several of the mightiest, the most essential aids to civilization.

This superiority of the Japanese is, as may be expected, more clearly visible in the representation of living figures, and particularly of the human form. Nothing can offer a more vivid contrast than the egg-shaped simpering faces, the entire absence of anatomy so long familiar to us on Chinese fans or porcelain, when compared with the vigorous muscular developments, the expressive countenances, and the ever-present sense of fun which pervades even the common picture-books of Japan. Printed and colored by blocks, and obviously very cheap, their amount of artistic power is truly remarkable, and the Japanese schoolboy has needed no Felix Summerly to stand up for his rights to be nourished on good mental food so far as relates to art. It must be admitted that decorum might at times be better guarded. These cheap books are mostly pervaded by a spirit of cariacature, tending, as by its nature cariacature must, to exaggeration. But the Japanese artist can, if he will, confine himself within strict academic limits without thereby sacrificing force.

A class of ornaments peculiar to these islands may, from their small size, have met with less attention from the ordinary visitor than their merits deserve. We allude to the small steel or bronze carvings which the Japanese wear at their girdles, which—to use the language of the seafaring—have a ribbon rove through them to support a tobacco-box, much like the watch, chain, and seals of the past generation. Some of these will repay close examination. Small in size, for they are rarely larger than an almond shell, they contain but one or two figures, a captive in his dungeon, or a huntsman stabbing a boar, but of singular vividness and breadth of execution.

We have in recollection at this moment, a wizard "so lean his eyes were monstrous, while the skin clung but to crate and basket, ribs and spine," that might have sat to the laureate for his life-like word portrait of Merlin's brother enchanter. Hitherto, however, all the specimens of Japanese art which have reached England have been ordinary marketable commodities, procurable by any one with a moderate command of ready cash, and it is with much interest that we can now contemplate a specimen of what they themselves regard as an individual specimen of high art. Dr. A. Barton has lent to the South Kensington Museum, England, a painting well known to the critical community of Japan, and which indeed—so we are informed—had to be brought away with some precautions to avoid the risk of a governmental embargo. The picture is in water color on silk, or possibly the admixture of silk and paper peculiar to that country, and represents a tiger, life-size, or to speak with strict accuracy, of the size of a leopard, though the colors are those of the huge tiger of Bengal. The animal is in a singularly bold position, giving ample play to the skill of the artist in foreshortening. The body clings to a huge rock, the hind leg appearing on one side, the fore leg on the other, while the chief mass of fur appears above the top of the stone. The creature is gazing at an unseen foe, the eyes fiercely expressive, the formidable jaws open, and the skin flattened over the skull, in the manner any one may observe in the common cat when excited by fear or rage. The most wonderful point in this very curious picture is the manner in which the fur is painted. Each particular hair seems to stand on end, and so accurately are brought out the spiral radiations of separate hairs from a central nucleus that more than one observer has been convinced that they had before them an actual skin and not a pictorial representation. This error is the more easy to fall into, as the chief defect in this marvelously vivid imitation is its want of shadow. This, the common fault in Oriental paintings, causes the limbs to lie flat against the rock and spoils what would otherwise be an almost complete deception. The accessories of the picture, a waterfall, and mossy stones, are dashed in with a singularly bold carelessness which, to speak truly, renders it somewhat difficult to decide what the painter meant by his conventional dabs and smears.

What Are Brittleworts?

The Diatomaceæ, or Brittleworts, are unicellular microscopic plants, so numerous that there is hardly a spot on the face of the earth, from Spitzbergen to Victoria Land, where they may not be found. They abound in the ocean, in still running fresh water, and even on the surface of the bare ground.

They extend in latitude beyond the limits of all other plants, and can endure extremes of temperature, being able to exist in thermal springs, and in the pancake ice in the south polar latitudes. Though much too small to be visible to the naked eye, they occur in such countless myriads as to stain the berg and pancake ice wherever they are washed by the swell of the sea; and when inclosed in the congealing surface of the water, they impart to the brash and the pancake ice a pale ocherous color.

Some species of diatoms are so universal that they are found in every region of the globe; others are local, but the same species does not inhabit both fresh and salt water, though some are found in brackish pools. The ocean teems with them. Though invisible as individuals to the naked eye, the living masses of the pelagic diatoms form colored fringes on larger plants, and cover stones and rocks in cushion-like tufts; they spread over the surface as delicate velvet, in filamental strata on the sand, or mixed with the scum of living or decayed vegetable matter, floating on the surface of the sea; and they exist in immense profusion in the open ocean as free forms. The numbers in which they exist in all latitudes, at all seasons, and at all depths—extending from an inch to the lowest limit to which the most attenuated ray of light can penetrate, or at which the pressure permits—are immeasureably in excess of what we have been in the habit of assuming. Temperature has little to do with the distribution of diatoms in the tropics; it decreases with the depth at a tolerably fixed rate, till it becomes stationary. It increases in the polar regions with the depth, and approaches the standard, which is probably universal, near the bed of the ocean.

Diatoms are social plants crowded together in vast multitudes. Dr. Wallich met with an enormous assemblage of a filamental species of Rhizosclenia, which is from six to twenty times as long as it is broad, aggregated in tufted yellow masses, which covered the sea to the depth of some feet, and extended with little interruption throughout six degrees of longitude in the Indian Ocean. They were mixed with glistening yellow cylindrical species of such comparatively gigantic size as to be visible to the naked eye.

Other genera constitute the only vegetation in the high latitudes of the Antarctic Ocean. Dr. Hooker observes that without the universal diffusion of diatoms in the south polar ocean, there would neither be food for the aquatic animals, nor would the water be purified from the carbonic acid which animal respiration and the decomposition of matter produce. These small plants afford an abundant supply of food to the hervivorous Mollusca and other inhabitants of the sea, for they have been found in the stomachs of oysters, whelks, crabs, lobsters, scallops, etc. Even the Noctiluci, those luminous specks that make the wake of a boat shine like silver in a warm summer night, live on the floating pelagic diatoms, and countless myriads are devoured by the enormous shoals of Salpi, and other social marine animals.—*Mrs. Somerville.*

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Improvement in Construction of Smelting Furnaces.

MESSRS. EDITORS:—As a reader of your excellent journal I have been much interested in the various articles published on the manufacture of iron, steel, etc.

My object in writing to you is to call attention to the manufacture of pig iron, and to get information and suggestions. I believe there is yet much improvement to be made, but not altogether in the direction now generally pursued.

If I am right, the principal improvements of late consists in building the stack much higher than formerly, in order to utilize the heat and more thoroughly prepare the stock for melting; second, to greatly increase the temperature of the blast, in order to perfect the melting when the stock arrives at the proper point, or "bone," as I believe it is called.

I have been engaged in melting iron in a cupola for a number of years, and for the past two years have changed the construction of the inner walls of the cupola and tweers, and for the past twelve months have accomplished much in utilizing the heat, and have consequently made a large saving of fuel. We use ninety graduated tweers in a cupola 36 in. in diameter. This arrangement thoroughly distributes the blast through the coke in place of chilling it, as it does in the ordinary way.

I am not aware that this plan has been tried in a blast furnace, although various patents have been granted. No patent, however, has been allowed for this specific arrangement or thing like it. If it could be used, and the same result attained in the manufacture of pig iron it would be a very important advance in the right direction. It is the opinion of practical men that it can be, and the hot blast dispensed with, but with the hot blast perhaps better results would be obtained.

I send the result of one day's work, and although it is somewhat better than the average year's work, it is not materially so.

COKE.		IRON.	
No. of charges.	Total.	No. of charges.	Total.
1 or bed	1,400	1	5,000
2 of 120 lbs. each	240	2 of 1,000 lbs. each	2,000
19 of 100 lbs. each	1,900	19 of 1,000 lbs. each	19,000
6 of 80 lbs. each	480	6 of 1,000 lbs. each	6,000
	4,020		32,000
Coke returned not burned	875	Iron returned not melted	462
Coke actually burned	3,145	Iron actually melted	31,538

One pound of coke melted ten pounds of iron. Loss in melting, two per cent.

Amount of limestone charged per tun, 50 pounds.
Size of cupola across the tweers, 36 inches.
Size of cupola above the tweers, 48 inches.
Hight to charge hole, 13 feet.
Two cylinders, each 36 inches in diameter, 30-in. stroke.
No. of revolutions per minute, 60.
Cubic feet of air per minute, 4,241.
Time in melting, 1 hour and 40 minutes.

Cincinnati, Ohio. R.

A Recommendation to "Many Farmers."

MESSRS. EDITORS:—In a recent issue of the SCIENTIFIC AMERICAN, my attention was drawn to the request of "Many Farmers," for an invention that would enable them to utilize waters running through their lands to waste while their corn crop is suffering by drought. To my mind it seems that if "Many Farmers" would club together and purchase one of the steam engines now in use to extinguish fires, they might draw the water from a considerable distance and throw showers over their fields at pleasure. These machines are portable and readily conveyed from one distant point to another, and if expensive at first, their utility would soon cover the cost, and the annual interest on the sum invested would be less than ditching, or pipes, etc.

In the same issue a substitute is wanted for the present cruel "method of branding cattle." It occurred to me that a chemical compound could be employed; say, Quicklime, 1 oz. ounce; niter, ½ ounce; orpiment, 3 drachms; sulphur 1 drachm; soap lees, 4 ounces, mixed and evaporated to a proper consistence to print with, or lime and water mixed to a thick cream, and passing through the mixture 25 or 30 times its volume of sulphureted hydrogen gas till the gas begins to escape, then stop the process. This pulpy mass laid on the hair for 12 or 15 minutes, then washed off with a sponge, will remove the hair as well as burning. The rain might do the washing off.

Perhaps this may suggest to your own prolific minds a still better compound. J. STAUFFER.

Lancaster, Pa.

The Premium Offered on a Time and Percussion Fuse by the Swiss Government.

MESSRS. EDITORS:—The Swiss Government, according to statements made in the Swiss newspapers, offers a premium of £2,000 in gold for the best time and percussion fuse for shells, and names Oct. 1st, 1869, when models are to be presented to the military department at Berne.

Inventors would like to know—First, is the notice official? Second, are inventors of all nations invited to compete? Third, is it not a time and concussion fuse that is desired? Fourth, is the fuse to be attached to the shell and fired? Fifth, what kind of rifle shell is used?—Is it on the button system, which allows windage and ignites the fuse without a fulminate, or is the sabot of such construction as to cut off all windage and thereby require a fulminate to light the fuze?

Any official facts published in your paper relating to the above would much oblige inventors in this country.

Washington, D. C. THOMAS TAYLOR.

[We have not seen the notice referred to and cannot answer the inquiries made. Perhaps some of our correspondents may be able to give the desired information.—EDS.

Editorial Summary.

MOUNTING small insects for the microscope, such as parasites and acari from birds, beetles, etc., may be performed by placing the live insect on the inside of a sheet of tolerably good note paper, folded, and when in the act of running, closing the paper and pressing it tightly in a book. By this means the legs and antennæ may be nicely extended, all the expressed moisture absorbed by the paper, and the skin left apparently unbroken. It should be allowed to remain in the book about two days, when it may be carefully removed from the paper, put in the turpentine bath, and afterward mounted in balsam in the usual way.

TURPENTINE AS A REMEDY FOR LOCKJAW.—The *Medical and Surgical Reporter* notices the communication of one of our correspondents in regard to turpentine as a remedy for lockjaw. It says it is one of the numerous remedies long known to physicians, and that its efficacy cannot be relied upon with certainty. The fact is that lockjaw is one of the most obstinate complaints physicians are called upon to treat, and no remedy has been yet found which certainly masters it. The Calabar bean has been lately tried with considerable success, administered hypodermically. This remedy is not, however, a new one, and has failed in many instances.

WE hope no reader will fail to peruse the article entitled "Patents or No Patents," published in another column. They will find therein much that is instructive as well as amusing, and will become convinced of three facts: First, that English workingmen are not such asses as Sir Roundell Palmer and Mr. Mcfie evidently took them to be; second, that the patent laws of that country are not likely to be repealed; and, third, that the American patent laws are, as a whole, superior to those of England, if not to those of any other country on the face of the earth.

THE poor children of Philadelphia, says the *Ledger*, are largely interested in the peach kernel trade. They extract the kernels from the "stone," put them upon strings, or threads, in bunches numbering from one to five hundred, and sell them to the druggists. The price is one cent a hundred, and an industrious gleaner might, possibly, collect, crack, and string 500 in a day; so that those urchins in the trade are not likely to be called on to pay income tax. The kernels are used, principally, for making alcoholic "bitters," and are chiefly valuable for the hydrocianic acid to be procured from them.

KENNEDY'S PATENT SADIRON.—The inventor of the sad-iron, illustrated and described on page 116, current volume, desires us to state that the bracket and pulley arrangement for taking up the slack in the flexible gas tube, is only necessary on very large work. For ordinary domestic use it may be dispensed with, the simple flexible tube of the proper length affording ample play for the iron.

"COSMOS" says that while some drainage works were being executed at Vielsalm, province of Liege, Belgium, the workmen found, at no great depth under the surface, a piece of native copper, weighing about four and a half pounds, and partly hollow inside exhibiting crystals. This discovery led to some further research, which resulted in finding some veins of malachite.

Unless glass is carefully annealed and thoroughly well made it is apt to cool unevenly; this does not affect the transparency or its appearance, but is discoverable on examination by polarized light.

STEREOTYPING by the paper-machie process was invented by Genaux, of Paris, in 1829.

Improved Machine for Boring and Mortising Blind Stiles.

This machine, as illustrated in the accompanying engraving, embraces all the features of the machine for which a patent was granted to Leonard Worcester, July 5, 1859, together with several other valuable improvements for which a patent is now pending, and which, it is claimed, render it the most efficient machine for the kind of work it is designed to execute on all kinds of stock now manufactured.

Machines have been made for some time that would mortise soft lumber free of knots and shakes, but none before this have had the necessary combination for both boring for revolving slats, or mortising for fixed slats, in all kinds of stock, hard or soft, clean stock or knotty and shaky timber, and for leaving the mortises free from chips ready for the insertion of the slats.

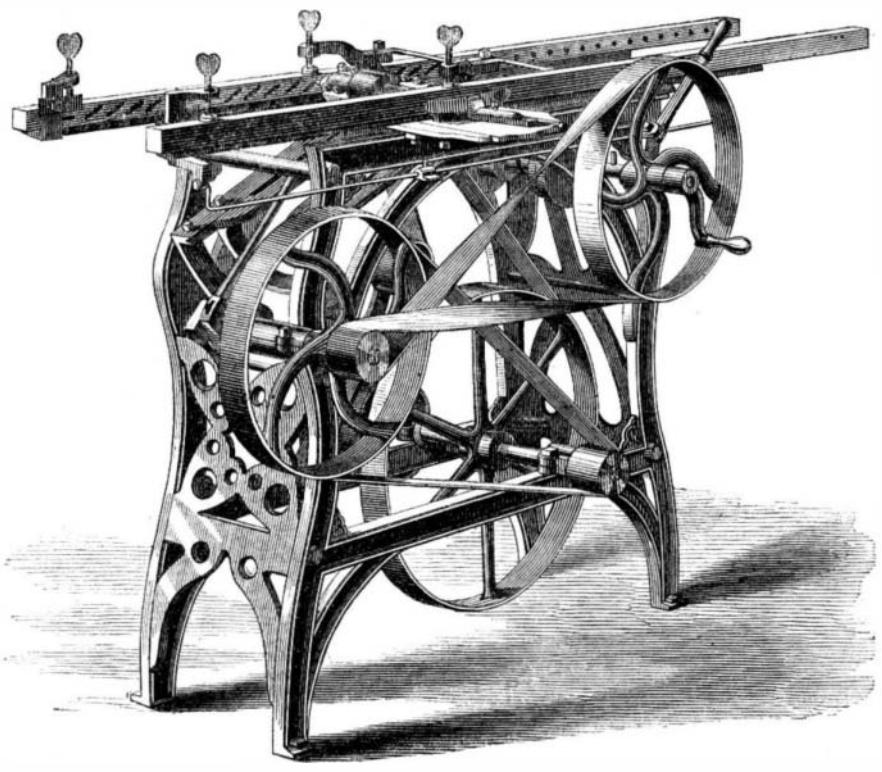
This machine is entirely automatic in its operations, either boring round holes for the pivots of revolving slats, or mortising the recesses for the ends of fixed slats. In cutting these recesses it can be adjusted to make them at any required angle. The cutting of the recesses is done by means of a reciprocatory or traversing burr or bit, which, we have already said, can be used in any obstinate description of wood, where ordinary machine chisels fail. It will also make the mortises any length from a round hole up to two and one half inches, and of any width or depth required in a window blind.

All the operator has to do is to put in the stiles and set the machine in motion, when it does its work, and, having done it, stops. It does the work on both stiles at once at the rate of sixty mortises per minute. One man, the inventor asserts, can set out and mortise from 125 to 150 pairs of blinds per day with one machine.

The bit or burr is a very simple device, not liable to be broken and easily kept sharp. It costs only ten cents.

The machine is very simple in construction and is made wholly of iron and steel. It is thoroughly built and easily set up and put in operation, and is not liable to get out oforder. Not more than one half a horse power is required to run it.

It is peculiarly adapted to the work on car blinds, where the mortises are less than one eighth inch in width, and, consequently, difficult to make with chisels of ordinary construction. Agents for its introduction throughout the United States are wanted. For further particulars address Martin Buck, agent, Lebanon, N. H.



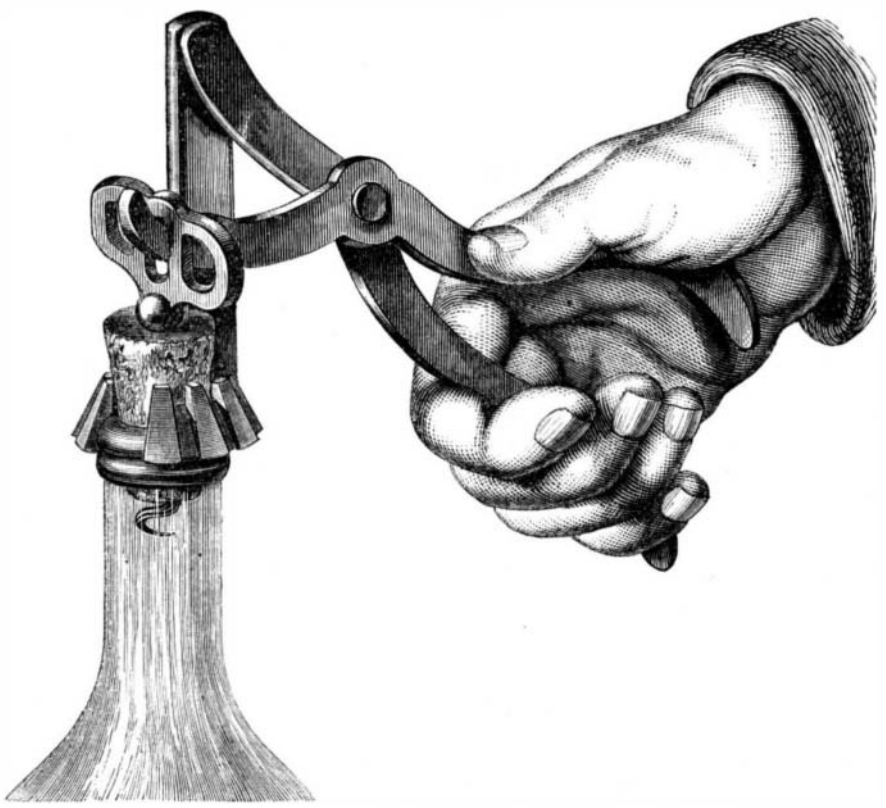
BLIND STILE BORING AND MORTISING MACHINE.

Improved Cork Extractor.

Our engraving shows a simple and powerful implement for extracting corks from bottles, patented Jan. 14, 1868, by James Morton, of Philadelphia. It consists of three bars pivoted together, which, together with the corkscrew, constitute the entire apparatus. One of the bars has a socket or cap at its lower end, which is placed on and around the nose of the bottle. Near the upper end of this first post or bar is pivoted the end of the second bar, near the middle of which the third bar is pivoted. The second and third bars have handles at their outer ends, and at the inner end of the third bar is a hook.

This hook engages with the corkscrew in the manner delineated in the engraving, and by forcing the handles together or pressing them downward, the cork can be easily extracted. The instrument is equally adapted to extracting corks on which rings or hooks are already formed so that no corkscrew is needed.

For further particulars address James Morton, 912 South Eighth street, Philadelphia, Pa.



MORTON'S DOUBLE-LEVER CORK EXTRACTOR.

A Deserved Testimonial.

A few days since Moses G. Farmer, Esq., of Salem, Mass., was presented with a sardius, or red carnelian intaglio, of Sir Isaac Newton, estimated to be about 200 years old, by S. W. Dewey, of this city, in consideration of his electrical investigations and inventions. This latter gentleman, in presenting it, stated that since being its proprietor he had often thought he would present it to Professor Morse, in token of the great good he had conferred upon the human family by his telegraph inventions, but lately he had become convinced that Mr. Farmer, the inventor of the fire-alarm telegraph and the American compound telegraph wire, was eminently deserving of it. Mr. Dewey received the intaglio from a Mr. Bishop, late of New York, who received it from his father, who was a diamond setter to the sovereigns of England, France, Spain, and Portugal, and the records held by him of the jewels he had in his possession were such as to leave no doubt as to the antiquity of the gift and the probability that it was taken from life.—*Boston Traveler.*

Professor Tyndall.

The following agreeable personal sketch of Prof. Tyndall, by a correspondent of the New York *Tribune*, will be perused with interest by our readers who have so often seen his name in these pages:

"One of the most agreeable features of my brief visit in London was the acquaintance, which, through the kindness of friends at home, I was enabled to make with several eminent scientific men whose names are cherished with equal honor on both sides of the Atlantic. Soon after my arrival I called on Prof. Tyndall at his rooms in the Royal Institution, a learned society, which, from the commencement of the present century, has exerted a marked influence on the development and popular diffusion of scientific knowledge in England. Its history is illustrated by some of the most important discoveries of the age in the natural sciences, including the labors of Count Rumford, Sir Humphry Davy, Faraday, and Prof. Tyndall himself, whose enthusiastic, poetical temperament and remarkable gifts of expression, combined with the habit of rigid scientific analysis, have contributed largely to create and gratify the taste for popular science, which prevails among a very considerable portion of the cultivated classes in English society.

"Prof. Tyndall has all the ardor of a reformer, without any tendency to vague and rash speculations. Recognizing whatever is valuable in the researches of a former age, he extends a gracious hospitality to new suggestions. With a noble pride in his favorite branches of inquiry, he is not restricted to an exclusive range of research, but extends his intellectual vision over a wide field of observation. The English, as a rule, are inclined to be suspicious of a man who ventures beyond a special walk in the pursuit of knowledge. They have but little sympathy with the catholic taste which embraces a variety of objects, and is equally at home in the researches of science, the speculations of philosophy, the delights of poetry, and the graces of elegant literature. But a signal exception to this trait is presented by Prof. Tyndall. His mind is singularly comprehensive in its tendencies, and betrays a versatility of aptitude, and a reach of cultivation, which are rarely found in union with conspicuous eminence in purely scientific pursuits. In his own special domain, his reputation is fixed. His expositions of the theory of heat and light and sound, and of some of the more interesting Alpine phenomena, are acknowledged to be master pieces of popular statement, to which few parallels can be found in the records of modern science. But in addition to this he possesses a rare power of eloquence, and manifold attainments in different departments of learning. I do not know that he has ever written poetry, but he is certainly a poet in the fire of his imagination, and in his love for all the forms of natural beauty. Nor has he disdained to make himself familiar with the leading metaphysical theories of the past age, in spite of the disrepute and comparative obscurity into which that science has been thrown by the brilliant achievements of physical research. I noticed with pleasure in his conversation his allusions to Fichte, Goethe, R. W. Emerson, Henry Heine, and other superior lights of the literary world, showing an appreciation of their writings, which could only have been the fruit of familiar personal studies. Besides the impression produced on a stranger by his genius and learning, I may be permitted to say, that I have met with few men of more attractive manners. His mental activity gives an air of intensity to his expression, though without a trace of vehemence, or an eager passion for utterance. In his movements he is singularly alert, gliding through the streets with the rapidity and noiselessness of an arrow, paying little attention to external objects, and if you are his companion, requiring on your part, a nimble step and a watchful eye not to lose sight of him.

"Though overflowing with thought, which streams from his brain, as from a capacious reservoir, while his words 'trip around as airy servitors,' he is one of the best of listeners, never assuming an undue share of the talk, and lending an attentive and patient ear to the common currency of conversation, without demanding of men the language of the gods. The singular kindness of his bearing, I am sure, must proceed from a kind and generous heart. With no pretense of sympathy, and no uncalled-for demonstrations of interest, his name will certainly be set down by the recording angel, as 'one who loves his fellow-men.'"

PROF. HORSFORD'S METHOD FOR MAKING BREAD.

In a recent letter from one of our correspondents, it was asserted that Prof. A. J. Bellows had charged that the preparation for raising bread, patented by Prof. Horsford, was poisonous in its nature, that it was simply phosphorus disorganized, whatever that may mean, and as such, as dangerous as any other poison, etc., etc.

To this statement, which we published without comment we say that after taking time to consider the possibility of the occurrence of free phosphorus during any stage of the process from the bones to the bread, we see no room for admitting any such possibility on chemical grounds.

Second, we have eaten of bread, pastry, etc., prepared by this method, for months and do not find ourselves poisoned so far as we are able to discern.

Third, the testimony of many eminent chemists, among whom Liebig stands first as undoubted authority on a question of this kind, not only declares it harmless, but beneficial to health. And we have no hesitation in saying that all statements to the contrary have no scientific or practical foundation, and they could not be made by a scientific chemist, who, in addition to learning, possessed that other essential of reliable judgment—candor.

Do Animals Think?

We have been asked to give our opinion upon this subject which has been recently debated in Tennessee. There has been no doubt in the minds of many eminent thinkers and observers that animals think and reason. We fully coincide in this belief, and think that a careful examination of their habits and acts will convince any candid observer that they are not wholly, although doubtless to a great extent, governed by instinct. Those to whom our columns are familiar will recollect a number of articles containing facts which go to prove the reasoning power of animals.

THE Board of Trade of St. Louis has appointed a committee of twelve to raise by subscription $120,000 to build an iron sea-going propeller to inaugurate direct trade between St. Louis and foreign ports. The vessel will be of 1,000 tuns capacity, and will not draw over six feet when light.

IT is stated that one hour after the gas of London is lighted the air is deoxidized as much as if 500,000 people had been added to the population.