ligenous acid is always formed in the burning of wood, as the pungency of wood-smoke, sufficiently shows. When wood is burned in open fire-places, the acid evolved has no noticeable effect on the mortar of the chimneys. Why not? Simply because it is largely diluted and rendered harmless by mixture with air. But where wood is burned in a stove with a checked draught, and the smoke-pipe enters a chimney with no other opening than at the top, the acid vapor collects and hangs in the chimney till it is condensed on the walls and destroys the mortar. The remedy is simply to make an opening into the chimney-flue somewhere below the entrance of the smoke-pipe—the lower the better, even if in a lower room. The air drawn through this opening will serve the double purpose of ventilating the room and of diluting and carrying off the acid vapor from the stove. If the chimney-draught is weak, it is well to have the opening into the flue controlled, so that it can be closed when there is need of draught to start the fire; but it should be opened again as soon as the fire will bear to be checked. Many years ago our good mason assured us that he had never known a flue injured where there was such an opening for the passage of air; and our experience since tends to confirm the fact.—*Waltham, (Mass.) Free Press.*

FARMERS' CLUB.

The Farmers' Club held its regular weekly meeting at its Room at the Cooper Institute, on Tuesday afternoon, March 7th, the President, N. C. Ely, Esq., in the chair.

EFFECT OF FREEZING FRUITS AND ROOTS.

Mr. Bergen remarked that turnips might be frozen and thawed without injury, but if the operation were repeated a number of times the root would be destroyed. The same is the case with the onion. But the potato is destroyed by a single freezing.

Mr. Carpenter disputed the statement in regard to the potato. If it is thawed gradually in the ground the freezing will not injure its germinating power.

Mr. Bergen said that the same statement was made in the Club a few years ago, and after that he found two fields of potatoes belonging to lazy farmers who did not finish their harvest before frost set in, and in both cases the tubers were utterly destroyed.

Mr. Carpenter still continued to contend for the correctness of his view of the matter. He said that he knew that if apples were frozen and then thawed suddenly in the air, they were ruined, but they might be frozen as solid as pebbles in tight barrels, and if they were left undisturbed to thaw in the barrels, no man could detect the least sign of their ever having been frozen.

SHORT LIFE OF THE PEACH.

Mr. Forest said that persons of the largest experience in the cultivation of the peach, had come to the conclusion that the best style of pruning, when the tree is transplanted, is to trim off all the side branches leaving the central trunk in the form of a whip-stock.

Mr. Carpenter remarked that the peach tree should always be transplanted at the age of one year from the bud. He also explained that the fruit of the peach grows on the wood of the previous year's growth, and hence the advantage of shortening-in, by cutting off one third or one-half of the new wood every year.

Mr. Quinn, of Newark, N. J., said that for the last six years he had set from 100 to 600 peach trees every year. He always sets the trees of one year's growth from the bud, and trims off all the side branches at the time of transplanting. The ground is well cultivated, the branches are shortened back every year one-third to one-half of the year's growth, and the trees are carefully examined every spring for worms; notwithstanding this care the trees invariably die at the age of four years.

Mr. Carpenter observed that this mortality is due to the borer, the worm which destroys ninety-nine of every hundred peach trees that are set out in this country. Were it not for this destructive pest we should have peaches in such abundance that we should feed them to the hogs, as was done forty years ago.

Several other subjects were discussed but we select the above for our columns.

HOLLY'S PEN RACK AND CALENDAR.

These engravings represent a neat and ornamental pen rack and inkstand combined with a perpetual calendar. The inventor says, concerning this affair, that the calendar consists of two independent cylinders of equal diameters, hung on a common axis. The circumference of one cylinder has upon it the days of the week; the other the dates of the month. The dates are arranged spirally, in such manner that when Fig. 1 is placed opposite to the day of the week on which any given month begins, the date of any day of that month will be found in the division opposite to that day. The spiral arrangement aids the eye in

Fig. 1

following the dates in regular succession, and relieves the calendar of the intricacy common to the several calendars hitherto in the market. The calendars can be readily used in combination with various articles. A few of the varieties are shown in the accompanying illustrations. Fig. 1 is a calendar in combination with a paper weight. The base of the paper-weight is perforated, and may be hung on the desk or wall if preferred. Fig. 2 is a calendar, pen rack and inkstand. Other sizes of pen racks are manufactured, and a sponge cup is also introduced in some of the varieties, with a pen rack. The calendars are

Fig. 2.

furnished in plain japan or in bronze, and are decorated with gold leaf. The artistic skill displayed in the several designs will render them ornaments to any desk or table, while their merits will doubtless make them standard articles. We are using these calendar pen racks in our office and find them admirably adapted to the purposes for which they are designed. The invention was patented January 3, 1865, through the Scientific American Patent Agency. For further information address the assignee of the patent, John T. Fanning, of Norwich, Conn.

New Bituminous Substance from Brazil.

At a recent meeting of the Royal Society of Scotland, Professor Archer read a communication on a new bituminous substance, imported at Liverpool from Brazil, under the name of coal. The Professor stated that the substance—a few specimens of which were presented to the meeting—had been submitted to chemical analysis, and had been found to yield a much larger percentage of oil than any of the bituminous coal which had been examined in Great Britain, not even excepting the Torbanehill mineral. It had little of the appearance of ordinary coal, but seemed to be indurated clay, and yielded a similar series of products to those afforded by other bituminous coal. It was very light, extremely buoyant in water, and was exceedingly inflammable, burning at a very low temperature.

PHOTOGRAPHIC ITEMS.

The Steaming of Albumen Paper prior to sensitizing is said to result in marked advantages. The albumen paper, prepared in the ordinary manner, is placed in a perforated box, within a chest, into which a jet of steam at 30 lbs. pressure is admitted, for 100 seconds. Albumen paper thus steamed will keep much longer, and is said not to discolor the sensitizing bath, the albumen being rendered partially insoluble. Another advantage is that the steamed paper, when sensitized, will keep in good condition twice or three times longer than the ordinary sensitive paper.

The Wothlytype.—This new process has met with but little favor thus far, having been voted "worthless" in the discussions of some of our photographic societies. Those who are so ready to condemn have probably had little practical acquaintance with the subject. Before long they will doubtless be glad to practice an improvement which just now they do not hesitate to reject. We have lately seen some most beautiful specimens of Wothly or uranium pictures. They compare with the best silver prints, and would do honor to any photographer. In London the Wothly collodion, also sensitized paper, which will keep in good condition for months, is now on sale; and at some of the photographic galleries negatives are taken, printed on paper by the Wothlytype process, and delivered to the sitter the same day.

New Intensifying Salt.—In Seely's *Journal of Photography* we find the following article by M. Carey Lea:—

"The extreme opacity of a strong red color to the actinic rays of light, renders it peculiarly adapted for negatives. Images of this color may be obtained in the following easy manner:—After fixing and washing the negative in the usual way it is first to be iodized to a bright yellow color. This may be effected in any convenient manner. It may be simply placed in a bath of iodine dissolved in water, or in a solution of iodine in alkaline iodide; or tincture of iodine may be poured over it. Or the negative may first be treated with bichloride of mercury, and subsequently with iodine solution, or both may be applied together in the form of a solution of corrosive sublimate in iodide of potassium. The conversion of the yellow picture to scarlet is effected by Schlippe's salt, the sulphantimoniate of sodium. A tolerably strong solution of this substance is poured over the plate, and moved backwards and forwards till its action is uniform. The color produced varies slightly in shade; when the operation has been properly performed, a brilliant scarlet color is obtained. The red coloring matter which gives the scarlet tint to the picture is probably the sulphantimoniate of silver, a substance of sufficient permanency to justify its employment, especially as it is to be further protected by varnish. The scarlet image thus obtained may be again modified by new treatment. An ammoniacal solution of nitrate of silver brings it from a scarlet to a purple color. This I mention merely as a matter of curiosity, the advantage being manifestly in favor of the first color.

"As Schlippe's salt is not everywhere to be had, and as many photographers may desire to prepare it for themselves, I give the following directions. Place in a closed vessel the following mixture, viz.:—

Gray sulphide of antimony	22 parts.
Crystallized carbonate of soda	44 "
Well-burnt lime	17 "
Water	48 "
Flowers of sulphur	4 "

"The lime is slaked with the water, and the whol is then mixed in the vessel, 140 more parts of water added; a large bottle is best, corked, and well shaken from time to time. At the end of twenty-four hours it is filtered, water poured on the filter to carry the soluble parts through, and the filtrate is evaporated to the crystallizing point. An abundant crop of large lemon-yellow crystals of beautiful forms (regular tetrahedral) is obtained. These should be dried and secured in a well-closed bottle. They are less permanent in solution, a ten per cent solution will however keep for some days; in proportion as the solution is weaker it becomes less stable.

"In preparing Schlippe's salt, the process may be very much expedited by heat. The materials may be placed in a large flask and boiled together for two or three hours. The test of the completion of the oper ation, whether heat is used or not, is that the gray insoluble powder at the bottom becomes white.

"The keeping properties of a solution of Schlippe's salt may be greatly increased by rendering it alkaline, for example, with a few drops of ammonia. But the brilliancy of the color produced is thereby greatly impaired. So, too, the mother water from which the Schlippe's salt has crystallized out, may be used. This produces a sort of deep red-black picture very opaque to the active rays. In fact it has occurred to me, latterly, that when it is merely wanted to produce an effectual strengthener, and a scarlet color is not especially sought for, it is scarcely necessary to crystallize the salt. This materially simplifies the operation. The ingredients already mentioned might simply be placed together in a large bottle, and set aside for a day or two until the whiteness of the insoluble portions indicates that the whole of the gray sulphide had been decomposed. It then might be simply filtered and placed aside for use. This liquid would doubtless keep well. I have not tried it, but as the mother water after crystallization does, it can scarcely be doubtful that this would also. I must repeat, however, that if a scarlet color is desired, the crystallized Schlippe's salt must be employed.

"I directed in the foregoing part of this paper to flow the plate with the solution of the salt. But I latterly prefer to use a rather weaker solution, or to drop the plate into a sufficient quantity to cover it, placed in a porcelain dish.

"There exist various compounds of a nature analogous to Schlippe's salt which would doubtless produce results very similar to it. The sulphantimonite of sodium, for example, would probably afford a very similar coloration. So, too, the various compounds of arsenic, sulphur and alkali, alkaline hyposulpharsenite, sulpharsenite and sulpharseniate. The reactions of these substances were not examined as there seemed no reason for expecting better results from them than from the sulphantimoniate, which is more easily prepared and less poisonous.

"In conclusion, I may remark that while a proper proportion of caustic soda is essential to the stability of the salt, an excess would be likely to be very injurious; the proportions I have given may be used with advantage. Red stains on the hands and on vessels, occasioned by the use of this substance, are easily removable with weak caustic alkali."

On Drops.

Mr. Guthrie, Professor of Chemistry and Physics at the Royal College, Mauritius, has made to the Royal Society an elaborate communication on Drops, from which we extract the "laws" which he deduced from his observation :—

Law 1.—The drop size depends upon the rate of dropping. Generally, the quicker the succession of the drops, the greater is the drop; the slower the rate, the more strictly is this the case. This law depends upon the difference, at different rates, of the thickness of the film from which the drop falls.

Law 2.—The drop size depends upon the nature and quantity of the solid which the dropping liquid holds in solution. If the liquid stands in no chemical relation to the solid, in general, the drop size diminishes as the quantity of solid contained in the liquid increases. The cause of this seems to be that the stubborn cohesion of the liquid is diminished by the solid in solution. When one or more combinations between the liquid and solid are possible, the drop size depends upon indeterminate data.

For example: certain variations in the drop size of solutions of chloride of calcium of different strengths point to the existence of definite hydrates ; while the regularity of the variation of drop size in the case of nitrate of potash points to the absence of hydrates.

Law 3.—The drop size depends upon the chemical nature of the dropping liquid, and little or nothing upon its density. Of all liquids examined, water has the greatest, and acetic acid the least drop size. It is remarkable that butyric acid, which has sensibly the same specific gravity as water, gives rise to a drop less than half the size of the water drop.

Law 4.—The drop size depends upon the geometric relation between the solid and the liquid. If the solid be spherical, the largest drops fall from the largest spheres. Absolute difference in radii takes a greater effect upon drops formed from smaller, than upon those formed from larger spheres. Of circular horizontal planes, within certain limits, the size of the drop varies directly with the size of the plane.

The fact that the drop increases in size according as the radius of the sphere increases from which the drop falls, and that the difference from this cause may amount to half the largest drop size, the author regards as important to dispensers of medicine. The lip of a bottle from which a drop falls is usually annuloid. The amount of solid in contact with the dropping liquid is determined by the size of two diameters, one measuring the width of the rim of the neck, the other thickness of that rim. In most cases the curvature and massing of the solid at the point whence the liquid drops is so irregular as not to admit of any mathematical expression.

Law 5.—The drop size depends upon the chemical nature of the solid from which the drop falls, and little or nothing upon its density. Of all the solids examined, antimony delivers the smallest, and tin the largest drops.

Law 6.—The drop size depends upon temperature; generally the higher the temperature the smaller the drop. With water the effect of a change of temperature of 20° C. to 30° C. is very small.

Law 7.—The nature or tension of the gaseous medium has little or no effect upon drop size.—*Druggists' Circular.*

Mining Phenomenon.

The effect of a current of warm air issuing from a mine in a cold day is sometimes quite remarkable, often giving the mouth of the mine the appearance of a hugh steam discharge pipe. The phenomenon is properly described, as follows, by the Virginia *Union*, in an account of a recent visit to the Savage mine near Virginia city:

We stopped a few minutes to watch the operations at the old hoisting works of the Company. Every moment or so a car, loaded with ore or waste dirt, would come rushing up the shaft to the surface, to be rolled out and sent thundering down the dump, where numerous heavy quartz teams were waiting to transport the ore to the mills. But to one uninitiated in such things the strangest phenomenon was the immense volume of steam which came rushing forcibly up and out the mouth of the shaft, enveloping the brakeman and the hoisting machinery in a dense fog, which, condensing, kept everything dripping with water. One would naturally suppose that some heavy steam machine was blowing off away down in the bowels of the earth. The philosophy of it is simply this, which we would state for the benefit of those who are not familiar with such things. In all shafts consisting of two or more compartments, a strong current of air invariably and unceasingly pours down one compartment and up another. Even when there is no air stirring on the surface, this current will pour up with such force that a newspaper, or other article, will not drop down that part of the shaft, and if thrown will immediately return to the surface. The air in the depths of the mine, is many degrees warmer than at the surface, and like all heated air has a tendency to rise; therefore, gathering in from the different drifts and chambers, it finds egress through the shaft—the supply and circulation being kept up by air shafts in different parts of the mine. This warm air, on arriving at the surface during the cold weather, and especially on a frosty day like that on which we made the visit in question, assumes the form of steam, and being condensed by the cold air, drips from everything which it envelops. Of course in warm weather none of this steam would be seen, for obvious reasons. It is decidedly an interesting sight to stand and see car after car come swiftly up to the surface, on the "cage," or little square platform, at the end of the big rope; and occasionally, while you are looking, a man will come bouncing up on a cage from the bowels of the earth, with startling suddenness, reminding you of one of those wonderful little painted boxes to be seen at any toy shop, which, if you unhook the lid, it flies back and a hideous little witch pops up before your astonished vision.

A MECHANIC of Milwaukie has manufactured two wonderful pieces of cabinet work intended as presents for the President and Mrs. Lincoln. One is an ordinary sized center table, of octagonal form, composed of twenty thousand different pieces of wood.

The British Army and Navy.

The British army and navy estimates for the year 1865-6 have just been announced. The cost of the aamy is £14,348,447—a reduction of £495,000 from last year; of the navy £10,392,447—a decrease of £316,000. Total estimates for the military and naval establishments for the coming year, £24,740,671; or, in American currency, $123,703,355.

In the naval estimates, a million of dollars are appropriated for the completion of the iron-clads *El Toussin* and *El Monassir*, which have cost heavily already. The officers and seamen in the navy number 88,000. There are also 7,000 boys in the service and 7,000 men in the coastguard service.

The navy consists of 540 vessels classified as follows:

Steamships, 445, of which 357 are screw, and 88 paddle; 26 screw ships are buiding; 69 effective sailing ships are afloat; making the total of steam and sailing ships 540. The building of three line-of-battle ships, 1 corvette, 4 gun vessels, and 4 gunboats is suspended. The classes into which these vessels are divided; deducting those which are suspended, are as follows: Screws—armor-plated ships, iron, third-rates, afloat 6, building 3; ditto, iron, fourth-rates, afloat, 2; ditto, wood, third-rates, afloat 6, building 1; ditto, wood, fourth-rates, afloat 4; ditto corvettes, wood, sixth-rates, afloat 1, building 1; ditto sloops, wood, afloat 2; ditto gunboats, iron, building 3; ditto floating batteries, iron, afloat 3; ditto ditto, wood, afloat 2; ships of the line, afloat 55; frigates, afloat, 37; building 1; block ships, afloat 8; corvettes, afloat 26; sloops, afloat 35, building 3; gun vessels, afloat 37; gunboats, afloat 105, building 2; tenders, tugs, etc., afloat 7; mortar ships, afloat 4; troop and store ships, afloat 15; yachts, afloat 1. Paddle: Frigates, afloat 6; sloops, afloat 19; small vessels, afloat 13; dispatch vessels, afloat 4; tenders, tugs, etc., afloat 40; troop and store ships, afloat 1; yachts, afloat 5.

Scale in Boilers.

[For the Scientific American.]

As incrustation is the sole cause of the destruction of boilers, we do not see why owners do not employ some means to obviate the evil. The thickness of an eggshell between the water and the iron compels the use of 15 per cent more fuel to generate steam; and as a crust, one-fourth to one-half inch is no uncommon occurrence, the immense waste of fuel, and the more rapid burning of the iron, are readily seen. Repairs to some of the western boilers cost $2,000 a year; this, and the fuel wasted, might both be saved if the boilers were kept clean, as iron cannot burn with water next it. Boilers using pure water have been run over thirty years without one dollar of repairs; hence will be seen the advantages and necessity of preventing scale. The item of stopping works "to scale boilers" is no inconsiderable amount; the apparent loss of the day is trifling, but in large establishments, where large capital is idle; the men off on a frolic, not to turn up when wanted, should induce every mill-owner to save this lost day, which need occur but once in six or twelve months if no scale formed. As proof, boilers in New York are cleaned but once a year, the water being pure enough to incur no risk of burning from incrustation formed in that time; boilers elsewhere could be run as long if kept free from scale. We, therefore, urge engineers and others to adopt some means to prevent scale, and as the Incrustation Powder, invented by Mr. H. N. Winans, of this city, has proved a reliable and uninjurious article for this purpose during the last ten years, and many of our citizens recommend it, we are confident it will save time and money where scale exists. E.

THE Lydians were the first who coined money, and they used iron first, then copper. "Athelstan first enacted regulations for the government of the English mint, in A. D. 928." The first gold coinage in England was in the reign of Edward the Third. Tin was coined by Charles the Second, and pewter by James the First.

THE first bank formed in the United States, was the Massachusetts Bank of Boston, in 1784; the first in New York was the Bank of New York, in 1800; and next the Manhattan Company.