The best fattening material for chickens is said to be Indian meal and milk.

A remedy for caterpillars, which is used on a large scale in France, consists in a solution (1 part in 500) of sulphide of potassium, sprinkled on the tree by means of a hand syringe.

The best and most durable insulation for electric wires is to tin them and cover with pure rubber.

Javelle water, used for turning white the dirtiest linen, and removing stains, is composed of bicarbonate of soda 4 lbs., chloride of lime 1 lb. Put the soda into a kettle over the fire, add 1 gallon of boiling water, let it boil from ten to fifteen minutes, then stir in the chloride of lime, avoiding lumps. Use when cool. This is good for removing fruit stains from white underwear.

Biborate of soda dissolved in water, used as a lotion, will remove prickly heat.

The average yield of corn cobs is 7 62 parts of carbonate of potash in 1,000 parts of the cobs, which is nearly twice as much as is furnished by the best specimens of wood. The corn crop of this country will supply 15,400,000,000 lbs. cobs, from which 115,500,000 lbs. of potash might be made.

The way they boil rice in India is as follows: Into a saucepan of 2 quarts of water, when boiling, throw a tablespoonful of salt: then put in 1 pint rice, previously well washed in cold water. Let it boil 20 minutes, throw out in a colender, drain, and put back in the saucepan, which should be stood near the fire for several minutes.

Save the corn cobs for kindlings, especially if wood is not going to be plentiful next winter. To prepare them melt, together 60 parts resin and 40 parts tar. Dip in the cobs, and dry on sheet metal heated to about the temperature of boiling water.

Equal weights of acetate of lime and of chloride of calcium, dissolved in twice their weight of hot water, is a fireproofing mixture for fabrics.

The ammoniacal solution of oxide of nickel will dissolve silk; that of copper dissolves cotton also.

[For the Scientific American.]

THE CHEMICAL FIRE-FLY.

BY PROFESSOR C. W. WRIGHT.

Of all the elements, there is none which presents such a diversity of forms as phosphorus, and not one that presents such a variety of properties which are so apparently contradictory. The number of allotropic forms assumed by this element, and the peculiar part which it plays in the conditions essential to the manifestation of sensation and intelligence, together with the fatal effects which often result from its introduction into the system, give it an interest not exceeded by that of any other form of matter whatever. A distinguished professor of this city, who was in his day a most attractive teacher, maintained that the chief element of success in a lecturer consisted in the power to address the eye, experimentally when possible, and by a well drawn mental image when the subject under discussion did not admit of physical demonstration. In other words, he contended that nothing should be left to the imagination of the student. There can be no doubt that a single, well selected experiment, skillfully executed, is more instructive than an hour's talk without illustration. Phosphorus may be selected as a means of illustrating the two methods of presenting a subject. Thus, the average text book informs the reader that phosphorus is luminous in the dark, or, in other words, phosphoresces when exposed to the air; and this is about all that is stated in reference to a property of this element, which is the most important of any connected with it. Upon this property, or one closely allied to it, is the poisonous quality of this agent based. Destroy this power of phosphorescence, and this element is no longer a deadly poison, either when swallowed, or by the action upon the bones of the upper and lower jaw. The phosphorescence of this element is accompanied by the development of ozone, and any substance which has the power of destroying ozone will arrest the luminosity of phosphorus, and, what is of still greater importance, destroy its poisonous action. In fact, phosphorus is not of itself a poison, but the ozone which it has the power of developing out of the oxygen of the air is the sole cause of the fatal results which follow its introduction into the system. This I have repeatedly demonstrated by experiments on the lower animals; and in two cases of accidental poisoning in human beings, the same facts have been proven. This is a subject, however, that properly belongs to the medical profession, and I will simply state that ten or fifteen drops of spirits of turpentine, mixed with an ounce or two of sweet oil, or any liquid fat, will prove an efficient antidote to elementary phosphorus, or any substance, such as the tips of matches or certain rat poisons, with which it may be incorporated. Other volatile oils, such as sassafras, may be employed when turpentine is not at hand. It is not every specimen of turpentine that will prove antidotal to phosphorus. Any substance that has the power to instantly destroy the luminosity of this body will prove effectual as an antidote; and the only assurance we have of the efficiency of any agent is to test it beforehand.

Phosphorus is, then, not of itself capable of producing inflammation of any tissues of the body; but ozone, which it has the power of evolving from the oxygen of the air, is the cause of all the local mischief which results from its contact with certain parts of the body. That this body may produce certain general effects when it finds its way into the circulation, we do not doubt, but these are distinct from its local action.

To prepare the chemical fire-fly, by which some of the most characteristic properties of phosphorus can be demonstrated, select a two ounce phial which has been well annealed, and introduce into it sweet or almond oil, till the bottom is covered to the depth of half an inch (lard will answer, if nothing better can be procured), and to this add fifteen or twenty grains of phosphorus, and then cork it loosely. After this, place the phial in a pan of cold water, and set it on a stove or other warm surface till the phosphorus melts, then shake the phial till the oil has dissolved as much of it as it is capable of holding in solution. Three or four vigorous shakes in the course of ten minutes will answer. That quantity of oil will not dissolve the whole of the phosphorus, which is not desirable. The cork must not be a closely fitting one, but must be forced into the phial so as to nearly prevent the escape of the oil when inverted. It is best to give the cork more of a conical shape than those in use by druggists. When experimenting, the phial must be warmed about as hot as the hand can bear, and slightly agitated or inverted, taking care, when doing this, to have the cork well secured; it may afterwards be loosened a little. When the cork is properly adjusted, which can be easily accomplished by a little practice, the whole interior will light up every few seconds, in rhythmical succession, and continue to do so for hours, provided the proper temperature is maintained. At the conclusion of the experiment, the apparatus should be put away in a dark place, and a tightly fitting cork introduced into the phial. A number of these phials, properly adjusted in a darkened room at different points, and several set swinging by means of strings suspended from the ceiling, produce a singular and weird impression, that grows upon the observer the longer the experiment is observed; and after a time it is difficult to divest oneself of the idea that the light is evolved by a living, moving creature. For impressiveness, there is no experiment in chemistry that makes such an enduring image upon the observer. Of course every precaution should be taken to avoid breaking the apparatus or spilling the oil. No damage, however, need be apprehended provided the directions are strictly followed. In experimenting with phosphorus, the inexperienced should always be provided with a large vessel of water in which a few drops of turpentine have been diffused. When burning phosphorus has been extinguished by this water, there is little or no danger of its re-ignition, which is very apt to occur when it is extinguished in the ordinary way. The phosphorescence of this element, when a solution of it is spilled upon any object, as well as its disagreeable odor, are instantly destroyed by a small quantity of turpentine suspended in water.

Under no circumstances should children or careless persons be permitted to experiment with phosphorus; not that it is anything like as dangerous as coal oil and many other articles handled daily, but there is no substance that so completely demoralizes the understanding, in case of an accident, as this.

The glow-worm may be imitated by transmitting bubbles of air through glass tubes containing the phosphorized oil. In fact, there is no end to the number and variety of experiments that can be devised by a person of inventive genius.

The phosphorescence of the fire-fly and glow-worm is due to slow combustion or oxidation; and the phenomenon is arrested in them, as it is in phosphorus, by placing them in a negative gas, such as nitrogen, for example. Phosphorescence is not always, however, the result of oxidation. This fact can be demonstrated by exposing the diamond to direct sunlight for a few minutes, and then transferring it to a darkened room, when it will emit a beautiful light for several seconds.

The phosphoresence of the fire-fly is not due to the slow combustion of phosphorus, nor is it an amatory display on the part of that insect. The species are perpetuated under different circumstances, and in the daytime. The fire-fly is a carnivorous insect, and the object of the illumination is to attract small insects, which are quickly devoured.

If the ear be placed near the vessel of phosphorized oil at the moment of illumination, a slight hissing noise will be perceived, produced by a sudden rush of air into the phial, in consequence of the partial exhalation (one fifth) of the air in the phial, by the abstraction of oxygen, which unites with the phosphorus. This fact is instructive. It demonstrates to us, in a striking manner, that a vessel which may be impervious to a liquid may permit the entrance or exit of a gas or vapor; and it accounts for the decomposition of spirits, conserves, extracts, etc., that are put up in vessels that are supposed to be hermetically sealed, simply because they do not permit of the escape of their liquid contents.

Louisville, Ky.

Progress of Flying Machinery.

A new steering balloon by Smitter is being exhibited, suspended in the middle of the Alcazar in Paris. The measurement is only 6,000 cubic feet, but the balloon is so light that, when filled with pure hydrogen, it must float. A considerable sum of money has been invested in it, and great ability has been displayed in the construction. Although no practicable result in open air may be hoped for, it is a wonderful piece of clockwork. In connection with this subject, it is stated that, for several months past, a firm of engineers have been experimenting privately at the Crystal Palace with an aerial steamer of a novel and promising character, weighing 160 lbs. Experiments are stated to have proved the capability of two vertical screws, each 12 feet diameter, to raise a weight of 120 lbs.; the steam engine, with water and fuel, forming part of the weight so raised to the extent of 80 lbs. The power exerted by it is equal to two and a half horses. The communication of motion is given by a vertical axis emanating from the car.—*Nature.*

Recent American and Foreign Patents.

Improved Dumping Car.

Benjamin Slusser, Sidney, Ohio.—This invention makes a considerable change in the frame of a dumping car or wagon, so that the contents may be discharged with little expenditure of manual force, and yet with great facility, the tail board being made to open automatically.

Improved Fifth Wheel.

Jacob Hodge, Springfield, Ill.—The fifth wheel is a circular iron disk, the face of which is slightly convexed, and which has lugs formed upon its sides to receive the clips, by which it is firmly secured to the axle. In the center of the disk is formed a hole to receive the hub on the circular disk of the head block. The lower side of the head block has a circular recess to fit upon the fifth wheel, the face of which is slightly convex, so as to bring the bearing toward the center. Upon the head block is a transverse rib, upon which rests a spring. Upon the rear side of the head block are formed two flanges, and an arm or projection, having slight flanges formed upon its side edges to form a seat for the reach, the forward end of which abuts against the rib of said head block. The connection between the reach, head block, fifth wheel, and axle is strengthened by two metal straps.

Improved Gas Generator.

James C. Mitchell, Lancaster, N. H.—This invention relates to certain improvements in the manufacture of illuminating gas, designed to utilize any kind of fuel for the production of the gas, and applicable to limited manufacture, as for private families, etc. It consists in a retort placed within a furnace, or a common stove if desired, and having an airtight door of peculiar construction, and a communication direct with the furnace, by means of which construction the gaseous contents of the retort may be drawn into the furnace and burned, when the airtight door is to be opened for drawing and recharging the retort. It also consists in the combination with the feed pipe to the gas holder of a ball valve to prevent back pressure.

Improved Cotton Chopper.

Wm. D. Evans, Society Hill, S. C.—The invention consists in a rotary chopper having intervaled sets of knives on two drums arranged on a single shaft, so as to chop out two rows simultaneously.

Improved Egg Tester.

Wm. W. Wilson, Parkville, Mo.—The invention consists in an egg tester consisting of a case in whose center is placed a lamp, and in whose side is a horizontal tube having an egg-holding cap at the outer end.

Improved Gang Plow.

A. Schrader, Walla Walla City, Wash. Ter.—The invention relates to that class of gang plows whose frames are supported on swiveled castor wheels so as to regulate the depth of furrow, and consists in an improvement by which the front and rear wheels are simultaneously graduated by the driver, so as to determine the exact depth of furrow required.

Improved Post Hole Borer.

Obadiah Love, Saxenburg, Pa.—The object of the invention is to expedite and diminish the cost of post-hole digging by making the blades form a cage, tapering in an upward direction, and causing the soil to crumble and discharge itself.

Improved Automatic Car Coupler.

F. W. Nash and S. S. Kirk, Washington, D. C.—This coupler is adjustable to any car, and couples with any other coupler, by simply bringing the cars in contact. It can be uncoupled from side, top, or platform of car, avoiding the necessity of the attendant ever going between cars. It is claimed to combine simplicity, utility, durability, strength, and cheapness. For further particulars, apply to S. S. Kirk, Washington, D. C.

Improved Vehicle Tongue Support.

George W. Burnside, Prairieburg, Iowa.—By suitable construction, when the draft is applied, the downward pressure of a chain upon a pulley raises the tongue, and supports it, so as to relieve the horses' necks from its weight, and hold it raised so long as the draft strain is continued.

Improved Foot Treadle.

Daniel E. Lillis, Lockport, N. Y.—The invention relates to the construction of swinging foot treadles for sewing machines and others, in which an adjustable foot plate is bolted on to the hanging bar, for shifting forward and backward on the bar to balance the feet relatively to the pivot. Ribs are cast on the edges of the foot plate, in combination with the notched hangers, to assist the binding screw in holding the foot plate fast.

Improved Lamp Fount.

Edward Brown, New York city.—The lamp fount is provided with a thin circular outwardly and downwardly projecting flange around an inner conical cavity, a space being left between the flange and body of the fount to receive the fastening screw of a bracket.

Improved Bessemer Converter.

Almon S. Dunning, Joliet, Ill.—The invention consists of a converter, the nose of which is constructed at the front part in straight or flattened shape. By the removal of the projecting angle or curved convexity, the sectional area of outlet is greatly increased, and consequently the force and velocity of the blast diminished. Thus any metal rolling up will fall back. The invention states that he has made about twenty thousand tuns of steel under this improvement, and with not one fourth the usual overflow.

Improved Harrow.

Joseph Rioth, Mount Sterling, Ill.—The harrow frame is made in two parts. Each part consists of three or more parallel bars, connected. The two parts may be adjusted closer together or farther apart, as may be desired. The outer ends of the outer bars of each part have rings secured to them. To the draft bar are attached five staples. Two draft chains, the forward ends of which are hooked into two of the staples, are equally distant from the center of the draft bar. The chains are passed through forward rings, and are hooked into rear rings, or are turned back upon themselves and hooked into their own links. The draft may be applied to the other side of the harrow. By detaching the chains, the parts of the harrow may be folded together, so that it may be drawn upon its side in passing to and from the field.

Improved Blind Stop.

Charles E. Steller, Milwaukee, Wis.—This consists of a plate of metal, arranged between the inner edge of one of the stiles of the blind and the end of one or more slats, so as to oscillate a little. It has a cam button on the style, so combined with it that, by turning the button against the plate, the latter will be pressed against the slats, so as to hold them by friction in any position in which they may be set. It was fully described and illustrated on page 70, current volume of this journal.

Improved Combined Grave, Coffin, and Monument.

Leland M. Speers and Abraham Clark, Newberry, S. C.—This device is so constructed as to prevent the escape of odors and the entrance of water, while allowing the features of the dead to be viewed whenever desired. The invention consists in a combined grave, coffin, and monument, formed of the recessed lower part, the grooved cover made thicker at its head end, and having an opening formed through it, in which is cemented a glass plate and the cover for said opening.