Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Power of Steam.

MESSRS EDITORS;—The position taken on page 22 of the present volume, in relation to the "power of steam" is not a proper one for obtaining the true power of steam. The views there advanced are correct when steam is generated against the resistance of the atmosphere, but it is a great mistake to compute the power of steam from such data, as they have no general application in determining the power of steam.

The power value of steam varies with the pressure at which it is generated. For instance, in the calculation on page 22, a cubic inch of water is employed, and being converted into steam against the pressure of the atmosphere gives a return of 2,000 foot lbs. of work; but if the same amount of water were vaporized in a closed boiler and under a higher pressure, it would give a larger return in work, or power.

I am a warm admirer of Professor Vander Weyde's ability and varied scientific attainments, but in this instance I beg leave to call the gentleman to order. The error is an important one, and if not universal it is a too common one, and should be corrected.

To realize the full power of steam is beyond the present reach of science. The steam engine, to be absolutely perfect, should generate steam at a pressure of 25,500 lbs. to the square inch, with a temperature of 1,000° above the boiling point; and no expansion should be allowed to take place before the water has received heat enough to give it a vaporous form (supposing no work other than overcoming the resistance of the atmosphere is performed); and then steam would be generated under the most favorable circumstances which the case will admit of. The following would be the result, under these conditions, if a cubic inch of water were employed.

To vaporize a cubic inch of water, thirty-six units of heat are required, and if the water is vaporized under the pressure of the atmosphere, 2,000 foot lbs. of work will be the result: but if the cubic inch of water is confined in a boiler, so that no steam can form until after the whole thirty-six units of heat have been imparted to the water, then, when the water is allowed to take the form of steam, the lifting operation will begin with a force of 25,500 lbs., instead of 15 lbs, as in the former case; and the amount of power developed will be 6,797 foot lbs., instead of 2,000. In the case where the greater result is obtained, one-quarter of the heat is annihilated by the work done, and the expansion in this case ends at 1,275 volumes, instead of 1,700, as in the other case.

If the steam engine were absolutely perfect, it could return but 193 foot lbs. of work for each unit of heat expended in making steam; or return only one-fourth the amount of work which the mechanical equivalent of heat calls for. I have expended much time in inquiring into that mysterious and fearful gap which exists between present practice of motors, and what theory establishes as the actual power of heat; and I will say that it is a curious and interesting fact that a prolonged and laborious study of the subject gradually leads into, and finally ends in, *electricity*, and establishes the fact that electricity is the only element or vehicle which is capable of giving the full power of heat. Such a study also developes the reasons why different vehicles for converting heat into power, do give a like return in work; and there is beauty, order and consistency existing among the vehicles throughout the entire field, when we come to understand the reasons why they differ. Electricity is the beacon toward which the sails must be trimmed to reach perfection in motors. Our present methods of generating electricity are but crude, miserable contrivances, compared with what they will be at some future time; and Professor Tyndall, one of the leading scientific men of the day, but reiterates this when he says of electricity, that *we know nothing about it*. Some entirely new and radical method of generating electricity will yet be found, which will set civilization agog, and rejoice and lighten the hearts of millions. This is the conclusion that I have arrived at, after having followed the subject during available hours, which if brought together into working days, would make one year of constant application. The true method for generating electricity is the problem for the times: present methods must be departed from. Great improvements in thermo-electrics, in my judgment, are yet to be made.

NEW YORK, Jan. 8, 1867. F. A. MORLEY.

Permeability of Metals.

MESSRS. EDITORS:—In No. 24, Vol. XV., you have an article on the "Action of Acids on Steel." So far as said article refers to the case spoken of by your correspondent, F. L. K., I think that both your reason and his, for the peculiar effect on the steel wire, are probably incorrect. Some months ago I saw in one of our shops some sheets of zinc which had been tinned in a peculiar way, but I did not ascertain how it was done. I did not inquire, but it appeared to have been tinned by rubbing on a mixture of mercury and tin. The workmen on cutting it discovered that it was very brittle, and ceased using it. A strip taken in the fingers and bent would break up into pieces almost as easily as a piece of pie crust. I suppose that the zinc being very thin (No. 9) the tinning had penetrated, comparatively, to a great distance, and the sheet, instead of being a sheet of zinc with tin outside, was a sheet composed throughout of zinc and tin and perhaps mercury too—being entirely changed in its nature.

In coating one metal with another, the metal coated must be penetrated by the coating metal to some extent, perhaps to one fiftieth of an inch, and if the sheet is only one fiftieth of an inch thick, of course the coating will go entirely through.

Another case. In making milk strainers with wire gauze bottoms we first tin the brass wire gauze, not with chloride of zinc, but with sal ammoniac: but if the soldering iron is accidentally too hot, we melt the brass wire, showing that a new mixture of metals is formed by coating the fine brass wire with solder; for it would take a much higher heat to melt the brass wire alone. The same thing takes place in tinning zinc with a soldering iron.

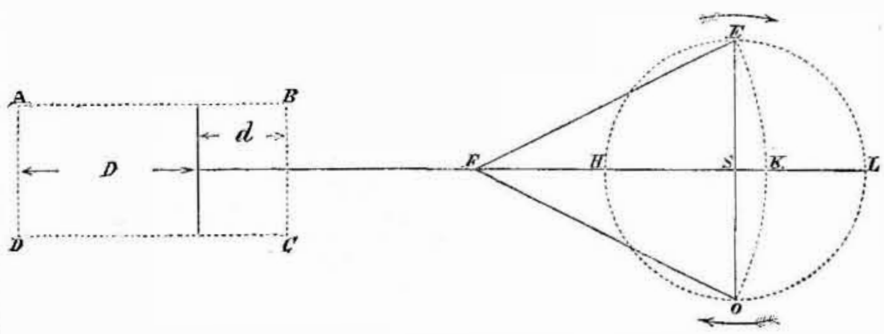
These facts lead me to think the peculiar results spoken of by F. L. K., are due to the tinning and not to the acids.

H. W. S.

"Position of the Piston when the Crank is Vertical."

In an article under the above title in the last number of the SCIENTIFIC AMERICAN, a correspondent makes the following singularly reckless assertion:—"The truth is, no formula can be given for all cases."

It is proposed to show that a formula *can* be given for *any* and *all* cases; a formula which is perfectly simple, requiring no trigonometrical computations, and which is within the comprehension of any schoolboy.



Let A B C D be the cylinder, E F, the connecting rod, S F, the crank, and H E L O, the circle described by the crank pin.

Put C=connecting rod.

c=crank.

D=distance of piston from outer end of cylinder when the crank is "vertical."

d=distance of piston from inner end of cylinder when the crank is vertical.

Conceive the connecting rod disconnected from the crank pin and revolved about E as a center, until it assumes the position E K. Then H K will be equal to the distance, D, of the piston from the *outer* end of the cylinder, and K L will be equal to the distance, *d*, of the piston from the *inner* end of the cylinder.

Now HK=HS+KS

=HS+EK—ES.

But HS=c, EK=C, and $ES=\sqrt{EF^2-FS^2}=\sqrt{C^2-c^2}$.

Therefore, substituting these values, we get

$$D=c+C-\sqrt{C^2-c^2}. \qquad (1)$$

Again, the distance of the piston from the *inner* end of the cylinder, at the same instant, or when the crank pin has arrived at O, will evidently be

KL=LS—KS

=LS—EK—ES.

Substituting for LS, EK, and ES their values as above, we have:

$$d=c-C+\sqrt{C^2-c^2}. \qquad (2)$$

The difference between D and d, as given by (1) and (2), is:—

$$2[C-\sqrt{C^2-c^2}]. \qquad (3)$$

If we suppose C to become infinitely long, the value of $\sqrt{C^2-c^2}$ will be come equal to C, and the difference between D and d will reduce to zero; and the piston will be at the middle of its stroke when the crank is "vertical."

It will be observed, therefore, that the longer the connecting rod the smaller will be the difference between D and d, and *vice versa*.

Example.—Let c=2·5 feet, and C=10 feet. Then from (1) we have

$$D=2{\cdot}5+10-\sqrt{100-6{\cdot}25}=2{\cdot}82 \text{ feet.}$$

(3) gives as the difference between D and d,

$$2(10-\sqrt{100-6{\cdot}25})=0{\cdot}64 \text{ of a foot:}$$

hence

$$d=2{\cdot}82-0{\cdot}64=2{\cdot}18 \text{ feet.}$$

If we make C=5 feet instead of 10, (1) gives us

$$D=2{\cdot}5+5-\sqrt{25-6{\cdot}25}$$
$$=3{\cdot}17 \text{ feet:}$$

while (3) gives, for the difference between D and d,

$$2[5-\sqrt{25-6{\cdot}25}]$$
$$=1{\cdot}34 \text{ feet, or more than twice as great as before.}$$

Finally, $d=3{\cdot}17-1{\cdot}34$

$=1{\cdot}83$ feet.

d might have been found in each case from (2); but the results would have been the same.

It appears, therefore, that this question is not so difficult after all: and it is clear that a resort to geometrical construction will always require more labor, while the results obtained will be less accurate than those obtained by the simple computations indicated in our formulæ. M.

Mrs. Wood on Snake Charming.

MESSRS. EDITORS: I am not a naturalist, nor yet a hunter, but was greatly interested in a paper entitled "Charming by Serpents," in No. 20, page 316, last volume of the SCIENTIFIC AMERICAN, and would like to add a few incidents that have come under my own notice.

One day in early spring time, hearing an unusual chipper ing under a cherry tree near the house, I stepped out to see what was the matter. On looking through the fence I saw a large garter snake, with glaring eyes distended to an unnatural size, and mouth wide open.

A common phœbe bird was rapidly flying—not in circles, but directly up and down from a small twig on the tree—toward the snake. As the bird receded, the snake closed its mouth, opening it again as the bird approached. I noticed a quantity of saliva or foam about the snake's mouth.

In a few moments the "combat" ended, if combat it was. The bird, with eyes as bright as the snake's, made a dive into the mouth of the snake, and was swallowed. I do not think the bird was injured by bites, though I did not examine it.

In this country (California) snakes are larger, more numerous, and of greater variety, than I ever saw at home (New York). Here, they are frequent visitors to the poultry yards, to the great discomfort of young chickens and turkeys: but whether they get possession of them by Mesmer's science, charms, or quarreling, I do not know. That they are swallowed in great numbers is certain. I have seen a large snake, in appearance like a rattlesnake with no rattle, with a good-sized young turkey's foot in its mouth; every time the snake drew or sucked, the turkey would cry out, and then it was perfectly quiet, with closed eyes. On applying a stick to the snake it let go its hold, to make its escape. The turkey seemed tired out, but in a short time was as well as ever.

It may be that snakes never charm. I know that they have never charmed me: they will only do to look at a good way off. It is rather a bold position to take, to tell a story of what one has seen with one's own eyes, that looks as if one believed that snakes do charm, when there is such good authority against the old supposition.

My little daughter, then eighteen months old, was out in the yard, accompanied by her little dog. Hearing him bark violently, I called the child; but receiving no answer, and fearing lest she had fallen into a prospect hole—there were many in that vicinity—I rushed out to find her. The horrible surprise I felt can not be easily imagined. She was standing near the verandah, and but a few steps from her was a great bull snake (so called here) with head erect, and eyes terrible to look at. The dog was barking, and running first toward the snake and then toward the door: his every motion was delight when I came, as I think, to the rescue. The snake did not notice me in the least, but was slowly raising itself from the ground. When I caught the child, the snake fell as though struck. Her body felt like a wilted plant. I thought she had fainted; but she was standing with eyes open, when she came to. She seemed just waking from sleep. I think the strange look in her eyes lasted not more than a moment, though it seemed an age. The snake measured seven feet in length, and very large in circumference, in comparison to its length.

I do not say there was any charm about it, but I think it a queer performance. MRS. R. E. WOOD.

Our Cosy, Napa, Cal., Dec. 12, 1866.

[It was a queer performance, indeed, and the facts as narrated appear to establish the fact that snakes have the power to fascinate.—EDS.

"Shut the Door, John."

MESSRS. EDITORS:—Many of the highest as well as the lowest traits of the human character, are often made known by very simple means. And very important principles in ethics, natural philosophy, and mechanics, have been discovered by accidents, incidents and details which are common in domestic life: but who would have thought, in olden times, of consulting with a four-paneled door, as a philosophic and a metaphysical friend, to obtain a knowledge of the hidden mysteries and the general effects of the human mind?

During the last ten years, in the winter season, according to our daily record, we have noticed the manner in which one thousand persons who called for work, have opened, shut or not shut our store door: this, you may say, is a futile and a useless undertaking; but we entertain a very different opinion. What are the facts, and what the deduction?

First, out of the 1,000 persons recorded, 355 opened the door and shut it afterthem carefully, when they came in and when they went out, without much noise.

Secondly, 226 opened it in a hurry and made an attempt to shut it, but did not and merely pulled it to, when they went out.

Thirdly, 202 did not attempt to shut it at all, either on coming in or going out.

Fourthly, 96 left it open when they came in, but when reminded of the fact, made ample apology, and shut it when they went out.

Fifthly, 102 opened it in a great hurry, and then slammed it to violently, but left it open when they went out.

Sixthly, 20 came in with "how do you do, sir," or "good morning," or "good evening, sir," and all these went through the operation of wiping their feet on the mat, but did not shut the door when they came in, nor when they went out.

REMARKS.—We have employed men out of all the above classes, and during that time have had an opportunity of judging of their merit, etc.

The first class, of 355, were those who knew their trade, and commenced and finished their work in a methodical manner, were quiet, had but little to say in their working hours, and were well approved of by those for whom we did the work, They were punctual to time, and left nothing undone which they had been ordered to do. They did not complain about trifles, and in all respects they were reliable men. and were kind and obliging in their general conduct.

Class the second, 225.—These were not methodical in their work, had much to talk about, were generally late, but were willing to quit work early. They were always in a hurry when we overlooked them, but they did not do as much work in the same time as class the first, and often left little things unfinished, and if they were told of it, would make many trifling excuses, but highly extol their own abilities.

Class the third, 202.—These were negligent in personal appearance and in their work. They talked much about their own good qualities, and were better acquainted with the business and domestic habits of their neighbors than with their own. They always belonged to the temperance society when first set to work, but in a few days afterward their breath would smell more like an old rum cask, than that of human beings. These men were not steady at their work, were always short of money, and could not be relied on in regard to truth and honesty.

Class the fourth, 96.—These were careless in their manner of work, committed many errors, but when they were pointed out to them, would apologize most willingly: soon forgot particular small items; were tenacious of their own rights, but not very nice about the rights of others: still, there was something pleasant in their manners at first sight, but they did not improve on further acquaintance. They required much watching and often talked about what they had done and what they had been, what they could do and what they intended to do, but they seldom did any thing properly.

Class the fifth, 202.—These were of a strong, nervous temperament—always in a hurry—little order and method in their work, often met with accidents, and often got themselves into difficulties by their hasty proceedings: otherwise, they were kind and willing to oblige, but the promises they so hastily made were soon forgotten.

Class the sixth, 20.—These were better dressed than the others, but were not good workmen, as they had tried many things, but had not mastered any one in particular. Their politeness was artificial, and one day was often sufficient to expose their deception. Innocent and small impositions seemed to be their legitimate business. They were too ignorant to blush at their own folly, and too proud to acknowledge their own faults. They were vain in the extreme, and unreliable.

REMARKS.—Whether these rules are applicable to all trades, professions and classes of men, I do not know, but I am thoroughly acquainted with the facts above stated, and also with the traits of character I have there described: therefore I leave the reader to make his own deductions.

JAMES QUARTERMAN.

New York City, January 5, 1867.

Extraction of Oils with Petroleum Naphtha.

MESSRS. EDITORS:—In an article on perfumery, which I wrote for your valuable paper last spring, I recommended the use of petroleum naphtha for the extraction of oils, showing its advantages over other solvents or other means of separating the oils.

Lately Dr. Vohl, in Cologne, has experimented in the same direction. As he came to similar conclusions with myself, I herewith give you his observations on this theme.

The usual method of extracting oils from vegetables, especially seeds, consists in a strong pressure after previous diminution by grinding. This mode extracts a number of substances from the seed, which produce rancidity of the oil or impart to it an unpleasant flavor, thereby impairing or completely destroying its utility for the table, while they by no means improve its value as a lubricator or for burning.

Among the first innovations upon this method was the attempt to extract oil with alcohol, ether, etc. These agents were soon laid aside on account of their limited solvent power and the faulty construction of the apparatus used in the experiments.

The introduction of bisulphuret of carbon into the market at a low price soon brought this substance into use for extracting oils from seeds, wool, etc., although its use is attended with many disadvantages, among which may be mentioned the decomposition of the bisulphuret by causes little studied as yet, producing a deposit of sulphur which imparts to the oil an unpleasant sulphurous odor and taste. The bisulphuret further dissolves, beside the oil, a resinous substance which on exposure to air soon produces rancidity and injures the quality of the oil for the purpose of lubrication.

During saponification such oil spreads an unpleasant odor, which it also imparts to the soap, together with the undesirable property of affecting the colors of metals which may be washed with it, as silver spoons, etc. Sometimes painted wood, doors, etc., are washed with such soap. If the paint contains lead, the change of its color to black will be no credit to the washing. The pressed seeds form moreover valuable feed for cattle, while seeds exhausted with bisulphuret of carbon are disagreeable to them from their offensive flavor.

The properties which a solvent for oils should possess, may then be said to be the following:—The solvent should be completely volatile and easily separable from the fat oil by distillation. It should not be decomposed during extraction of the oil or during distillation, or if decomposed it should not deposit any substance that dissolves in the oil and injures its quality. It should not dissolve any substance injurious to the quality of the oil. It should be cheap and procurable in large quantities.

My experiments have demonstrated that the Canadol, a volatile light hydrocarbon produced from Pennsylvanian and Canadian petroleum, possesses all the properties mentioned, and is therefore especially adapted for the extraction of oil.

A consideration of the first importance is the complete removal of sulphur from the hydrocarbon. For this purpose the treatment with sulphuric acid and bichromate of potash, or with sulphuric acid and peroxide of manganese, should not be omitted. Before using the canadol it should always be tested for sulphur.

Pure canadol has a specific gravity of 650 to 700 at 60° Fah. It boils at 127° Fah., evaporates completely, without leaving a residuum, is neutral and of a pleasant, ethereous odor. This substance behaves differently from other similar hydrocarbons toward fatty oils. Tar oils, benzole, etc., dissolve oils as well as resins produced by the oxidation of the former, and are therefore largely used for removing grease spots from clothes. The canadol, on the contrary, dissolves the unchanged fats and oils with facility and in large quantities, while it exerts very little or no influence upon dried or resinified oils, as well as resins and gum resins. Amygdaline and sinapine (sulpho-sinapisine or sulpho-cyanate of sinapine), contained in many oil-bearing seeds, especially the brassica varieties, are also insoluble in canadol. The yield of oil by this mode of extraction is 6 to 7 per cent greater than in the extraction by pressure, this amount remaining in the latter case in the residuum used as cattle feed.

The oil extracted by canadol is of a bright golden yellow, almost tasteless, and without odor. Its liability to become rancid is very slight, while its freezing point is as low as 18° below zero. It requires no further purification for table use. The canadol, charged with the oil, may be filtered through bone black before its distillation from the oil, when the latter will become almost colorless.

The manipulations on a large scale, in order to be successful, should secure a complete comminution of the seeds, which should then be treated with the extracting solution at its boiling point. The extracting medium should be separated completely from the oil as well as from the refuse seeds. The refuse yields, to boiling alcohol, resin, vegetable matter, and chlorophyll, beside minute quantities of oil. Sinapine may be prepared from it. Mixed with water to a thin mash and heated to 80—100° Fah., it develops ethereal oil of mustard. After treatment with alcohol, no such oil is developed, as the requisite sinapine is wanting.

The action of canadol upon oils is so energetic, that it may be employed for analysis, as it always extracts the oil almost completely, giving results which are at least accurate enough for practical purposes.

The Construction of Wharves.

MESSRS. EDITORS:—In your paper of Dec. 22, I notice that you advocate the construction of piers or wharves on cast-iron pillars, which will allow a free flow of the tides, deposit, etc. This, I think, will be found objectionable, and will have a tendency to cause the deposit to accumulate and fill up the slip or dock much faster than would be the case if constructed so that the tides could not flow under the pier.

Several years since, by an Act of the Legislature of this State, parties were allowed to extend their wharves into the Christiana Creek, provided the wharves were not made solid, but built on piles ten feet apart between the rows, the rows to be placed in the direction of the current. The result has been that the deposit has accumulated under and in front of these wharves, around the piles, so as to make it necessary to extend them into the creek for 80 to 100 feet. There is not now 12 feet of water 100 feet outside of where there was 18 feet thirty years ago. The building of all such wharves has been prohibited by law. GEO. G. LOBDELL.

Wilmington, Del., Dec. 29, 1866.

[The proposal of the New York Pier and Warehouse Company contemplated dredging between the piles.—EDS.

A Singular Celestial Phenomenon.

MESSRS. EDITORS:—On the night of January 1, 1867, at about 11.15 P. M., I noticed a strange appearance in the heavens. This remarkable phenomenon consisted in a bright bar of light, connecting two stars, which lasted several minutes. On consulting the atlas, I placed the position of the phenomenon in the constellation *Eridanus*. A star of the fourth magnitude, near *Theemim*, was connected with another of the same magnitude (about five degrees southwest), by a bright light resembling that of a comet. From the upper one of the two there was a bright light turned off a little more toward the northeast. The color of the light was about the same as that of the star *Aldebaran*. I wish you would inform me through your columns of the cause of this phenomenon.

J. JULIUS CHAMBERS.

In the Clouds.

The Polytechnic Institute appears to be rapidly going into the clouds, and unless it expels some of its superfluous gas it will soon be beyond the reach of the unassisted eye. The Institute as its name implies was established, or at least we so supposed, to furnish information upon the arts. It did very well for a while, but its members seem to be getting far too learned for the mass of mankind. In this number we present our readers with a conglomerate of a very sapient discussion of the nebular theory, solar segregation, cosmogony etc., which contains some atheistical speculations about the eternity of matter, which may do very well to stimulate the fancy but can afford no substantial good. We invite the gentlemen of the Institute to return to the bosom of mother earth, and to confine their investigations to things more practical. The SCIENTIFIC AMERICAN cannot be made the vehicle for ventilating such absurd nonsense.

CENTALS.—The Chicago Board of Trade have resolved that after the first of March, 1867, other Boards of Trade concurring, all transactions of grain shall be conducted by the cental or 100 lbs.: expressing a substantial instead of an apparent measure of food. It is expected the change will be general throughout the country.

IMPORTANCE OF ILLUSTRATING INVENTIONS.

Thousands of persons who have spent a little money in bringing their inventions prominently before the public, have realized rich harvests thereby. We believe, and have abundance of evidence in support of it, that greater results have been effected to the patentee oftentimes, by having his inventions illustrated in the SCIENTIFIC AMERICAN, at the expense of a few dollars, than by thousands spent in injudicious advertising. It is only subjects of merit or novelty that we will publish in these columns, and to the pages of the SCIENTIFIC AMERICAN the public refer for the latest improvements.

Patentees who have good inventions cannot over-estimate the importance of having them first illustrated and afterwards advertised in these columns. It will usually pay tenfold the cost, and has often paid a hundred-fold.

To patentees, and those who wish to have their inventions illustrated in this Journal, the following general directions will be a guide:—

In preparing engravings for publication in the SCIENTIFIC AMERICAN, the use of a model from which to make a design, is preferred. If it is inconvenient, however, to send a model, a well executed photograph, taken from a machine or model, will usually answer the purpose. The Letters Patent should be sent with a statement of the advantages claimed for the invention. After the order is received the engraving will be prepared and published, and the model, patent, and engraving returned by express. For further information address publishers of this paper.

A Pretty Fish.

Mr. Lord, an English traveler, and a clever sensation writer, has just published in London a book on British Columbia and the Pacific Coast, in which among other traveler's tales he gives a lively description of the octopus, in "the Brobdignagian proportions he attains in the snug bays and long inland canals along the east side of Vancouver's Island." The creature is a huge flat disk, with eight long radiating snake-like arms, fringed with numberless suckers, and which it uses like oars in mid-water, like spider legs on the bottom, as climbers on the sides of rocks, as hangers on the rank aquatic vegetation, and collectively as a hand for grasping its prey. These arms are gifted with prodigious strength and lightning-like mobility. The Indians display great skill and daring in hunting the monster in their canoes with long spears.

VARIOUS MINERALS.—We published lately a letter relative to the valuable manganese beds of Arkansas, discovered from geological indications, just before the civil war. To this may be added a more recent discovery of the same kind near Mission Dolores, Cal. Manganese is also mined on San Pablo bay. The rapidly increasing consumption of manganese in the manufacture of Bessemer steel adds greatly to the importance of these developments.—The Tennessee copper mines reopened since the war begin to turn out a large product; impeded however, by the want of sufficient facilities for transportation. Much attention is drawn to the iron veins of that state, by a geological report just published showing very extensive deposits.—The iron of North Carolina is of great value, particularly the mines of Lincoln Co., and the rich deposits on Deep river described by the late state geologist, Mr. Emmons. In the latter region are also found coal, gray and yellow copper, roofing slate, mill stones, and agalmatolite or image stone, a somewhat rare mineral.

CORRECTION OF LOCAL ATTRACTION.—We advise our friend, Captain Forbes, whose interesting communication on this subject we published on page 21 of this volume, to accredit his friend Capt. Martin to the Emperor of Russia. That enlightened potentate has just presented a gold pocket compass set with brilliants, to Mr. A. Smith Jr., of London, in recognition of the value of his mathematical researches into the deviation of the compass in iron ships. As the practical result of the researches of Mr. Smith and the rest of the transatlantic *savans*, according to Captain Forbes, is *nil*, the Emperor probably conceived a bauble to be the most appropriate reward. But as he is accumulating rapidly a great iron fleet, he would undoubtedly make it a very substantial object to a practical Yankee to cure his compasses, even if he could not so admirably diagnose the disease "in the language of the *savans*."

FLAVORING OF CANDIES AND PASTRY.—Chemical imitations of fruit and flower flavors have been carried to great perfection by the French of late years. Few persons suspect the poisonous ingredients which they roll as sweet morsels under the tongue, in mixed candies and flavored cakes. It is well to avoid all flavors that are not derived easily, cheaply and abundantly from nature. But even the oil of lemon, in consequence of the large demand for that flavor, was long ago adulterated or supplanted extensively with a vile imitation from turpentine. The fusel oils, which are very poisonous, give us the delicate and agreeable apple, pineapple and banana flavors now so common in candies. Gum drops and fig paste are not made from gum arabic or other valuable natural jellies, since a poisonous but cheap composition has been invented to supply the large demand for those confections. The cheaper candies for the wholesale trade are also colored with villainous stuff, of which arsenic and other poisons are essential ingredients.

PHOTOGRAPHING SHOT IN MOTION.—The feat has been accomplished of taking a photograph of a cannon ball in its passage from the gun when fired. The ball is shown just protruding from the muzzle of the gun. The front of the camera was covered with a revolving disk, with one or two holes so placed in it as to correspond with the line of the lenses when revolved to the proper point. A strong spiral spring