CAPILLARITY.

When your cup of tea is all gone but a spoonful, rest your hand upon the edge of the cup and gradually lower your spoon till the point just touches the surface of the liquid. You will see the bits of leaves floating in the fluid immediately dart toward the spoon, converging from all directions.

Again, take two plates of glass, bring the vertical edges on one side in contact, and separate the two opposite edges by a thin wedge; then place the lower edges of the glass plates in a shallow pan of water. You will see the liquid rise up between the plates, ascending the highest where the edges are nearest together. The hight of the column will be inversely as its distance from the angle of contact between the plates, and the surface will consequently describe a hyperbolic curve.

The following facts in relation to capillarity are stated by Professor Miller :—

"The elevation of the column of liquid in tubes of equal diameter varies with the nature of the liquid, the variation depending partly on the difference of cohesion between the particles of the liquid, partly upon the difference of adhesion between the liquid and the glass. In consequence of the decrease of both these forces by heat, the hight of the column diminishes as the temperature rises.

"In liquids, such as mercury, where the force of cohesion preponderates over their tendency to adhere to the sides of the tube, the capillary action is reversed; the surface becomes convex instead of concave, and the hight of the column within the tube is depressed below the general level. In a mass of liquid, each particle is maintained in its place by the mutual attraction of all the surrounding ones; but if a column be isolated from the mass of liquid by the interposition of the walls of the tube, the sides of which exert little or no equivalent adhesive force, the cohesion of the mass below draws down the upper particles, and produces a depression of the column. This depression of mercury in glass renders a certain correction necessary in reading off the hight of the mercurial column in the barometer, which always stand a little lower than the elevation due to the atmospheric pressure. The narrower the bore of the tube the greater is the depression. Experiment has shown that this capillary depression is nearly one-half less in tubes that have had the mercury boiled within them, than in unboiled tubes, as the process of boiling expels the film of air, which adheres to the glass in unboiled tubes. By employing a tube of $\frac{2}{3}$ or $\frac{1}{2}$ an inch in the bore, this correction becomes so trifling that it may be neglected. In a tube of $\frac{1}{4}$ of an inch in diameter, in which the mercury had been boiled, the depression is 0·02 inch, while with a similar tube of $\frac{1}{2}$ an inch in diameter it is only 0·003. The capillary depression of mercury is slightly increased by elevation of temperature.

"Capillary action plays an important part in the operations of nature, and in a variety of ways has been rendered subservient to the wants of man. A familiar illustration of its employment is seen in the wicks of lamps and candles, which, being composed of a bundle of fibrous materials, furnish hair-like channels by which the oil or melted combustible is elevated to the flame, and supplied as fast as it is consumed. Capillary action influences the circulation of the liquids in the porous tissues of organized beings, and it is the principal mode in which water, with the various substances which it holds in solution, is supplied to the roots of growing plants. By its means, during the droughts of summer, fresh supplies of moisture are raised towards the surface, for the maintainance of vegetable life; and in the same way, when during winter the surface is hard bound by a long dry frost, water is constantly finding its way from beneath, is solidified upon the surface, and remains stored up until a thaw ensues; when this occurs, the accumulated moisture mellows the soil and produces the well known soft and plashy state of the ground which follows long-continued frosts, and which extends deeper, the longer the duration of the freezing temperature, although neither snow nor rain may have fallen. Few persons are aware of the immense force which may be developed by capillary action; if a plug of dried wood be fitted into a strong glass tube, and the end of the plug be immersed in water, the wood becomes swelled by the imbibition of liquid owing to capillary action, and the tube is split. In some parts of Germany this force is turned to account in splitting millstones from the rock: holes are bored into its substance in the direction in which it is to be split, and into these holes wedges of dry wood are driven tightly; when exposed to moisture they swell, and large blocks of stone are thus detached with little labor or expense.

"As adhesion takes place solely between the surface of bodies, it is evident that any circumstance which increases the extent of that surface must materially facilitate the exertion of this force. Minute subdivision, by thus increasing the extent of surface, greatly exalts the effect of adhesion:—for example, a cube of 1 inch in the side exposes a surface of 6 square inches, i. e., there is a square inch upon each of its six faces; if this cube be subdivided into a number of smaller cubes, each of which is only $\frac{1}{1000}$ of an inch in the side, it would furnish 1,000,000,000 of these minute cubes. Now as each little cube has 6 sides, the surface which it will expose is $\frac{6}{1000000}$ of a square inch, 1,000.000 of them will expose 6 square inches; that is, as much surface as a solid cube of an inch in the side; the 1,000,000,000 cubes will consequently expose 1000 times as great a surface, or upwards of 41·7 square feet. The force of adhesion, therefore, by such subdivision, should be increased somewhat in this proportion.

"The influence of this kind of subdivision in exalting the effect of adhesion is strikingly exhibited in the case of charcoal. The structure of the wood from which the charcoal is procured is cellular: when heated in vessels from which air is excluded, the volatile constituents of the wood are expelled; and the charcoal, which does not fuse, remains behind in a very porous condition, retaining the form of the wood which furnished it. Mitscherlich calculates that the cells of which a cubic inch of box-wood is formed expose a surface of not less than 73 square feet.

"Adhesion occurs between charcoal and other bodies with degrees of force that vary very much. For the coloring matters of vegetable and animal origin this adhesion is extremely energetic; so that if these bodies be dissolved in any liquid and agitated with charcoal, nearly the whole of the coloring matter will be retained by the charcoal, and on separating the latter by filtration, the liquid will run through colorless. Ordinary vinegar, and port wine may thus be obtained in a colorless condition. Advantage is taken of this fact in the refining of sugar, in which process the sirups are deprived of color by filtration through a column of charcoal twelve or thirteen feet in thickness. The species of charcoal which is most extensively employed for this purpose is that obtained by burning bones in closed vessels; and it is hence termed *bone black* or *ivory black*, or frequently *animal charcoal*. The charcoal is in this case in a state of extreme subdivision; it does not constitute above a tenth or a twelfth of the weight of the mass; the remainder consists of earthy matters, chiefly phosphate and carbonate of calcium. When bone black has been used for filtering liquids, and has ceased to take up any more coloring matter, it is thrown aside and allowed to ferment; if then it be well washed and re-burned, it may be used again with nearly equal effect. Other animal matters, especially dried blood, furnish, when calcined and well washed, a charcoal which is still more efficacious. The addition of carbonate of potassium to the mass before calcination, still further increases the discolorizing power.

Steam in France.

The Government of France has just issued a decree materially altering the regulations laid down in 1843. These were not in accordance with the growth of machinery and trade, and very irksome to those against whom they operated. In 1850 there were but 6,832 steam engines in all France; in 1863 there were 22,516, representing a force of 617,890 horse power, or nearly that of two millions of horses in reality, and which is set down as more than the force of all the men in the kingdom capable of labor. Under such circumstances, and the greatly extended practice and increased knowledge of engine-makers, the old regulations had become quite inapplicable. The new decree greatly simplifies the legislation on the subject. The testing of the various parts of the machinery officially, till now imperative, has been done away with, except as regards the boiler, which will, in future, have to be proved up to twice the effective pressure of the steam. Steam engines are to be no longer regarded as dangerous machines, and may henceforth be set up without authority from the Government officers and without any other form than a declaration of the fact. Boilers are, as heretofore, divided into three classes, according to their capacity and the pressure to be employed; the regulations concerning the first class are greatly simplified, those of the second class may be set up in any factory or workshop not connected with the dwelling houses of other parties than the proprietor, his family and workpeople, and the least dangerous class may be introduced even into houses occupied by any number of separate families; and even with regard to other cases, the consent of the neighbors is sufficient to set aside the regulations. Another important provision of the new law is, that all steam boilers shall consume their own smoke, six months grace being, however, allowed for the necessary arrangements to be made. There are other clauses well worthy the attention of governments and sanitary boards.

The Thames Embankment.

The works next to Westminster Bridge are those which attract the greatest amount of public attention, for there everything can be watched from the pumping out of water to the puddling in of clay between the timbers of the coffer-dam, and here, also, can be seen the whole plan of struts and cross timbers which enables the iron caissons to keep out the whole flood of the Thames for a depth of 40 feet above them, and resist a pressure of no less than 120 tuns on each caisson. The caissons are elliptical tubes of wrought iron rings or belts, each ring or belt being 12 feet long by 7 feet wide and 4 feet deep, with a flange or edge that admits of the rings being bolted one to another. Three or four of these rings are bolted together and sunk between guiding piles to their proper position in the bed of the river, then others are similarly added on till the hight of the whole is sufficient to raise them above high water mark, and the weight of the whole is sufficient to sink the hollow tube of iron which they form through the soft mud on which they rest and keep them water-tight from below. When this result has been attained the water is pumped out and the tube gradually weighted with iron to force it lower till it has reached a fair depth, and has a firm hold in the ground, when the agency of the pneumatic machinery is called into play. After the workmen have descended and dug out the gravel and shingle to a depth of some two or three feet below the lowest internal edges of the tube, a weight of sixty tuns of iron is placed upon it from the inside, with an air-tight iron cover, which closes in the top. Through an aperture in the top of this cover the air is forced in by steam power till it has reached a pressure of 8 lbs. to the inch—a pressure which dilates the tube more than half an inch, when the air is suddenly released, and the cylinder as suddenly contracts and sinks through the earth which it has itself enlarged to a depth of two or three feet lower. This process has to be repeated over and over again till all the superincumbent mud and silt and gravel has been penetrated, and that mysterious geological compound, like heavy, brown plaster of Paris, though hard as marble, and known by the name of the London clay, has been reached, when no effort of modern engineering can contrive to get anything much further. The presence of this London clay on the banks of the Thames varies in an almost unaccountable degree. In some cases it crops up close under the mud; in others it can only be found after a laborious penetration of 40 feet below it. Thus one caisson may only penetrate 10 feet below the surface, and its next neighbor may have to go to the depth of 40 feet or 45 feet. Once, however, that it is reached the sinking of the caissons stops, they are merely filled up to the level of low-water mark with solid concrete. The lower parts of these iron banks are never to be removed. The upper parts, which now shut out the Thames at Westminster, will, of course, be taken away, as the wall of the real embankment is built behind them. To take this part as exemplifying the process of construction, we have here a length of 240 feet of iron caissons towards the river, shut in by a cross dam near Montague House, which reaches back from the caissons to the shore, so as to enclose a water-tight space of nearly an acre and a quarter. From this place the water has been pumped and the mud flushed out, and here in this space next week the labor of building the embankment proper will begin. The first operation will be to clear out all the shingle and gravel to a depth of 14 feet behind the caissons, or more than 40 feet below high-water mark, additional and still more powerful timber supports being added to the caissons as the men get lower down beneath the river, and the pressure of the great mass of water overhead increases. This somewhat hazardous work will be done in short sections at a time, and as fast as the required depth is reached—that is to say, on a level with the concrete with which the caissons are half filled—the excavation will cease, and the space is then to be filled up rapidly with solid concrete. On this will be laid the brickwork, and over all, the river face, the solid blocks of granite, which are to rise in a massive wall to a hight of 30 feet above the river. It may give a good rough general idea of the gigantic proportions of this work if we merely mention the quantities with which Mr. Furness, the contractor for the first portion only, from Westminster to Waterloo Bridge, has to deal. First, then, 71,000 cartloads of earth have to be excavated, and 60,000 cartloads of concrete have to be "tipped in," 4,000 rods, or nearly 70,000 tuns, of brickwork have to be laid and faced with 30,000 tuns of granite, and the whole has afterwards to be filled up behind with 400,000 cartloads of earth. To those who are now so often blocked up in the Strand by the long, slow-moving, dismal string of carts laden with earth for the embankment it will be sorry tidings to hear that at the least 200,000 more cartloads have yet to pass that way. We fear however, that the nuisance is unavoidable. For the present, therefore, we fear that an abatement of this nuisance, however ardently to be desired, is not yet to be looked for. Another section of the embankment besides that we have mentioned, and which Mr. Furness is hurrying forward with the utmost possible speed, is that between Montague House and Hungerford, where the steam pile-drivers are busy every minute of the day. This section is composed entirely of wood. The coffer-dam is formed of wooden piles in two rows 7ft. apart, and driven through the shingle as close as they can be got together. The interval between the first and second row is then "puddled" in the usual manner with stiff clay till it is water-tight, when the water is pumped out, the coffer-dam strengthened with struts, as in the case of the iron caissons, and the work of excavation, filling in concrete, and, finally, building will go on as behind those we have already mentioned. Altogether, no less than 1,300 feet out of the 2,000 feet of the first section to Waterloo Bridge have been dammed in with piles or caissons, and this length will be subdivided by nine cross sections leading backwards, so as to render the work of pumping and subsequently building as easy as possible. The length, however, already inclosed towards the river, and over which the water now flows behind the coffer-dam only on sufferance, is very great, and will, when the Thames is entirely shut out, give a space of nearly eleven acres reclaimed from an unsightly, muddy, foreshore into one of the noblest, and the most needed, thoroughfares in Europe.—*Times*.

A Canal with a Leaky Bottom.

The London *Engineer* says:—

"An unexplained accident happened at Soho, near to Birmingham, on Wednesday evening, which for some time occasioned considerable alarm to the owners of property there and to the authorities of the Great Western Railway. That line between the Soho and the Hackley station runs under a tunnel, 100 yards long, of an arm, about a quarter of a mile in length, of the Birmingham canal. At about 5 o'clock in the afternoon the driver of a train saw some water running through the tunnel on to the line. Soon a stream of water poured out, and a channel was cut by a number of workmen through the embankment on which the station is built, so that the water might run off into some waste ground. The stream, however, increased in volume, and sweeping through this opening carried with it many tuns of the embankment. Subsequently it threw down about one hundred yards of the substantia stone wall which bounds the line from the Park road, and rushing on to the road tore up the roadway and inundated much property. The water seems to have percolated through the bottom of the canal under the wall of the towing path and the roadway beyond, a width of about twenty-six yards, and then found its way out principally at the bottom of the wall on the down line. As the water poured down it carried with it the whole of the sand that had formed the covering of the tunnel, and broke down the solid brickwork (about eight feet wide) which formed the towing path. This fell in masses on the roof of the tunnel, which, although bared by the water, withstood the pressure, and the roof remains quite solid."

Steam on Common Roads.

Between traction engines and pleasure carriages driven by steam on common roads there is a very wide difference, and those who have the greatest good of the greatest number at heart will continue to urge the claims of the former class over the latter. The London *Engineer* in a leading editorial, headed "Steam on Highways," very properly condemns high speed pleasure carriages in the following language:—

"It is to the last degree unlikely that any practical advantage whatever could follow on the general introduction of high speed road locomotives, and up to the present moment every exertion to produce such machines represents but so much mechanical skill wasted which might have borne good fruit if devoted to a better purpose. The advocates of the traction engine should now more than ever be careful to avoid giving even the semblance of offense; and we know of nothing garbed with a thin vail of science so offensive to the tastes and likings of those who use our highways as 'experimental trips' as they are grandiloquently termed, with machines whose only merit consists in running on crowded roads at a pace too fast to serve any good or useful end. Legislation under such circumstances becomes a necessity. We can hardly feel much surprise that it is very sweeping and indiscriminate."

Hot Ashes.

Fire-Marshal Blackburn, of Philadelphia, in his annual report, thus speaks of the danger from hot ashes:—

"Next to that strange and mysterious process of nature, chemical action, in the production of fires, the most insidious agent is hot ashes. They will retain heat for weeks, and start combustion at the moment least anticipated. Neither an ash box nor an ash barrel is ever safe an instant on one's premises, especially if placed on a wooden floor or against a frame wall or board partition. I have been actually amazed in witnessing the carelessness exhibited by people in getting rid of their ashes, and this, sometimes, too, in places, such, for instance, as large storehouses filled with stocks of goods of great value, important manufactories, depots, etc., where I had a right to expect better things of the good sense and forethought of the proprietors, or other persons in charge of them. I am convinced that many of the fires, the commencement of which is wrapped in mystery, come from depositing heated ashes in wooden vessels.

"The owners of dwellings and other buildings in which fire is required, should be compelled to construct bins of brick, stone, or other incombustible material, in their cellars, for the deposit of ashes which the occupants ought to be obliged to have removed, whenever necessary, at their own expense, and all ash carts employed for the purpose should be covered. This would soon diminish fires, and the abominable arrangements we now have for ridding our residences, counting-houses and workshops of ashes would no more annoy us, or mar the beauty and cleanliness of our metropolis.

"Another treacherous promotor of combustion is a cigar stump that has retained fire, thrown into a wooden spittoon containing sawdust, or allowed to smolder among the same ignitable material in a stove box made of boards. I have had some remarkable cases of burning from this cause. It spit-boxes of wood must be used, they should be filled with sand as an absorbent instead of sawdust. But when iron and earthen spittoons are so plenty, and can be bought so cheaply, I can see neither wisdom nor economy in having the wooden utensil in any one's place. As for stove boxes in bar rooms, and other places where there is much smoking, where sand to fill them can be had so readily, there is certainly no excuse for the use of sawdust."

Hydraulic Coal-Cutting Machine.

This machine is intended to take the place of manual labor in "nicking" or "kirving," or as it is termed in Yorkshire, "baring" the coal. It is now regularly at work in the Kippax Colliery, near Leeds, where it has been in successful operation for some months. The only portion of the seam removed by it at the Kippax Colliery is a band of shale, which is also the usual place for baring by hand labor; no portion of the seam is, therefore, reduced to small coal by its action. The direction of the workings is toward the rise. While the machine proceeds with the baring, completing the work at once going over, square pieces of wood and wedges are inserted loosely into the baring, at intervals of four or five feet, to keep the coal in position till the colliers come to remove it. This slight support does not, however, prevent the coal so bared from detaching itself from the unbared part of the bed; the line of fracture being a few inches beyond the extremity or back of the baring, and in one even straight line. The quantity of coal obtained for every yard face is about two tons, and the yield of small coal produced by the breaking up the detached coal and the bottom coal about 6 per cent. Water is the force employed to work this machine, and being for all actual purposes incompressible, it exerts its full power, allowing for the friction in its passage through the pipes, even when transmitted from great distances. This self-acting apparatus consists of an hydraulic reciprocating engine working horizontally, or at any angle to suit the inclination of the coal-seam, or at any required hight above the floor. The piston rod is a hollow trunk or ram, into which is fitted a cutter bar, easily removed, carrying three or more cutting tools. These tools can be adjusted so as to enter the coal at an angle with the line of the face; the actual length of the cutting stroke into the coal is 16 inches and, consequently, the three cutters conjointly give a total depth of four feet. The length of the cutting stroke can be varied according to circumstances. The cutting action of the tools being a steady push or thrust, without any percussion, it is necessary that the machine should be firmly held upon the rails during the cutting stroke, and be released so as to traverse forward at the end of the return or back stroke. This rigid fixing of the apparatus on the rails during the stroke is effected by means of a vertical self-acting holder, on which is a prolongation of the piston rod of another cylinder, mounted upon and becoming a part of the apparatus itself. The piston rod of this cylinder is actuated by means of the same self acting valvular motion as that of the cutting cylinder, and the "holder-on" retains its "grip" by means of a small keep-valve; which retains the water during the cutting stroke. At the return or back stroke, the valve motion opens the keep-valve and releases the water, thus enabling the holder-on to descend and to slacken its pressure against the roof, and thus the machine is free to traverse upon the rails the requisite distance for the next cut. The traversing or progressive motion is also self-acting. The results, as at present obtained, give an average rate of cutting of about ten yards on the face per hour, with a maximum under favorable conditions of thirteen yards. The amount of pressure required for working the machine varies from 150 to 300 lbs. per inch, according to the hardness of the metal.—*London Mining Journal*.

Pyroligneous Acid in Chimneys.

A correspondent of the Scientific American inquires whether there is any remedy for the condensation of moisture in a chimney, produced by burning wood in a close stove. The Scientific American knows no remedy and only comforts its correspondent with the assurance that the moisture is a solution of pyroligneous acid, and will destroy his chimney.

We beg the Scientific American to note and publish the following remedy, for which we have long been indebted to a first-rate practical mason. Pyroligenous 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 it 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