and are highly polished, the cost is four times more. Therefore the judgment of the seller may be fairly questioned, should he attach much importance to the number of holes jeweled. The high sounding description, the maker's name (unless it is genuine), the offered trial, the enticing cheapness, are often effective baits to the short-sighted.

It has already been shown that the principle of a watch is no proof of the excellence of its quality, the beauty of its case, etc., in no way effects its works, and even the offered trial is not a sufficient test. The purchase of a very cheap watch may teach the useful lesson, that low price is not exactly the word for cheapness. The size and form of a watch are determined by fashion or convenience, and although the appearance is of less consequence to a person buying one for his own use than the quality, yet no reason exists why a good watch should not be handsome, while many that are showy and handsome are good for nothing as time keepers, and are merely useful as articles of trade.

The individual who wishes to procure a good time-keeper should apply to a watchmaker or dealer of known honesty and ability in his art or business, and who therefore should be implicitly trusted. The various prices will point out the comparative qualities of the works, for the external ornament of a good watch form but a small portion of the expense. In regard to choosing either an English, an American or Swiss watch, circumstances must in many instances determine that. There are good makers in each country. If you have a preference for any particular maker, be sure to get one with the genuine name engraved on it. For a moderate thick watch, choose an English or American watch; for a thinner watch, or one of small size for a lady, take a Swiss one, as Swiss watches are to be preferred for small size, style, and lowness of price. With the exception of size, the appearance of a watch is totally independent of its quality as a machine—it may be handsome, yet bad. But a good watch is seldom unsightly, for the knowledge of form, indispensable to a good watchmaker, is doubtless the reason why watches made by good makers generally look well, although they have become antiquated. With regard to size, although there is no necessity for the large, thick watches worn some years ago, yet those very flat and small are deficient in the first principles required for correct performances and durability, and are more easily spoiled by unskillful workmen in repairing. Although all the parts may be in equally reduced proportion, the very particles of the metals, the more rapid decay of the small portion of oil which can be applied, and the limits to the visual power of man, must ever prevent a very small watch from being as serviceable as one of moderate size; that is, the smallest consistent with accuracy and durability. The large, thick, old style of watch is less absurd than some now made. Reason may justify the one, while fancy is the only apology for the other.

There are other circumstances which must also determine the choice. If the purchaser is going in parts of the country where he may not find skillful workmen in case of an accident or repairs, he should procure a watch constructed on a principle generally understood, and which can be easily arranged when out of order.

The preceding remarks are all that suggest themselves as useful to the inexperienced in selecting watches. More detailed instructions would explain the construction of the machine, and might be interesting to a few, in particular to watchmakers—there are works published for their use and instruction; but to be able to discover the quality or imperfections of a piece of mechanism so minute and complicated as a watch, requires knowledge and patience attainable only by a long experience. I will therefore explain the different kinds of watches made, and leave it to the purchaser to make his selection.

Correspondence.

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

Do We See the Sun so soon as it Rises?—Aberration of Light.

MESSRS. EDITORS:—When there are books, as stated on page 277, in which it is laid down that "as it takes light eight minutes to come from the sun to the earth, we do not see the sun until eight minutes after it has risen," then such writers, in order to be consistent, must also state that as it takes light one second to reach us from the moon, we see her at the place she left only one second ago; and as it takes light three, ten, or a hundred years to come from different fixed stars to the earth, we now also see those different stars at the place they occupied three, ten, or one hundred years ago, which is perfectly absurd; this might perhaps be the case if the earth stood still and the stars revolved. As however the earth moves between the sun and fixed stars, which are comparatively at rest, leaving out refraction or other disturbing elements, we see the sun, not eight minutes after it has left the place where we see it, but we see the sun (not only at sunrise but always) twenty seconds of a degree in its apparent orbit ahead of the place it really occupies. This may appear paradoxical, but I will prove it to be the fact.

EFFECT OF ATMOSPHERIC REFRACTION.

It may be well to dispose here of refraction, notwithstanding it is left out of account, its knowledge is related to our subject. It amounts at sunrise and sunset to about half a degree, thus equal to the apparent diameters of our sun or moon. We see, therefore, those bodies when rising or setting so much higher than their true position, so that when they are exactly below our horizon, so that this is in line with their upper edge, we see them above our horizon, touching it with their lower edge, as the apparent motion of the sun amounts to 15° per hour, or 30′ in two minutes' time, its apparent place, when rising almost perpendicular, is, at sunrise, two minutes ahead, and at sunset as much behind his real position. In winter and at high latitudes where the sun rises and sets in an orbit not perpendicular but very oblique to the horizon, its displacement by refraction is not in its orbit, as it is always an apparent lifting up, vertical to the horizon.

DISCOVERY OF THE ABERRATION OF LIGHT.

The problem of the combined effects of the velocity of light and the earth's motion, has been solved by the astronomers of a former century, and is known as the theorem of the aberration of light. Its theoretical solution is in perfect accordance with the minutest practical observations, made with the most elaborate and largest astronomical instruments, which in some observatories of Europe have been constructed, chiefly for the special purpose of measuring the amount of this aberration. The history of this discovery, and of the gradual development of its theory is very interesting, but would occupy many pages of this paper and therefore must be passed by. I will only state that it means the apparent displacement of all heavenly bodies by the motion of the earth, that its amount is independent of their distances from us, that it is zero for those bodies, towards or from which the earth is moving in its yearly orbit, and at its maximum for those placed at right angles to the direction of this motion.

EXPLANATORY ILLUSTRATION OF ABERRATION.

To understand this combined effect of the earth's motion with the transmission of light, let us imagine rain-drops to fall down like they do in a perfect calm, perpendicular to the earth's surface. Let us now suppose we are standing on the platform car on a railroad track, and rapidly moving forward or backward; when moving forward the rain drops will strike the front part of the body, and will appear to arrive under an angle, deviating forward from the perpendicular and greater in proportion as the motion of the car becomes more rapid. When moving backward, the opposite will be the case, the rain-drops will strike from behind at an angle which also will deviate more from the perpendicular in proportion as we are moving faster. In both cases the rain will appear to us to arrive or come down from a direction inclined towards the side we are moving to, and not perpendicular as is really the case.

APPLICATION TO THE ABERRATION OF LIGHT.

Now this is exactly the case in regard to light coming from the heavenly bodies. When we compare the direction of the rain-drops with that of the light, and the motion of the earth in its yearly orbit with the moving railroad car; when the light comes to us at a right angle with the direction in which the earth is moving, it will cause an apparent change in the direction of the light, and consequently in the apparent place of the heavenly body the light is coming from. If the velocity of the earth's motion in its yearly orbit was much slower than it really is, so that it was to our instruments incomparable with the velocity of light, it would exert no influence on its apparent direction; but it happens to be so rapid that the relation is quite within the pale of actual measurement, as the following calculation will demonstrate.

SIMPLE CALCULATION OF THE AMOUNT OF ABERRATION OF LIGHT.

The earth moves in its yearly orbit with a velocity of nearly 70,000 miles an hour, the light is transmitted at the rate of 650 million miles an hour, which is 9300 times faster than the velocity of the earth. When now we take in consideration that an equal velocity of both would change the direction of the perpendicular or 90° into its half or 45°, we see that a velocity of only $\frac{1}{9300}$ will deviate the angle only to $\frac{1}{9300}$ of 45°, or 18 seconds; which, however, ought to be corrected trigonometrically, (for which we have here no space) to about 20 seconds. This now must be the maximum aberration produced by the yearly motion of the earth, on the position of all stars observed at right angles to the direction of that motion. They must all appear displaced to an amount of 20″ forward to the direction of the earth's motion, and this is the most easily observed in all those placed at about right angles to the ecliptic. As the earth moves in its yearly orbit around the sun in the opposite direction it did exactly six months before or after, the apparent displacement or aberration must for the same stars near the ecliptic pole be 20″ in one direction, and six months afterward 20″ to the opposite side of the heavens, making in all 40″ displacement in their positions; they therefore will yearly appear to move in small circles of $\frac{2}{3}$ of a minute in diameter.

ACCORDANCE OF THEORY WITH OBSERVATION.

This now is actually and exactly the case. It takes, of course, very perfect apparatus to observe seconds of degrees, but the more correct and minute the observations have been made, the more they correspond with this theory; for stars around the poles of the ecliptic it is proved fully 40″, for those toward the ecliptic less, and finally for those in the ecliptic, for the time that the earth is moving towards or from them, no aberration whatsoever can be observed.

INFLUENCE OF THE EARTH'S DAILY MOTION ON THE APPARENT PLACE OF THE SUN.

The velocity of the earth's equator by the daily rotary motion, is 1500 miles per hour (only that of a cannon ball), and being thus about fifty times smaller than that of the yearly velocity, would in the most favorable circumstances cause an aberration of less than half a second, which is almost imperceptible by the at present existing most correct instruments, therefore it may be left out of our calculations.

As the daily rotation of the earth cannot to any perceptible degree have any influence on the apparent position of the heavenly bodies, it can have no influence whatsoever on the apparent position of the sun, even at midday, and much less at sunrise or sunset, when this rotation turns us toward or from this luminary.

APPARENT DISPLACEMENT OF THE SUN BY ABERRATION PRODUCED BY THE EARTH'S YEARLY MOTION.

It is only the yearly motion of our earth then, always nearly at a right angle to the position of the sun, which displaces this body apparently, but always in the same direction, to the amount of about 20″, to that part of the heavens toward which the earth is moving at the time of the observation; and as this yearly motion is from east to west, like the apparent daily motion, it must cause an apparent displacement of the sun also towards the west, therefore ahead. The daily rotation is retrograding in regard to the yearly motion, for those parts of the earth's surface where it is midday, and accelerating where it is midnight; at the equator this would diminish the sun's aberration less than half a degree, and in higher latitudes even less, therefore the effects of the daily rotation may be neglected.

RECAPITULATION.

Displacement of the sun upward, observed when at the horizon, caused by atmospheric refraction, 30′ of a degree and 2″ in time. Displacement of sun, forward aberration caused by the earth's yearly revolution as any where observed, 20″ of a degree, $1\frac{1}{3}$″ in time. Displacement of sun, backward aberration by daily rotation observed at the equator at noon, $\frac{1}{2}$″ of a degree, $\frac{1}{30}$″ in time. Displacement of sun, aberration by daily rotation observed near the poles, 0.

New York City. P. H. VANDER WEYDE, M. D.

Velocity vs. Power.—The Value of the Indicator.

MESSRS. EDITORS:—I was much gratified with your article on "Shafting and Belts—Absorption and Transmission of Power," in No. 16, current volume. Permit me to make a few remarks on the same subject.

That the indicator does determine, in the only positive and correct degree, the power developed by the steam engine, has come to be an established and indisputable fact. It has necessitated the abandonment of many beautiful theories, both in regard to the length of belts and the velocity of shafting. Many suppose that an engine of say eighty horse power, should work up to its maximum under all circumstances, and yield that amount of useful power, whatever the length of the driving belt, the relative position of driver and driven, or the velocity of the shafting. The engine that drives its shafting at six hundred revolutions cannot be supposed to yield such an amount of power as one that jogs along at one hundred and eighty. Velocity is a great absorbent of power, and in the first case a very large percentage of the real power of the engine is taken up by the friction of the shafting.

An experiment was recently made to determine the relative amount of power required to drive ring spinning frames at differing velocities. The result was as follows: Thirty-six frames of one hundred and twenty-eight spindles each, one and a half inches ring, running at 6,400 revolutions absorbed, exclusively of necessary friction of shafting and engine, 59.36 indicated horse power; at 6,000 revolutions, 52.78; at 5,400 revolutions, 51.21, and at 4,800 revolutions, 47.38, the other conditions being the same in each case.

More care should be used in the proportions of engines, as well as in the arrangement and velocity of shafting. Some engines have their pipes, valves, and ports too small to ever allow an approximation to the boiler pressure. Some users of steam believe that if an engine has a cut-off it *must* work on the expansion of steam to perhaps double its intended capacity. If valves are properly set, and the ports are of sufficient area, we shall not find, so often as we do now, one end of the cylinder doing from sixty to eighty per cent of the work. It is a wonder that some engines run at all, and they would not in some cases perform a revolution but for the momentum of the fly wheel. The indicator is the instrument for ascertaining these difficulties, and the time will come when it will be held in the estimation it deserves. He who makes its manipulation his specialty, should also understand how to remedy the defects his instrument discovers. He should be able to adjust the parts of the engine, and also ascertain the points at which the power is absorbed by improperly placed shafting, belts, and pulleys. T. P., JR.

Providence, R. I.

Cutting Mirrors.

MESSRS. EDITORS:—Your correspondent "A. M. S., of Mass.," in reference to cutting small mirrors from large ones, is evidently an unskilful operator in the use of the diamond. A pure, clean diamond cut will separate silvered plate just as cleanly as ordinary glass, and without in the least degree injuring the silver. Solutions or other preparations are rather injurious than otherwise, owing to the contraction in drying, tending to "drag" the amalgam.

The chief danger in cutting silvered glass, lies in the unguarded manner in which some undertake the work. Secure a steady, level table; spread evenly thereon a piece of cloth or flannel, free from lumps, chips, drops of hardened glue, etc., (so frequent in workshops); measure off the desired size, and with a skillful confidence put in the cut, taking care not to change the angle of the diamond as the hand is drawn toward the body; commence the breaks at the end where the diamond leaves the glass.

A word as to the cutting properties of the diamond might not be out of place in this connection. Not over one-half of those who use this tool do so intelligently. A true diamond cut in ordinary glass, is a beautiful, clear, hair-like line scarce observable, and noticed plainly in silvered glass only on account of reflection. The usual so called "*cut*" with many is a heavy white line, *something they can see*, or they are not satisfied. Such a cut is mere *abrasion* of the glass, in the part over which the diamond has traveled.

The cutting point is found, in the ordinary glazier's diamond, somewhere between the perpendicular and the angle at which a pen is usually held while writing. This point must be sought for, and the diamond used only by one person. Here is applicable your frequently urged advice, "study the use of your tools," and have your own "kit."

The natural philosophy of the diamond cut in glass has not yet been satisfactorily explained, though studied over by some of the first minds in this country and in Europe. After the fracture of a piece of well cut glass, the track of the diamond is marked by a serried line (something like saw-teeth) of a beautiful regularity, penetrating to the depth of about $\frac{1}{64}$th of an inch, varying slightly according to pressure. This appearance is quite plain to the naked eye, but under the microscope is the full beauty and much cause for astonishment. Thus seen it presents the idea of the line of holes in a sheet of postage stamps, with the exception that the holes are much closer, and appear as if made with an oval instead of a circular punch. A true cut is the result of much practice and study, and will become familiar by a clear, whistling, somewhat musical sound.

Again reiterating your excellent advice, "Study the use of your tools," and much real pleasure will result in their use. ENTERPRISE.

Cincinnati, Ohio.

Electro Magnetism as a Motive Power.

MESSRS. EDITORS:—I have been for years in receipt of numerous letters of inquiry on this subject, and as the writers are undoubtedly for the most part readers of your journal, permit me to refer them to your excellent report of my experiments at the Tabernacle in New York, found in your paper of November 15th, 1851, Vol. 7, No. 9.

It will be remembered that on that occasion I raised by the axial force of magnetism, with a huge helix, a bar of iron of 2000 lbs. weight, 5 inches from the floor. The bar weighed 800 lbs., the platform fastened to the top of it 300 lbs., and the six men on the platform over 1000 lbs. more. The huge mass I caused to vibrate for an inch by my finger. The bar and helix were the kind used in the engine exhibited. The battery used was 50 pairs Groves with platinum plates 12 inches square, 10 inches immersed. Such an enormous power has never been thus far repeated. Zimmermann, a late German author on electricity and magnetism, ridicules the idea, and says, "*It is an American story, and beats Munchausen.*" It will also be remembered that before this, I started with an electro magnetic locomotive to go from Washington to Baltimore. The car weighed 11 tuns, containing 14 passengers, two axial engines under the passenger seats, and a Groves battery of 100 pairs of the above size, swung on rubber springs underneath the car. On the way out the battery cells gave way, the acids mixed, and this happened twice before we reached Bladensburgh, a distance of six miles. It was for the most part an ascending grade. On a level track we made 19 miles an hour, although the machinery was rude and the friction of the engines and car couplings very great. We deemed it prudent to go no further, and had three more breaks on our way home. The engines were rated at four horse power each. All that can be inferred from the experiment is that the power can be increased on the axial plan to any extent, and that the larger the engines and battery the greater the portion of power obtained. The reverse of this is true in every form of engine which employs *electro magnetic attraction* as a source of power. The larger the magnets and engines the greater the loss of power. I have long since, however, come to the conclusion that a practical working engine cannot be made on any plan where the circuit is broken.

The combustion of metals with a three or four horse power is terribly rapid at all the breaks in the cut off. The magnetism must be unchanged and the current unbroken to get a working engine, if it can be obtained at all; and the battery must be constant and convenient. The cost per diem is not the real question. Produce a reliable working engine of even half a horse power, and it will be used in many places with great convenience, and in some with profit, even if it should cost twenty times the amount of steam in a Cornish engine. I need not dilate upon this part of the subject.

CHARLES G. PAGE.

Washington, D. C.

Casting Metal in Plaster Molds.

MESSRS. EDITORS:—When reading No. 13, current Vol., on page 201, I see one of your correspondents speaks of plaster of Paris for molds for castings of low fusible metals, and recommends that the mold be subjected to a heat of 400° F.

I must differ with the writer. I have had some experience in the use of plaster of Paris for molds, and I found the best plan was to dry the molds perfectly in open air. When about to use them, I warm them just enough so that they would not chill the metal when poured in. After warming I held them over a flame that produced a good deal of smoke, until the inside of the mold was completely blackened over. Then I could get about two hundred castings from each mold, after which the plaster became soft and small particles broke off. Upon examining I found the plaster was burnt and of no further use for molding purpose. A. C. SMALL.

Augusta, Ga.

Water Rams.

MESSRS. EDITORS:—As a more full reply to the correspondent, p. 167, about the water ram, we may say that a good water ram yields 60 per cent of the water expended, thus: that it yields 60 per cent useful effect of the mechanical power expended. This mechanical power and effect we obtain, of course, by multiplying the weight of the water by the height it falls or is raised. For instance, let 100 lbs. of water fall 3 feet, the power is represented by 300; this will raise 6 lbs. 30 feet, of which the mechanical effect is represented by 6 × 30, or 180; now 180 is 60 per cent of 300; and so the mechanical effect is 60 per cent of the power expended.

M. P. P., of E. W., Mass., states that he finds that his ram raises by a fall of 3 feet about one-sixth of the water expended, some 30 feet; this would for 100 lbs of water expressed be 16 lbs. raised. The mechanical power is here 3 × 100, or 300; the effect is expressed by 16 × 30, or 480; more than three times the effect of the best ram, and 60 per cent more than the power employed, which evidently is an absurdity. If this was so, he could obtain from the water thus raised more power than from the original fall; and being able to raise easily six times the amount of water to only one-tenth of the hight, he would possess perpetual motion of the hydraulic kind. Evidently our correspondent overestimates the amount of water raised, and it should, according to the other circumstances mentioned, read $\frac{1}{16}$ in place of $\frac{1}{6}$.

Screw Threads---Honor to Whom Honor is Due.

MESSRS. EDITORS:—In your edition of April 25th I notice an article entitled "Screw Threads and Bolts—A Uniform System," in which you speak of my system. Doubtless you have before you one of my drawings of the Franklin Institute System, which I published about one year ago, and which has come into very general use in many parts of the country. Now I am not in any way responsible for this system, nor would I claim the honor of originating it.

The committee who prepared this system had it under investigation from April 21, 1864, to December 15th of the same year, when it was reported to and adopted by the Institute and the committee discharged. It consisted of the following named gentlemen: Wm, B. Bement, Chairman, firm of Bement & Dougherty; C. T. Parry, Superintendent Baldwin's Locomotive Works; J. Vaughn Merrick, firm of Merrick & Sons; John H. Towne, firm of I. P. Morris, Towne & Co.; Coleman Sellers, Engineer Wm. Sellers & Co.; B. H. Bartol, Superintendent Southwark Foundery; Edward Longstreth, Foreman Baldwin's Locomotive Works; James Moore, firm of Matthews & Moore; Wm. Sellers, firm of Wm. Sellers & Co., and Algernon Roberts, of the Pencoyd Iron Works. The above committee have given good reasons for the adoption of this system as stated in my circular, and in view of all the facts it is due to them, and to the machine making public, to yourselves and to myself, that this explanation be published, believing that you wish to do justice to all concerned in this matter. EDWARD LYMAN.

New Haven, Conn.

Why is it?---Water vs. Beer.

MESSRS. EDITORS:—I have frequently amused myself by arranging a row of common glass tumblers, and pouring a greater or less quantity of water into each, thereby producing the different tones of the diatonic scale. But the other day on attempting the same experiment with ale, I found that the sound was deadened—that on striking the tumblers there was no vibration, the effect being as if they were cracked. Can you inform me why ale should thus check the vibration, while water only alters the pitch of the tones without destroying their ringing quality? O. T. A.

Geneva, N. Y.

[Beer is to some extent gelatinous in consistency and thus cannot give the ring of the more mobile water.—EDS.

Editorial Summary.

AMMONIA IN COAL GAS.—Dr. Gunning of Amsterdam, calls attention to the fact that coal gas, however well purified, is by no means free from ammonia. The result of some experiments he has conducted, shows the existence of a little over one cubic foot of ammonia, or ammoniacal substances, in every one thousand cubic feet of gas. Attention is called to the fact that where wet gas-meters are in use, the water, being rarely if ever changed, must in time become fairly saturated with ammonia. A meter used for two years in the laboratory at Amsterdam, with a capacity for fifty-seven gallons of water, held no less than nine pounds of these bases. Since coal gas also contains sulphur compounds, there is formed sulphate of ammonia, which, converted by the intense heat into bisulphate of ammonia, attacks the glass cylinders, or chimneys, placed on the Argand gas burners.

CHLORIDE OF COPPER is now extensively used in Germany as a preventive against the cattle plague. The mode of administering the specific is as follows: A solution is first made by dissolving one quarter ounce of the green crystalized salts in spirits of wine. In this solution a pad of cotton is soaked for a time, and is then laid on a plate and set on fire in the center of the stable, the animals' heads being turned toward the flame, so as to make them breathe the fumes. The operation is performed morning and evening, and a spirit lamp filled with the solution left burning in the stable every night. The liquid is also administered internally, with the addition of one half ounce of chloroform for the above quantity, a teaspoonful being put into the animal's drink three times a day.

EXPERIMENTS WITH CATERPILLARS.—A late experiment in the southern part of England has proved that the ordinary caterpillar cannot be made available in yielding, like the silk worm, a profitable article of merchandise. Plantations of ailanthus trees were set out, and many eggs were procured. After hatching, the young caterpillars fed plentifully, attained their growth, and finally made cocoons. So far all was encouraging, but, on unwinding, it was found that unlike the cocoon of the silkworm proper, which sometimes yields a thread two thousand yards long, the filament from the caterpillar cocoons was in short lengths, necessitating carding in order to arrange the fibers, a process very expensive, and furnishing a weak, lusterless material when finally woven.

CURE FOR WHOOPING COUGH.—Physicians in Hartford, Conn., have adopted with marked success a new method of treatment for curing children afflicted with whooping cough. The juvenile patients are taken on a tour of inspection to the city gas works, and while intently engaged in witnessing the various processes employed in manufacturing their evening's artificial-illumination supply, they breathe the not very pleasant air of the gas house. In some way, not very clearly understood, the inhaling of this air is found to cure or greatly alleviate the complaint. This ingenious method of benefitting the youthful mind and body simultaneously has become immensely popular in the place, the people at the gas works asserting that during the last twelve months no less than three hundred cases have been experimented upon, the results, generally, being of a most favorable character.

EFFECT OF EXPOSURE ON COAL.—Prof. Rockwell, has called attention to the deterioration which coal suffers from exposure to the weather, and to the importance of keeping it as dry as possible. Anthracite suffers the least; bituminous the most. According to the experiments of Grundmann, in Germany, coal exposed to the weather in heaps lost during a period of nine months 50 per cent of its value as fuel, and about as much as a gas making material; it undergoes a process of slow combustion, taking up oxygen, and giving off the volatile products of oxidation,—air and moisture playing the principal part, and warmth promoting it; the valuable combustible ingredients are lost, and the injurious ones, as sulphur, oxygen, and ash, are relatively increased. Coke from weathered coal is of inferior quality, losing its coherence.

A WEATHER TOY.—A Bostonian, says the *Commercial Advertiser*, has a toy barometer on exhibition, which consists of a miniature cottage, with two doors. At one of these stands a man, clad in such purple and fine linen as constitute a Sunday-go-to-meeting garb in New England, while at the other appears a female arrayed in like apparel. These twain seem to watch the impending weather. If there are signs of rain, the man, with a noble bravery worthy of a better fate, steps boldly out of doors, while the woman shrinks into the cottage. But if the signs are favorable, the woman goes forth to shop and gossip, while the man stays at home and tends house and baby. A thermometer forms part of the household furniture of this institution.

FRENCH OPIUM. It has been demonstrated in France that opium can be extracted from the poppy, the greatest and almost the only drawback to its profitable manufacture, being the frequency of rains occurring at the time when incisions have been made in the stems, whereby a large portion of the juice is either lost or spilt. Lately M. Lallier has tried the plan of pulling up the plants by the root, in the proper season, and bringing them under shelter, where the incisions may be made regardless of the weather. The plan has answered beyond expectation, and the roots being kept in water during the process, a larger proportion of milky juice is obtained than usual.

THE MEDALS and diplomas awarded to the American exhibitors at the late Exposition, are now on exhibition in Washington. The collection is one of great interest, comprising four crosses of the Legion of Honor; three grand prizes; fifteen gold, seventy-four silver, and ninety-five bronze medals; two hundred diplomas, and a series of photographic views of the Exposition. One silver medal was decreed to the United States government for specimens of settlers' houses; a bronze medal was also struck for the Agricultural Bureau, and one gold medal was awarded to the "*Industrie armoirière des Etas-Unis d'Amérique.*

A NEUTRAL MAGNETIC CHAMBER.—Faraday has shown that if a small cubical space be inclosed by arranging square bar magnets, with their like poles in apposition, so as to form a chamber, within that space all local magnetism inferior in power to the magnets employed, will be neutralized. The same effect may be obtained with electro-magnets as with permanent magnets, and it is proposed in the *Mechanics' Magazine* thus to inclose the compass of an iron ship, as a remedy for the deviation by local attraction. A battery might be constructed to be excited by the sea water flowing through it, requiring no attention as long as the zinc plates lasted.

ENGLISH TELEGRAMS.—The uniform rate for transmission of messages throughout the United Kingdom,—provided the English government decide to take the telegraph lines under its charge,—is not to exceed one shilling for every twenty words, irrespective of the distance sent, and exclusive of the names and addresses of senders and receivers; the same charge also including the cost of delivery by special messenger, within one mile of the terminal office.

STEEL BILLIARD BALLS.—Among other new uses of steel, one of the latest, as we learn from a foreign cotemporary, is the employment of this metal in the manufacture of billiard balls, in place of ivory. Such balls are recommended for their great elasticity and their freedom from any liability of cracking.

CARBOLIC ACID.—A correspondent of the *Lancet* testifies that among the many other virtues of this substance, is its value in odontalgia, or, less technically, toothache. To one drachm of collodium flexile add two drachms of Calvert's carbolic acid. A gelatinous mass is precipitated, a small portion of which inserted into the cavity of an aching tooth invariably gives immediate relief.