A Peculiar Worm Disease.

At a recent meeting of the Chicago Amateur Photographic Society, Prof. Bellfield showed a series of photo-micrographs, one of which, he said, represented a peculiarly interesting animalcule. It was a species of worm found in the blood—a new disease, and, so far as known, confined to the tropics, so that, as skillful medical practitioners are not very plentiful in those regions, the opportunities for studying it have been very limited. The particular case from which this photo-micrograph was made was an English soldier who had been some time in India. At the age of 25 he was sent home with his regiment, and quartered in London. Soon after arrival there he showed such peculiar symptoms that he was sent to hospital, where the speaker was then practicing. The picture before you represents a drop of blood obtained by pricking his finger. You will see it contains a great number of minute worms. The most remarkable part of the whole matter is, that these worms are present, or at least visible, only at night, from 5 or 6 P.M. to 8 or 9 A.M. They gradually increased in number from 6 P.M. to midnight, and then diminished to 8 A.M., by which time they had completely disappeared. The maximum number (about midnight) would be from 100 to 125 in a drop of blood such as could conveniently be included under the cover glass. It was very difficult to count them on account of their continual squirming, but by different persons counting, so as to check one another, we were sure there were over 100. We had this patient under our observation for about three months, and made a chart showing the variations in number of these parasites from hour to hour and from day to day. We also made a calculation of the total number probably contained in his blood at the maximum, and estimated it at about forty millions. Now, the question is, when they disappear what becomes of them ? No satisfactory answer has yet been given to that question. One theory is that they are dissolved in the blood, and as they are of a very low grade or organism, there would seem to be some foundation for that theory, but it is open to the almost insuperable obstacle that no mother worm, however industrious, could possibly produce forty millions a day, and keep it up for three months or more. He might mention here that the parent worm has only been found in two cases. It inhabits the same body in which the larvæ are found, is nearly three inches long, and about the size of a hair. The disease is of such recent origin, and, as previously mentioned, confined to tropical countries, that opportunities for study have been very limited. It was first noticed in India in 1869. The likeness of this parasite to the trichina has been generally noticed—each has a distinct sheath, and each is capable of violent motion. It is, however, smaller than the latter, and is found only in the blood, while the former inhabits the muscles. It has been ascertained that the larvæ of these blood worms are sucked up by mosquitoes, develop in the body of the latter, and after the mosquito's death presumably arrive at maturity in the water, and are imbibed by human or other animals in drinking the water.

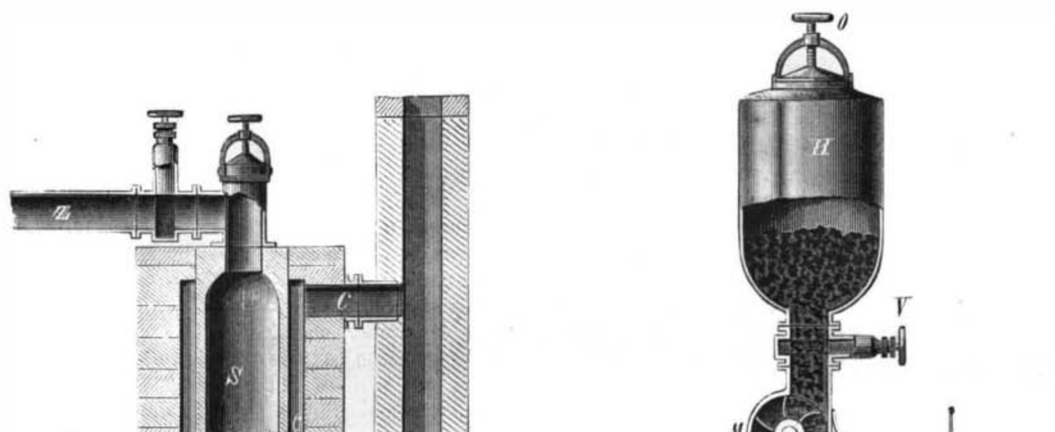
A Useful Kind of Solder.

A soft alloy which attaches itself so firmly to the surface of metals, glass, and porcelain that it can be employed to solder articles that will not bear a very high temperature can be made as follows:

Copper dust obtained by precipitation from a solution of the sulphate by means of zinc is put in a cast iron or porcelain lined mortar and mixed with strong sulphuric acid, specific gravity 1·85. From 20 to 30 or 36 parts of the copper are taken, according to the hardness desired. To the cake formed of acid and copper there is added, under constant stirring, 70 parts of mercury. When well mixed, the amalgam is carefully rinsed with warm water to remove all the acid, and then set aside to cool. In ten or twelve hours it is hard enough to scratch tin. If it is to be used now, it must be heated so hot that when worked over and brayed in an iron mortar it becomes as soft as wax. In this ductile form it can be spread out on any surface, to which it adheres when it gets cold and hard.—*Amateur Mechanics.*

IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATING GAS.

Coal gas is commonly made by placing from two to four hundred pounds of bituminous, or, as it is better known, gas coal into an iron or fire clay retort heated externally. The air being excluded from the retort, the coal is coked, the gas, tar, and other products of the coal being conducted away through suitable purifying vessels, and the coke remaining in the retort being removed at regular periods ranging from three to six hours, when the retort is again freshly charged with coal. The work of discharging and recharging the retorts is done mostly by hand labor, and from the fact that the temperature of the retort house when this work is done often reaches 116° to 120°, it may be inferred that this work is extremely trying to men, even after being long used to it. To make water gas, anthracite coal contained in a suitable apparatus is heated by external fire, but more frequently brought to incandescence by direct combustion. The supply of air is then shut off, and the vessel being closed by a valve, steam is admitted. The steam passing through the heated coal is decomposed principally into hydrogen and carbonic oxide. In a further stage this otherwise non-luminous gas is enriched by hydrocarbon vapors or gas to any required degree, and passing on through the purifying apparatus, the gas is disposed of the same as gas made from coal only.



NEW APPARATUS FOR THE MANUFACTURE OF ILLUMINATING GAS.

In the accompanying engraving we illustrate in section a system for the manufacture of illuminating gas, devised by Mr. Frederic Egner, Engineer to the People's Gas Light and Coke Co., of Chicago, Ill., which seems to have novel and interesting features. By the use of this, the manufacture of coal and water gas may beunited; cannel or ordinary gas coal being the principal material used, and this with the least amount of manual labor, the work being done for the most part by machinery, the action of the gases themselves, and the gravity of the material.

H is a hopper for coal, closed air tight at the top by the removable door, O. Several of this kind of doors are placed in desirable positions about the apparatus. V are valves to be used as occasion may require. R is a cast-iron retort, cylindrical in form, divided internally into a number of compartments by annular lips or flanges and longitudinal ribs or partition pieces. The retort rests at both ends on half pillow blocks, and is closed at the ends and still further supported by one stationary and one movable mouthpiece. The movable mouthpiece, A, at the upper end rests on the inclined slide, P, thus allowing expansion of the retort. Between the hopper, H, and movable mouthpiece, A, the joint is effected by the water lute, L; P and H being supported independently by beams, B, and suitable pillars. G is a water gas generator or the coke chamber, provided with doors, DD, and a blast pipe at X, and steam connections. C are hot air chambers or flues for the passage of the gases of combustiou. S is the superheater or fixer for the gas. Z is the pipe through which the good gas passes to the purifying apparatus.

The process of gas making by this system is as follows: The hopper being filled with coal, the air tight cover closed, and the retort brought to a dull red heat, say about 980°, near which it is to be kept throughout the process, the retort is caused to be slowly revolved by means of a cog wheel keyed upon the lower end of the same, which is engaged by a pinion upon a shaft, not shown in the cut, which imparts motion to the whole. As the retort slowly turns over the fire on the grate, F, the coal will drop from the upper chamber into the next below, and so on, until the coal, deprived of the richest and largest part of the gas, drops into the coke chamber. As the upper chamber of the retort is emptied, the measuring drum, M, delivers a fresh charge of coal from the hopper into the retort. At the temperature mentioned, the results of a ton of coal would be about 6,000 cubic feet of rich gas, and a large amount of tar and other vapors. These vapors in the ordinary processes are, almost immediately after leaving the retort, condensed in the hydraulic main, where they must pass through a lute composed of tar and water in escaping from the retort. But in this process the tar still in the shape of vapor—to which condition it cannot be brought again by ordinary means after being once condensed—is brought into the superheater, S, a retort heated externally and filled with loose brick laid in a checker form as shown, and then the tar vapors are for the most part converted into rich gas. And in this way alone it is believed that the product of gas per ton of coal would exceed any results previously worked by the old processes. The gas, too, will be exceedingly rich.

The coke while still in a red hot state, is treated with a current of superheated steam, and until quenched will decompose the steam, and thus not only considerably swell the volume of gas made, but this volume being non-luminous, it will in a simple and economical manner reduce or dilute the otherwise too rich gas made in the first operation. The quenched coke may then be removed. But if it is not desired to save the coke, the process for making water gas in addition to coal gas, and in combination with the same—aided with a little oil—can be fully carried out, and all the coal placed in the retort be thus converted into gas, excepting naturally that part of the coal—the slag or clinker—which must be removed the usual way through the lower door of the generator, G.

It has been found in practice that iron retorts, when not heated above the temperature herein stated, have, after fifteen months' use, been practically as good as new. Fire clay retorts have been substituted for iron, because by enabling the coal to be subjected to a greater heat a larger yield per ton was obtained. But here we convert the gaseous products of the coal into fixed gas and condensable vapors in the iron retort without injury to the latter, and then send these products into a fire clay retort heated to any required degree, and then complete the operation. By comparing this with older processes, it must be admitted that the system is worth a fair trial at least.

Further particulars may be obtained by applying to the inventor, Frederic Egner, care of People's Gas Light and Coke Company, 39 and 41 So. Halsted St., Chicago, Ill.

DR. H. WINNACKER (*Naturforscher*) has made a particular study of the vegetation of sewers and of drainage channels. He finds that the algæ which are harmless flourish best in channels which are constantly traversed by clean water. On the other hand, the Schizomycetes (including *Micrococcus, Bacillus, Spirillum,* and *Bacterium*) which are dangerous flourish in water courses which are alternately wet and dry. A green deposit is a favorable sign.

Crystoleum Painting.

Photographs and other pictures may be colored from the back as follows:

Take a smooth piece of glass rather larger than the print to be colored, and, after having cleaned it thoroughly, dust it over with powdered French chalk; rub it well into the glass, and then wipe it off with a piece of clean linen.

Next coat the plate with plain collodion, and allow to set, but not dry, otherwise the film will probably leave the glass. When the collodion is set, it in turn receives a coating of gelatine solution—one part by weight of gelatine to eight parts of water. This is then placed on a level surface, care having been taken that the gelatine solution has flowed well to the edges of the plate. It must then be left to dry. The print should also receive a coating of gelatine similar to that on the plate. This is best done with a soft brush or a piece of clean sponge, by which means there will be no danger from air bubbles. The picture must then be dried. Next wet the film on the glass plate by passing a wet sponge over the surface; and at the same time wet the print by immersing it in cold water for a few seconds. Now lay the print face downward on the glass plate, bringing them in contact by means of a squeegee or roller, taking care, while doing so, not to disturb their position, as it may wrinkle the film beneath. It must then be allowed to dry. Next rub the paper away from the back of the print with fine glass paper, working gently in a circular direction, the object being to get it as thin as possible. Care, however, must be taken not to rub away all the paper.

The next operation is to render the print transparent. There are several substances for rendering the print transparent, but I have found ordinary paraffine wax melted at low temperature answer as well as anything. Place the print in this, keeping it in a molten condition, and when transparent the picture should be removed. If the temperature be raised too high, it is liable to turn the print yellow.

When cold wipe off all excess, and then proceed with the painting. This only requires a little ordinary care. It is best to begin with the eyes and lips, and all small places which require different colors to the main color. When these are dry, the color of the flesh and dress may be laid on with a large brush. When the paint is thoroughly dry, a sharp knife is passed round its margin. The print is then raised from the glass, which it leaves freely, and a delicately painted photograph is the result. It may then be mounted on card in the ordinary way. This process seems to lend itself to oil paints; but if the operator wish to employ water colors he must use some medium, such as shellac dissolved in borax, for mixing the colors.—*E. E. Cadett, in Br. Jour. of Photography.*

Nitrogen Selenide.

Verneuil has recently sent to the *Bulletin Soc. Chimie* a report of his experiments on the preparation of the selenide of nitrogen which was discovered by the late Professor Wohler in 1859. The Gottingen professor prepared it by saturating selenium perchloride with ammonia gas; but Verneuil finds that the method more recently proposed by Fordos and Gelis for the preparation of nitrogen sulphite yields better results, and he takes 10 grammes of the perchloride and mixes it into a paste with a few drops of carbon disulphide, and the paste is then suspended in a liter of carbon disulphide, in which it is almost insoluble. Into this liquid a current of dry ammonia gas is passed. Flocks of ammonium chloride are precipitated, and the liquid passes from a rose tint to a dark cochineal red color. Finally, the red color disappears and brown flocks are thrown down. The current of gas is continued until the flocks become of a clear orange tint. The liquid is filtered, and the flocks washed with carbon disulphide and dried. On removing the ammonium chloride with water, washing again with carbon disulphide, and drying, the nitrogen selenide is obtained pure in amount equal to 80 per cent of the theoretical yield. It forms an amorphous powder, insoluble in all solvents, having the formula Se_2N_2. When dry it detonates instantly by a shock, being as easily exploded as mercury fulminate, less easily than nitrogen iodide. Potassium hydrate and hydrogen chloride decompose it, producing selenite of potassium and ammonia.

Laying Turf in Summer.

Mr. Henderson says: "I find that turf can be successfully laid down, if necessary, in dry and hot summer weather, by simply covering it when finished, before it gets too dry, with about a quarter of an inch of light soil put through a half inch sieve. The grass begins to grow through the soil in a very few days."

THE ARGUS PHEASANT.

In the year 1780, the first skin of a magnificent bird, called the Argus pheasant, was sent to Europe. It excited universal admiration. A little later, in 1785, Marsden gave the following account of its manner of living:

"The famous Argus pheasant, or 'kuau,' is a bird of unusual beauty, perhaps the most beautiful of all birds. It is a very difficult matter, after it has been captured, to keep it alive for any length of time. It hates the light. When it is in a dark place it appears quite lively, and its voice may perhaps be heard. Its tones are more pitiful but not quite so shrill and clear as the peacock. In bright sunlight it sits motionless. Its flesh tastes exactly like the flesh of other pheasants."

Raffles says: "This bird, which plays an important part in Malayan poetry, lives in the deepest wilds of Sumatra, and is commonly found by pairs. Solomon Müller asserts that he heard the strong voice of this bird for the first time, when near Southern Borneo, sixty meters over the sea. The young, as with the peacock, obtain their beautiful plumage after repeated moulting."

The natives catch these birds in snares, because it is not only remarkably shy and cunning, but it conceals itself in the thick undergrowth of the forests, so as to escape even the sharp eyes of the natives. An old Malay, whom Wallace challenged to shoot one of these birds, whose voice was continually heard in the forests of Malacca, asserted that during twenty years of his life as a hunter he had never killed one of these pheasants, or even seen one in the open forests. From Padang, on the western coast of Sumatra, Rosenberg writes: "The natives often bring me living birds, receiving from one and a half to two guldens in payment for each one. They are also numerous in the mountain forests of this island. In the midst of the deepest wilds the traveler or hunter sometimes comes upon a bare place, cleared carefully of branches and leaves, from which paths run into the forest in all directions. Here, sometimes at midday, the Argus pheasant may be found resting, playing, or fighting; they may be seen like hens lying on the ground, which is warmed through by the sun's says, and 'bathing' themselves in the sand. The hunters place their snares in these paths. The hen lays from seven to ten white eggs, a little smaller than goose eggs. The nest is concealed in the thickest undergrowth. In freedom the bird subsists on insects, snails, worms, leaf buds, and seeds of various kinds. The flesh is very palatable."

Until recent times, Marsden's opinion that these birds could not endure captivity was thought to be true. But now the Argus pheasant may be found in several zoological gardens. It is really incorrect to call this bird a pheasant, for, as Rosenberg asserts, in gait, behavior, and disposition it is a peacock; possesses its loud voice, and even its expression of countenance.

When sitting it holds itself in an almost horizontal position, carries itself in a lazy manner. It walks with long strides, and nods its head with every step. Its head is drawn in between its shoulders, and is only thrown forward in walking; it runs dexterously along the branches; springs without help from its wings over long distances; is not a good flier.

The Argus pheasant (Argus giganteus) differs from all known birds in the extraordinary development of the secondary feathers of the wings. "While walking or sitting on a bough this is not so noticeable, but when the bird spreads its wings they come out in all their beauty. When the bird chooses, it can raise the tail so that it stands in the air between the wings, and is partially spread."

The bill is elongated and slightly curved at the point; the foot is long, but has no spurs. The eye is naked; the head and back of the neck are covered with short feathers. The short crown feathers are a velvety black. The hair-like feathers of the back part of the head are yellow striped with black. The feathers on the neck are a warm chestnut brown, striped with light yellow. The middle of the back is a yellowish gray ground, marked with round dark brown spots. The longest tail feathers are black, with white spots surrounded with a black ring.

The secondaries of the wings are wonderful examples of plumage; they have a beautiful dark reddish brown ground color, with bright reddish gray stripes, and are covered with rows of spots, surrounded by a dark ring. Wood says that in one feather in his possession there were seventeen large "eyes" on the outer web, each being surrounded by a ring of jetty black, then with a dash of chocolate within the ring, then olive with a tinge of purple, lastly a spot of pure white near the tip, fading imperceptibly into the olive on one side and the chocolate on the other; between these spots are some leopard-like mottlings. The inner web is pale fawn, covered with black spots surrounded with buff, and the tip of the whole feather is deep brown, spotted profusely with white.

The ring around the eye is reddish brown, the bill ivory white, the eye bright ash-blue, the foot bright carmine.

The total length of the bird is more than five feet, the plumage is so developed.

The hen is much smaller and plainer in form and the marking of the plumage. —*From Brehm's Animal Life.*

THE ARGUS PHEASANT.

A Diffusion Engine.

A curiosity in physics was exhibited by Mr. Woodward, lately, at the Physical Society, London, in the shape of what is veritably a diffusion engine, that is to say, a machine in which work is done by the diffusion of gases. The action of the engine is based on an experiment of the late Professor Graham, the well known chemist. This experiment consists in taking a red clay porous cylinder containing air, and covering it with an inverted bell jar full of hydrogen. The hydrogen diffuses into the cylinder more quickly than the air diffuses out, as is shown by means of a glass tube projecting from the bottom of the cylinder into a vessel of colored water. When the gaseous pressure inside the cylinder is increased by the influx of hydrogen, the mixed gases descend this tube and bubble out of the water. On removing the bell jar, the action ceases and a reaction, due to fall of pressure, causes the water to rise in the tube. By suspending the gaseous cylinder of porous clay from a balance beam, and directing a jet of hydrogen gas against its side, the beam begins to oscillate and keeps plainly oscillating for a length of time; the action being sustained, as Professor W. G. Adams, F.R.S., pointed out, by the alternations of gaseous pressure in the cylinder.

Copper and Lead in Food.

A. Gautier shows that copper is little calculated to produce mortal results. The solubility of most of its salts, their marked color, nauseating taste, and emetic action give at once warning. The salts of lead, on the contrary, have no pronounced taste, or are even sweetish. They are in general colorless. If introduced into the system, there is no alarming effect until the nervous centers, the liver, and the blood have become interpenetrated with the poison. All foods sold in tins, especially if of a fatty nature, public water supplies, wines, beers, effervescing drinks, the glaze of earthenware, enamels, and especially culinary utensils lined with tin, may introduce lead into the system.