let all be combined in your valuable columns, we shall then be in condition to figure up what must be done in order to fly by machinery. Hoping that this will draw the pen of some more able person, I am yours, etc.,

JAMES E. GILLESPIE.

Pawtucket, R. I., Sept. 2, 1864.

[In a personal interview with Mr. Gillespie we were much impressed with the reasonableness of his original views. He has gone the right way to work. As nature has reduced flying to a practical art, with sound judgment he turned his attention to the study of her wise and successful arrangements. The fact that a bird's wing is set with the forward edge about ten degrees higher than the rear edge he ascertained by instrumental observation, and, so far as we are aware, this is a new and valuable contribution to the knowledge of the subject. We should like to see it verified by other observers. The statement that the stroke of the wing is perpendicular to its plane, it would be still more interesting to have confirmed. The fact that nature does not employ rotary fans in flying is not conclusive proof that this is not the best arrangement. The continuity of the blood-vessels and other ducts precludes the use of rotary motions in the organs of living beings, and these motions are never employed in the organic world. Still it may be that the reciprocating motion of wings is the true plan for flying.—EDS.

Hyperbolic Logarithms, as used in Calculating the value of Steam Expansion.

MESSRS. EDITORS:—In calculating the theoretical gain by expansion engineers generally make use of the hyperbolic or Napierian logarithms as a simple and accurate method of obtaining the desired result.

Many of those who use this method are unable to see the connection existing between this mathematical table and expanding steam. As our text-books on steam do not appear to make this subject sufficiently clear, perbaps the following explanation may be useful.

The capacity of a steam cylinder with a certain diameter will vary as its length; hence, when steam is allowed to enter freely during a portion of the stroke the quantity of steam used will vary as the portion of the stroke during which the steam has been freely admitted, and the pressure will remain uniform. Now, as soon as steam is cut off from entering the cylinder, and, at the same time, the piston advances, thus enlarging the capacity of the cylinder for that portion of steam which has been already admitted, the pressure of this steam decreases in a corresponding ratio, according to Marriotte's well-known law.

It is desirable to determine this decreasing pressure at every point of the piston's progress, and from this data to estimate the mean pressure during this expansion, in order to calculate the value of expansion.

An arithmetical as well as an ordinate method are each at times employed in obtaining this mean pressure, but it is not to our present purpose to dwell on either of these methods, my object being to show why hyperbolic logerithms are used in calculating tbe value of steam expansion. It has been observed, that simply by a fortuitous coincidence, the series of numbers so extensively used in mathematical calculations, and known as hyperbolic logarithms, are a series of numbers from which the theoretical mean pressure of steam during expansion can be easily and accurately obtained. We have a series of numbers in this table of logarithms which vary in the same proportion as the laws of nature cause steam pressure to vary when the steam is expanding.

Thus the logarithm of the number representing the ratio of expansion, divided by the length of the stroke through whicb the steam had been expanded, will represent the mean pressure of the steam during expansion; the pressure and the length of the stroke each being represented by a unit. Then, when we have a number representing the ratio of expansion, or the relative space the steam must fill before the piston reaches the end of the stroke, in comparison with the space filled before expansion; then, by referring to a table of hyperbolic logarithms for the logarithm of this number, and by dividing this logarithm by the number representing the length of the stroke through which the steam was expanding, we will obtain tbe number representing the mean pressure of steam during expansion.

To ascertain the amount of work done, or the value of expansion, the mean pressure throughout the stroke must be obtained, and, as we have just shown how to obtain the mean pressure during expansion, and as the pressure before expansion is uniform, the calculation becomes very simple.

The object of this article, however, is not to attempt to simplify the practical rule, but only to enable some persons who have not yet seen the reason for the use of this table of logarithms, to understand why it is thus applied.

I trust that it may be evident from the above explanation the use of hyperbolic logarithms for this purpose is as much of an accidental coincidence as if the young engineer should find a twig with knots and marks on it corresponding to the divisions on his two foot rule.

The twig could then be used instead of the rule for measuring purposes, just as a table of hyperbolic logarithms is now used, instead of a regular table, prepared expressly for the purpose of expanding steam.

G.

[We are pleased to receive communications with original ideas in them, whether we regard all of the ideas in them as sound or not. We will waive at present all discussion of our correspondent's position, that the relation between the varying pressures of gas expanding in accordance with Mariotte's law and hyperbolic logarithms is accidental; but the question that we ask him is how he knows that steam in expanding follows the Marriotte law? We are aware that this is stated in books, but what we want to know is who has settled it by experiment.—EDS.

The Pitches of Screw Threads.

MESSRS. EDITORS:—I have been a constant reader of your paper for the last ten years, and never attempted to correspond on any subject, being always contented with what others said in your paper. But I think that a great reform can be made in the pitches of screw threads, if a majority of mechanics are awakened to the necessity of the case. I have been building machinery for the last sixteen years, and for the last ten years I have adopted a regular system for common threads which is practically well adapted for work in the western country, or any where else. I make my 1 and $\frac{7}{8}$th bolts 8 threads to the inch, $\frac{3}{4}$ 9, and $\frac{5}{8}$ 10, $\frac{1}{2}$ 12, and $\frac{3}{8}$ 16, and $\frac{1}{4}$ 18; and make the thread half the depth of the pitch. If you can bring about a uniform system for screw threads it will save manufacturers much money, and machinists a great deal of annoyance. I am well aware that some shops cut all kinds of fractional threads, or "bastards," as they are technically termed, in order to prevent their machinery from being repaired in any other but their own shop, but I consider that very short-sighted in a business point of view.

P. T. KISSANE, Machinist.

Sept. 29, 1864.

Feeding Gold Fish.

MESSRS. EDITORS:—Can you through the medium of your paper inform me the mode of feeding and keeping gold fish. I find very great mortality among them, and am convinced it is from improper treatment.

J. B.

Cincinnati, Ohio, Sept. 28, 1864.

[We have been told by persons who keep fish that they do not require to be fed, and we have seen it stated by others that gold fish will soon starve to death unless they are properly supplied with food. Perhaps some of our readers who have had experience will answer our correspondent's question. It is possible that he is not aware of the necessity of changing the water frequently. Though $\frac{8}{9}$ths of all water is oxygen, the gills of fishes have not the power of decomposing water and appropriating the oxygen which is chemically combined in its constitution. Their life is sustained by the free oxygen which the water absorbs from the atmosphere, and as soon as this is exhausted the fishes cease to breathe. Hence the necessity of either frequently changing the water, or forcing air into it by an air-pump.—EDS.

Caution in Boiling Clocks.

MESSRS. EDITORS:—I have noticed in your current volume, an easy way of cleaning clocks by boiling them in water. Allow me to add that before doing this all steel springs and tempered bearings should be removed, for if the springs are boiled with the rest, the temper will be reduced and their elasticity

impaired. One boiling may not injure, but if repeated it will certainly do so. I have seen gun locks destroyed in the same manner, and have been smart enough to spoil one myself. This I should think is sufficient warning to the unwary, who might possibly take a notion to boil clocks and gun locks.

A CONSTANT READER.

Fort Hamilton, Sept. 29, 1864.

[We have great respect for experiments, and seldom if ever reject a communication which gives an account of one. As steel is reduced to a spring temper by plunging it into a bath at a temperature of 550°, it would be surprising to see the temper still further lowered by a bath of boiling water at a temperature of 212°. It would therefore be interesting to have our correspondent's experiments repeated.—EDS.

The Casting of the One Thousand Pounder.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington City, Oct. 5th, 1864.

MESSRS. EDITORS :—I beg leave to correct a slight mistake in your notice of the 20-inch Army gun now at Fort Hamilton, N. Y., in your paper of the first instant.

It is stated therein that this gun was cast under my superintendence, and my official report referred to, as in corroboration ; but as my report actually states, I was only "present" at the casting. The whole operation was performed under the immediate and personal superintendence of Major Rodman himself, the designer of the gun and inventor of the mode of casting : and I was only an interested spectator of the great event.

As it was intended to cast a gun of the same size for the navy, dependent on the success of the army gun, I was directed to be present at the casting, and to report in detail upon it, which I did ; but my "superintendence" went no further.

It is scarcely to be supposed that an operation so important, and which, if successful, was destined to mark an era in ordnance, as well as in the art of gun making, would have been entrusted to the direction of any one but the distinguished inventor himself : and therefore, in justice to him, as well as myself, I have to request that the error may be corrected in your next publication.

R. AULICK,
Lt. Comdr. U. S. N. and Assist. Chief of Bureau.

What it Costs to Sink an Oil Well.

We notice in many of the new oil companies now being formed that the money laid aside for the development of the property rarely exceeds $20,000, while in many instances it does not amount to more than $10,000. That our readers may understand the extent of the development to be expected from a fund of the amount stated we subjoin a statement of what it costs to sink a single well six hundred feet deep, the depth to which it is now found necessary to go to secure success. Here are the items:—

One engine, 10-horse power, delivered on the premises	$2,100 00
Derrick, complete	150 00
Walking beam, sampson post, and appurtenances	50 00
Bill wall, band, wheel and belting	150 00
Oversett tools	300 00
1¼ inch hawser and 1¼ inch hand pump rope	150 00
600 feet tubing, at 92 cents	570 00
50 feet driving pipe	250 00
500 bushels coal, at 60 cents	300 00
Two engineers, say 60 days each, at $3	420 00
Contract to drillers, 6 0 feet, at $2 25	1,350 00
One pumping barrel and valves	37 50
Two wrenches, at $10 each	20 00
One clamp	5 00
Two 2-inch gas tongs	15 00
Total	$6,067 50

To this add $500 for contingent expenses, such as accidents in breaking machinery, getting tools fast in wells, and the charges by professional tool extracters, etc., and there will be less than $3,500 left of the $10,000. It will thus be seen that where it is intended to put down a number of wells, as proposed by so many of the new companies, there must be a larger reserve fund, or the stockholders will have to foot the bills.—*Pittsburgh Chronicle.*

Restoration of Violet Color.

A writer in the *Technologist* says :—

"Your readers may probably be interested in the following description of a process for restoring the color to violet silk, after its extraction by acid. It is well-known that spirits of hartshorn will act upon black under similar circumstances, but I am not aware that any chemical agent has hitherto been put forward, as a restorer of violet; and I claim to be the originator of the experiment, with the result of which I am very well pleased. After applying to several chemists and druggists on the subject, and failing to hear of anything that would answer the purpose, it occurred to me to try the "iodine process," which is employed for the purpose of obliterating blots of marking ink from linen; although the process is doubtless well-known to most of your readers, it may be as well to describe the plan adopted :—First, brush with tincture of iodine the portion of fabric affected; after a few seconds well saturate the spot with a solution of hyposulphite of soda, and dry gradually in the air; the color will then be perfectly restored. I should be very glad if any of your correspondents who may try the experiment would give the result through the medium of your columns.

"I should have stated that I was induced to try the experiment described above, in consequence of my knowledge of some of the chemical properties of iodine, and its relation to the color in question: in deed, it is well known that iodine derives its name from the violet vapor which it exhales when volatilized."

Receipt for Making Black Varnish.

A correspondent sends us the following receipt for making varnish, with a request that we should give our opinion of it:—

PATTERN WOOD AND IRON VARNISH.—1 lb. of gum asphaltum, ¼ lb. of gum benzone, put both into a can or jug with 1 gallon of benzole, and let stand until they dissolve, then add 1 pint of linseed oil, and it is ready for use. To have it clear leave out the asphaltum, and for patterns leave out the oil, and to change the color add any color you wish, and mix with the clear varnish. J. CASS & Co., Cincinnati, Ohio.

Lockport, N. Y,, Sept. 13, 1864.

This is a good receipt provided genuine benzole is used; but if what is called benzine in our markets is substituted, it will not succeed. Professor Seely, of this city, was making black varnish in large quantities before the war, by dissolving asphaltum in camphene, and when the supply of spirits of turpentine was cut off by the war, he attempted to find a substitute. He found that benzole was quite as good as camphene, but on trying the most volatile portions of petroleum, the "naptha" or "benzine" as it is popularly called, it would not answer the purpose. Our correspondent will find a full explanation of the difference between benzole and benzine on another page.

How to Test Quicksilver and Detect Adulteration.

Quicksilver, after being extracted by the plain process of retorting, is seldom quite pure, and generally contains a small proportion of other metals. The eminent naturalist Priestly suggests a very simple method to purify mercury, by merely shaking it strongly in an iron flask, and renewing the air in the same repeatedly with a pair of bellows. By this manipulation a black powder will be formed on the surface, which can easily be separated. If no more of this dust is formed the quicksilver may be considered pure. In this state it will always give a clear sound when agitated in the flask, while an admixture of lead will make it sound dull, as if the vessel were made of potter's clay. It is often found in the market wilfully adulterated with lead, tin, and bismuth. Of lead, it can absorb or dissolve almost one-half of its weight, without losing much of its liquidity. This adulteration can easily be discovered by rubbing some of the metal on the open palm; if it soils the skin it is adulterated—if pure it leaves no trace. Besides, if dosed with lead, it will leave a tail behind—*il fait la queue*, to use a French expression—that is, the drops, instead of being globular, will assume an elongated form, and a more or less flattened surface. Some of these observations may be, perhaps, useful to the gold miner, as many complaints have latterly been heard about the impurity of the quicksilver sold in the mines, which fact is also proved by the frequent occurrence and admixture of base metal in the amalgam gold, probably in most cases, by artificial means.—*San Francisco Mining and Scientific Press.*

Another Question about a Rolling Wheel.

The question in regard to the power required to start a train having excited so much interest, we propound another of a somewhat similar character. When a wheel is rolling along the ground, the upper portion moves more rapidly in relation to the earth than the lower portion, so that the motion of every portion of the wheel except the center goes through a series of changes in velocity during each revolution. This suggests two questions:—

First. Do these changes in the velocity of the several parts have any tendency to check, through the action of inertia, the onward rolling of the wheel?

Second. Do they have any tendency to alter the form of the wheel; and if so, in what way?

FARMERS' CLUB.

The Farmers' Club of the American Institute has commenced its sessions after the summer's vacation. The meetings are held every Tuesday at half-past one P. M., at Room 24, Cooper Institute, under the presidency of Alderman Ely. Though the great mass of the proceedings are adapted only to agricultural papers, we occasionally find items that help to make up that endless variety of interesting matter which we constantly aim to present in the colomns af the SCIENTIFIC AMERICAN.

From the proceedings on the 4th of October we select the following :—

YIELD OF GRAPES TO THE ACRE.

Mr. Robinson:—I regret that Mr. Carpenter is not present, as I have here a letter criticising very sharply his statement that it is possible to raise ten tuns of grapes to the acre. Mr. Carpenter said that ten tuns —20,000 lbs. of grapes might be raised on one acre, and this quantity at 15 cents per lb. would amount to $3,000. This correspondent asks if that is not drawing a long bow. (The speaker then made a calculation of the number of vines that might be grown on an acre, and came to the conclusion that with proper cultivation there was no difficulty in raising ten tuns of grapes.)

Dr. Trimble :—I think, Mr. President, that these large statements are calculated to mislead. It must be remembered that for one perfect crop that we get there are several imperfect.

THE WAY TO RAISE PEARS.

Dr. Ward :—If Dr. Trimble means this remark to apply to the pear I shall dispute its correctness. My pear trees have borne for fifteen years a good crop every year.

Dr. Trimble:—Dr. Ward has had a great deal of experience, and with the thorough care that he takes of his trees, he may always have a good crop, But it is very different with the culture that farmers ordinarily give to their trees. I would ask Dr. Ward how often he has changed his trees?

Dr. Ward:—I have some fancy varieties that have been replaced, but the Duchesse d'Angouleme, the Bartlett, and others that I rely on for my crop, are the same trees that I set 15 years ago.

Dr. Trimble :—How often do you plow the ground?

Dr. Ward :—Every spring. I go through with a light shear plow that stirs the ground about two inches deep, and then I put on the mulch.

Dr. Williams :—What do you use for mulch?

Dr. Ward :—Salt hay or straw. I spread it on two inches deep, so that a man can lie down anywhere in the orchard without soiling his clothes.

Mr. Robinson :—How often do you manure the ground?

Dr. Ward :—Every year; and I think it very important to spread the manure on the surface. I find that if I omit the manuring one year, though the crop is about the same, the fruit is smaller in size.

Colored Flames.

In answer to a correspondent we give the following receipts for making colored flames:—

BLUE FLAME.

Nitre	5 parts.	
Sulphur	2 parts.	
Metallic Antimony	1 part.	Mix together.

RED FLAME.

Dried nitrate of strontia	72 parts.	
Sulphur	20 parts.	
Gunpowder	6 parts.	
Coal dust	2 parts.	Mix.

WHITE FLAME.

Petroleum.

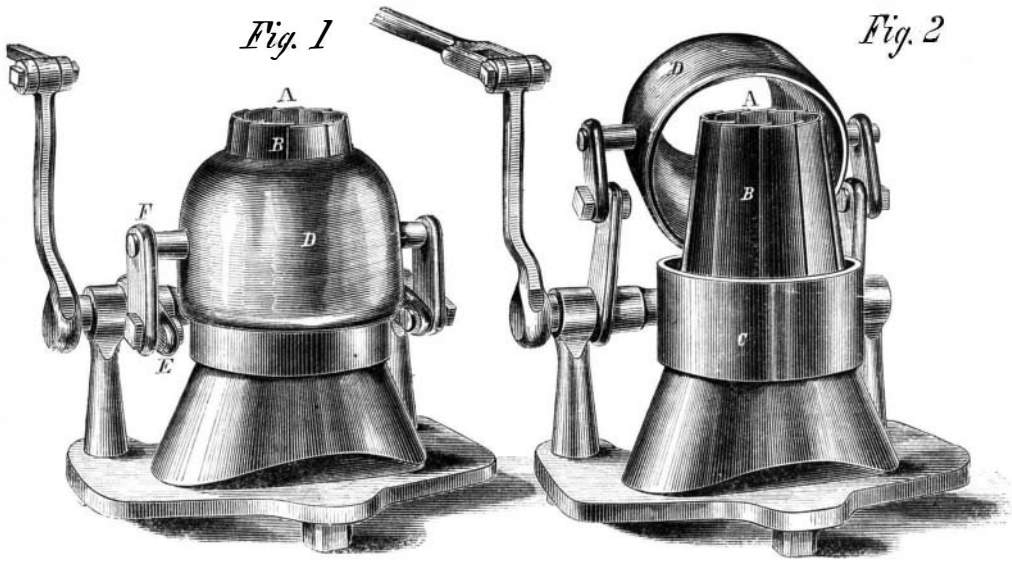
CUTTING IRREGULAR FORMS.—A very valuable machine for this purpose is advertised in our present number.

THE quantity of maple sugar returned in Ohio this year amounts to 6,785,178 pounds.

Improved Variable Exhaust.

A number of ingenious arrangements for adjusting the apertures of exhaust pipes on locomotives have been invented and put in operation, but the one herewith illustrated promises features not heretofore furnished. The object is to contract or expand the mouth of the pipe so as to increase or diminish the force with which the exhaust rushes upward, and thereby directly affect the intensity of the blast, upon which the evaporating power of the boiler depends very greatly.

The device here shown represents a novel and easy working apparatus for the purpose alluded to. Both the exhaust pipes lead into one opening, A, which is composed of a series of thin steel plates, B, lapping over each other at the top and rivetted at the bottom to the case, C. Over these plates the cap, D, is neatly fitted. The levers, E, connect to the arms, F, and when the latter are worked the cap slides up and down on the plates, B. This causes the plates to spring in at the top and narrow the orifice; when the cap is lifted the reverse occurs. In Fig. 2 the cap is shown removed and the plates fully disclosed. This arrangement is intended to be worked from the footboard, or cab of the engine, and the exhaust opening, A, can be changed instantly at will, by merely moving a lever. It is not liable to be clogged by cinders, and has no parts likely to get out of order. This arrangement was patented through the Scientific American Patent Agency on July 12, 1864, by John Dykeman and John Bolton; further information may be had by addressing Mr. Dykeman at Harlem Railroad Machine Shop, Greenbush, N. Y.



DYKEMAN AND BOLTON'S VARIABLE EXHAUST.

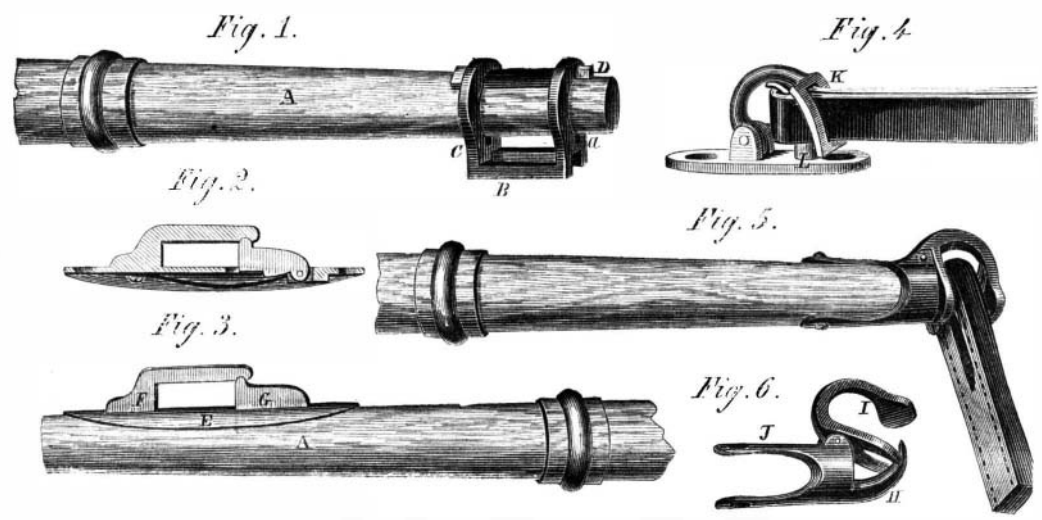
Trace Hook and Hold-back.

Very many serious accidents have been caused by traces slipping off the whiffletrees, or breeching straps slipping out from the hold-back fastenings, or other parts of the harness, which are usually attached by straps, buckles or hooks, of one kind or another, working loose, falling down, and thus frightening the team so that it becomes unmanageable.

In Fig. 1 a new arrangement (which dispenses with the use of buckles on the yoke strap) ordinarily used with a double team, is shown, The yoke, A, is attached to the pole or tongue of the wagon, as usual, but the hold-back straps are buckled round the shank, B, of the stirrup, C, and remain permanently without requiring to be unbuckled whenever the team is unharnessed, as is the case with ordinary harnesses. To get the hold-back straps off, the stirrup is turned round on the yoke until the slot, *a*, in it comes opposite the spur, D; the stirrup then slips over it and is left hanging to the strap. Another arrangement to effect the same object is shown in Figs. 2 and 3, The casting, E, sets in the yoke, and has an arm, F, cast solid on it. There is, in addition, a tongue, G, which has a spring under it (see section Fig. 2) which forces the tongue against the arm before-mentioned. When this tongue is depressed, the strap may be inserted and cannot come out, for the tongue is always pressed upward by the spring below.

These fixtures may be used either for whiffletrees or yokes A trace connection of ingenious design is shown in Figs. 5 and 6. The strap slips over the horn, H, and the link, I, which is hinged to the shank, J, falls down against the end of the horn, as in Fig. 5, and keeps it in place. For a single team the breeching straps are attached to the fixture shown in Fig. 4. This is fastened to the thills as usual, and the strap slips through the square eye, K, and hooks over the horn, L, which keeps the strap securely in position.

These fixtures were patented through the Scientific American Patent Agency, by H. W. Catlin, Burlington, Vt.; for further information address him at that place.



CATLIN'S TRACE HOOK AND HOLD-BACK.

TOMATOES.

Persons who have not learned to like tomatoes are losing one of the great luxuries of life. Like all acquired tastes, the flavor becomes exceedingly attractive, and this esculent adds materially to the pleasures of the table. But it is from its effects that the tomato is most craved by those who are accustomed to its use. It seems to have the property to cause all other food to be assimilated by the system, and gives comfort after dinner even to dispeptics.

The most common way of cooking tomatoes is to stew them. They are scalded with boiling water, which loosens the skin so that they can be readily pealed, the peal is taken off, the fruit is sliced into a saucepan with broken cracker or bread and a little salt, and stewed for twenty or thirty minutes. A better plan is to place the mixture in an earthen dish, and set the dish into a hot oven.

Many persons think that the best way of preparing tomatoes is to pare and slice them cold, and sprinkle them with a little fine loaf sugar, to be eaten raw. Some add salt and vinegar but this is no improvement. For eating cold the tomatoes should be pared without being scalded, as the scalding injures the flavor.

The tomato vine is killed by the slightest frost, but if pulled up before frost comes, and hung under shed fronting the south, the fruit will continue to ripen for weeks.

WEBSTER'S ILLUSTRATED DICTIONARY.

Before the London *Times* had been sold to stockjobbers, and when it possessed some measure of impartiality and fairness, the great "Thunderer" pronounced Webster's Dictionary the best dictionary of the English language ever published. Since that verdict was given the work has increased enormously in extent and value.

We have before us a copy of the edition of 1864, unabridged and illustrated. It is a large quarto volume of 1,768 pages. The title page states that the work has been thoroughly revised, and greatly enlarged and improved, by Chauncey A. Goodrich, D.D., LL.D., and Noah Porter, D.D., both Professers in Yale College. It is published by G. & C. Merriam, State street, Springfield, Mass., and by Bell & Daldy, 186 Fleet street, London.

This ponderous volume is a vast treasury of knowledge. Its principal purpose is, of course, to give the orthography, etymology and signification of all the words in the English language. So large is the number of new words that are constantly being coined in the rapid advance of the sciences, that only a new edition of any dictionary can even claim to have them all. The publishers state that the present edition of Webster contains 114,000 words, which is **10,000 more than any other dictionary.** Besides the full and accurate definitions of these words, the meanings of more than 3,000 are made still more clear by admirable wood engravings. These engravings represent objects in the various departments of natural history, the arms and flags of different nations, figures in heraldry, the various implements employed in gunnery and their several parts, the parapet, scarp, and other portions of fortifications, chemical apparatus, and an endless variety of other matters.

This dictionary also embraces a pronouncing vocabulary of Greek & Latin proper names, an etymological vocabulary of modern geographical name, a pronouncing vocabulary of modern English Christian names, and various other matters. It is an encyclopedia in itself, and will doubtless be in the household of every man who can afford to purchase it.

ELASTICITY OF CAST-IRON CANNON.—We find the following statement in the *Artizan* (London):—"Captain Blakely's 11-inch cast-iron gun, hooped with steel, and which broke one of the hoops under proof a short time ago, having been repaired, has again been proved at the Woolwich butt. The gun is 15 feet long, 43 inches in diameter at the breech, and 20 inches at the muzzle. The gun was fired two rounds, with a charge of 52½ pounds of powder, and a cylinder weighing 540 pounds, and showed no signs of strain or damage. The gun, it is stated, is manuactured to the order of the Russian Government, and will now be despatched to St. Petersburg."