

**THE PROBOSCIS AND LANCETS OF THE STABLE FLY.**  
BY J. MICHELLS.

During one of the annual plagues of the house flies, I was much surprised to notice one of these little creatures escape from my hand, which had just received quite a sharp wound, such as would be delivered by some lancet-bearing dipterous insect.

Being very familiar with the anatomy of the common house fly (*Musca domestica*), and knowing it to be incapable of such an act, I determined to secure the next specimen that informed me of its presence in this emphatic manner.

The following day the opportunity came, and when my little visitor had recovered from the alarm caused by the rather sudden withdrawal of my hand, he soon returned when my wrist was courteously placed at his disposal, and he now, without interruption, leisurely regaled himself at my expense.

I now made my observations and found that, although the fly closely resembled and, to the casual observer, would probably be mistaken for one of those with which we are all but too familiar, and whose apparent hostility to the nervous, the irritable, and bald has furnished "Leech" and other caricaturists with a subject for many a sketch, still, on closer observation, the well known proboscis of the house fly, terminating with a lobe, was absent, and in its place a sharp pointed tube-like instrument was seen.

Death by an overdose of chloroform, followed by a dissection of the parts that appeared novel, was soon accomplished, and the same, after proper preparation, permanently mounted in balsam in the usual manner.

A microscopical examination, with a good 1 inch objective, at once revealed the formidable nature of the apparatus at the command of this innocent-looking fly.

As a good drawing saves a long description, I offer one made by "camera lucida," which faithfully represents the proboscis and lancets thus prepared, the object in the small circle showing its real size.

I would direct attention to the strong bayonet-looking lancets, and the powerful muscular levers that propel them at the will of the insect; these lancets, called "setae," vary in number from 8 to 2. After dissecting many specimens of the fly in question, I never observed more than two. The proboscis is doubtless a powerful sucking apparatus, the ferocious-looking jaws with which it terminates being arranged to expand and fasten upon the wound made by the lancets.

The brush-like appendages, called "maxillary palpi," will also be noticed, one of which, in the drawing, is somewhat hid at the base of the proboscis.

I apprehend this fly is the stinging stable fly (*Stomoxys*) which sometimes goads horses almost to madness by their severe and incessant punctures. They are clearly not particular in their diet; and wandering into private dwellings and horse cars, attack the first they approach.

**IMPROVED TRICYCLE.**

We select from the *English Mechanic* the accompanying sketch, with its details, of the Bradford tricycle. It is operated by both hands and feet. The feet rest upon cranks that drive a shaft placed in the lower portion of the framework, and as this shaft is rotated, it communicates motion by means of a chain band to the large 60 inch driving wheel. The shaft of this driving wheel has two cranks, which, being engaged by the hands of the rider, materially assist locomotion. A steering wheel 24 inches in diameter is placed in the rear, being attached to a vertical rod; its upper end being provided with a small gear wheel meshing into the geared arc of a lever, the opposite end of which, formed like a fork, partially encircles the body of the rider. By inclining the body to the right or left, this lever, turning on its pivot, produces a corresponding turning of the steering wheel.

By the arrangement of the tricycle, it may be propelled by either hands or feet, at the option of the rider, or the simultaneous action of both hands and feet may be employed.

**Separation of Nickel and Cobalt.**

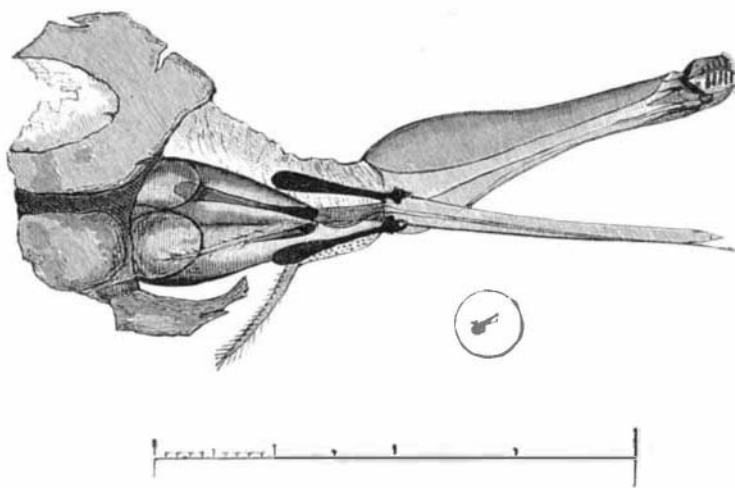
The separation of nickel and cobalt has hitherto been a somewhat difficult operation, but by the new method, which I made known a short time ago, this is effected easily and rapidly. The following method of detecting and isolating minute quantities of nickel in commercial chloride of cobalt, supposed to be pure, will give an idea of its practical nature: A few grains of that salt are dissolved in water, and the whole of the cobalt precipitated, with the nickel, by xanthate of potash employed in slight excess, and previously dissolved in a little distilled water. A few drops of ammonia are then added, just sufficient to render the liquid slightly alkaline, and the dark green xanthate of cobalt is collected on a filter. The

whole of the nickel is in the filtrate, and the whole of the cobalt in the filter. The nickel in the filtrate is precipitated by a few drops of sulphide of ammonium.

Character of xanthates.—Besides the yellow precipitate which the soluble xanthates give with salts of copper, all the insoluble xanthates, on dissolving in nitric acid, give rise to nitrous ether, which is readily recognized by its odor.—*Dr. T. L. Phipson, in Chemical News.*

**Repairing Gas Bags.**

When small leaks occur in bags used for gas to supply a magic lantern, they can be closed with thick boiled glue mixed with glycerin, in the proportion of 1 part of glycerin to 4 of glue, applied warm to the bag while filled with air. If too much glycerin is added the cement will be sticky, which can be overcome by strewing powdered soapstone over it; if too little glycerin is added, it is too hard. If the



THE PROBOSCIS AND LANCETS OF THE STABLE FLY.

holes or rents are large, the glue is made quite stiff and applied to strips of soft leather and this applied as a patch. Glue is better for this purpose than caoutchouc or gum.

**New Mechanical and Engineering Inventions.**

An improved form of Tubular Bridge has been devised by Mr. George E. King, of Des Moines, Iowa. The posts, counter braces, and lateral braces, are connected to a tubular arch by pins passed through angle irons rigidly secured to the arch, and also to eyes formed on the posts and braces. The advantage of this arrangement is that the tube is not weakened, nor so perforated that moisture can enter between the joints of the plates.

In the Manufacture of Twist Drills, it is required to clear them or reduce them in diameter from the cutting edge of the spiral. The drill is held in a spindle. A finger engages the spiral slot in the drill as the latter is moved downward, so that it is always kept in proper relation with the cutter, the inclination of which may be varied as desired.

Messrs. George and Samuel Isaacs, of New York city, propose a new Rail Cleaner for cars, which consists of improved bushes, which are held down by levers, upon the track in front of the wheels. Arrangements are provided to prevent

relieves all pressure from the shuttle, so as to facilitate the throwing of the same, and the arrangements are such that when the operator has to stop, to tie a thread or for any other cause, he can instantly go on with the work without being required to find the treadle in which he left off work.

An improved Pipe and Bar Cutter, which cuts off the pipe or bar very quickly and smoothly, has been patented by Mr. Jesse Astall, of Galveston, Tex. By simply turning a hand nut the cutter is fed forward. There is a device for holding the pipe very securely as the piece is cut off.

A new Zinc Smelting Furnace has been devised by Mr. Octavius Lumaghi, of Collinsville, Ill. The new feature consists in constructing the back wall of the furnace with holes through it. Removable plates are provided in combination with retorts through their butt ends, for allowing a circulation in them when desired. In smelting, all that can be got in the form of spelter is thus obtained, and then all the zinc that remains in the retorts in the form of oxide is extracted.

Mr. James Craik, of La Cross, Wisconsin, proposes a new Bail and Driver for Millstones, which carries the stone with a positive motion, and at the same time permits the stone to poise itself with the utmost freedom on the top of the spindle. The construction is both simple and ingenious.

A new Car Brake, devised by Mr. Jacob J. Anthony, of Sharon Springs, N. Y., comprises a cylinder containing pistons, which are forced apart by steam, water, or air, under pressure. By this means levers are moved so as to force the brake shoes against all the wheels simultaneously, and with an equal pressure on both sides of each wheel.

A new Leather Rounding Machine has been devised by Mr. Thomas S. Reed, of Calais, Vermont. The upper roll has one of its journals supported in a pivoted and the other in a sliding box. This facilitates the purpose of the machine,

which is gradually to compress the leather by passing it through different grooves until it has attained the required diameter.

For moving cars about in car shops, yards, etc., over short distances, Mr. Andrew Lebus, of Flora, Ill., has contrived a simple and powerful Jack. A clamp is secured to the car sill, and a plate having a V-shaped notch is applied to the rail. A lever is then moved, throwing a rod forward, which propels the car. The lever is then moved backward, the plate takes a new hold, and the operation is repeated. This invention will doubtless prove of much utility.

A new Ballast Distributing Car, for ballasting a railroad track with broken rock, gravel, sand, etc., has been devised by Mr. Adam B. Dockstader, of Sherman, Tex. In the bottom of the car are a number of spouts, which are closed by a series of pivoted boards, which may be moved simultaneously by a lever from the platform. With this construction the ballast can be discharged as desired while the train is in motion. This will doubtless materially facilitate labor.

A novel Mail Bag Catch, for taking mail bags and delivering them from a car while the latter is in motion, has been patented by Mr. George F. Shaver, of Westfield, N. Y. A rod on the car seizes a bag suspended from the roadside crane, while another rod on the latter, at the same time, takes a bag suspended from a frame attached to the car. The bag entering the car slides inward and strikes a curtain, so that it is subjected to no injurious shock.

Those of our readers who may desire further information concerning any of the above described inventions, can obtain the same by communicating with the inventors at the addresses named.

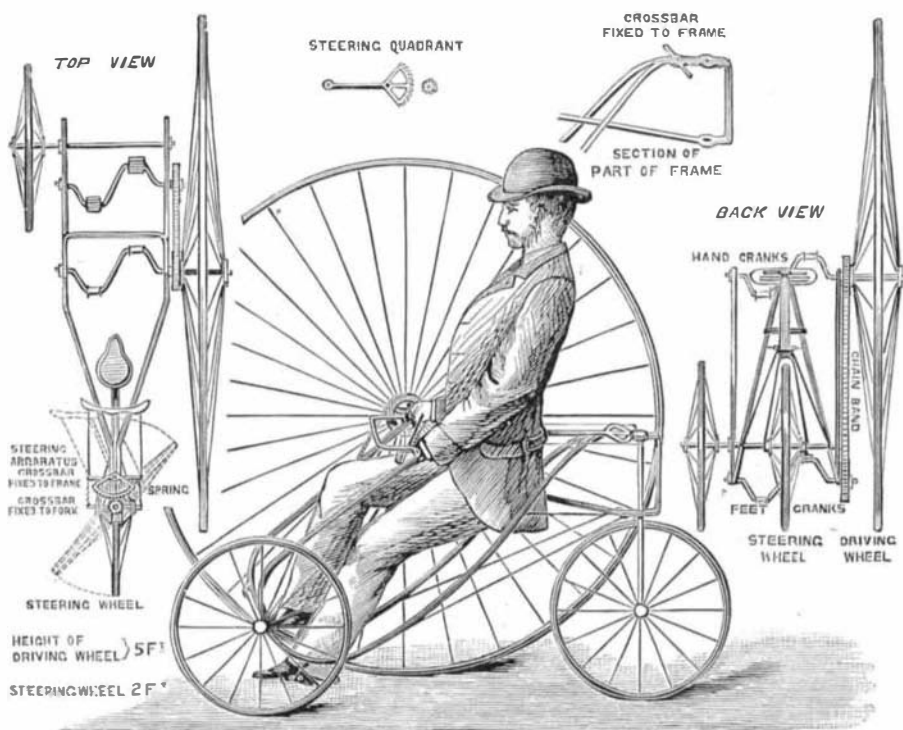
**New Building Inventions.**

A novel Eaves Trough Machine, devised by Mr. William J. Barber, of Covington, Ind., forms the trough of metal by causing the sheet to pass through suitably shaped rollers, which give it the necessary turns and beadings. This is a very simple and ingeniously constructed machine.

A new Vault Cover and Railing has been invented by Mr. Clarence H. Straight, of Bryan, Ohio. It consists of racks, which may be turned downwards to rest upon the pavement or floor, and so to close the opening, or to turn upwards to serve as a railing for the same.

For Holding Window Sashes in any desired position, Mr. Zelotes Curtis arranges toothed eccentric cams, that are pivoted to the casing of the fastener and operated by bell crank levers, which turn on a common pin, and are acted upon by a spiral spring. This device retains the sash securely and is very easily operated.

Mr. Daniel T. Keefe, of Glens Falls, N. Y., also has devised an improved Sash Holder, which sustains the window at any height without the use of cords or weights. A roller is provided with a flanged bearing frame that is acted upon by a helical spring. This is combined with a screw-threaded plug, which enters the casing. The roller, by friction, holds the sash as desired.



THE BRADFORD TRICYCLE.

the brush head turning out of true, and the tufts are so fastened in the heads that the bristles are prevented from becoming cut or broken. This device is well suited for use on street cars.

An improved Hand Loom has been devised by Messrs. W. P. Clements and Jas. H. Cagle, of Davidson River, N. C. The new features include a shuttle box and throwing apparatus, and a new heddle construction. When the batten strikes the cloth, the weight of the shuttle and clamp piece

Those of our readers who may desire further information concerning any of the above described inventions, can obtain the same by communicating with the inventors at the addresses named.

#### SCIENTIFIC AND PRACTICAL INFORMATION.

BY MR. T. C. PLESEY, OF IQUIQUE, PERU.

##### NEW SOURCES OF SUPPLY FOR TANNING MATERIAL.

The Liverpool Chamber of Commerce recently stated that the supply of material for tanning leather was falling short in England, and called for information as to where fresh sources of supply might be discovered. In the province of Baldivia, in Chili, there exists almost impenetrable forests of trees of considerable variety, among which there are not only such (as the "lorontilla" and the "ulma") as would make a splendid addition to the beauty of English—and other moist temperate climates—parks and gardens, but great numbers of a fine large tree, the "luigue," considered to be a species of oak, the bark of which is used for tanning leather at a German tannery of some importance, long established on the river bank opposite the city of Baldivia. It might be profitable to search in that locality for the required supply of tanning material, as there is a good prospect of success, and the certainty of finding other elements both of utility and ornamentation. Inducements are held out by the government for colonization, and labor at present is not dear.

##### PREPARATION OF BROMIDE OF AMMONIA.

Place in a good sized bowl containing some liquid ammonia a teacup containing bromine, covering all with a sheet of glass. The bromine vapors first settle down, and are followed by the more expansive ammonia; they become rapidly converted into the bromide, whose pure white crystals form round the edges of the bromine. The whole operation only occupies a few minutes.

##### PYROXYLIN.

Finding, after taking every precaution to rid my gun cotton of acid, that the sensitizers employed with the collodion I made with it underwent slow decomposition, I resolved to boil it, when I found that after the acid flavor disappeared an intense bitter principle became extracted by the operation. Washing well then, between each boiling, I continued the latter until the bitterness gradually diminished, and after some twenty odd boilings disappeared. The collodion made with this was always stable, it did not discolor, even by exposure to the light, and worked well to the last drop, even after being kept for years. Pyroxylin made with mixed acids only, I presume, would not require this treatment. I made mine with a mixture of sulphuric acid and nitrate of potash, and am persuaded that the source of the annoyance was the resulting sulphate of potash which formed in the fiber of the cotton. The cotton thus prepared has the advantage of so high a degree of solubility that it is possible to make and sensitize collodion and take a good negative with it within an hour.

##### QUICK CAMERA PRINTING.

Photographs for subsequent painting on in oil may be prepared by floating the prepared and sensitized surfaces with a pyrogallol and acetic acid developer before exposure. The operator is thus enabled to see his pictures coming out, and stop them at the right stage for fixing. This has been attended with the most satisfactory results. It is only necessary to have a lighted candle in the room, stationed behind the canvas, and, covering up the mouth of the camera, approach it occasionally to note progress. Life-sized pictures, or thereabouts, from  $\frac{1}{4}$  plate negatives, require about 30 seconds to print suitably.

##### DURABLE AND STEADY QUICKSTUFF FOR DAGUERREOTYPING.

Slake quicklime with water until it is so completely hydrated as to remain quite damp—as far, in fact, as possible, just to avoid actual coherence between the particles—and saturate with bromine charged with a sixteenth part of pure iodine, when it will be found to coat, after iodizing the silver plate to a light rose, in from ten to twenty seconds in the mild temperature required in a daguerreotype gallery; work with great steadiness, in spite of considerable variations in temperature and frequency of drafts during the day upon the vapor; give beautiful, delicate, bright, clear, vigorous impressions, allowing of a full strength solution of hyposulphite of gold to fix; and work equally well for months without the necessity of renovation. The plates thus prepared require about one fourth the time over the iodine bath, for the second as compared with that occupied by the first coating. This method admits of considerable latitude to the operator, so as to modify, without prejudice to success, the character of the results obtained, the proportion of the iodine to that of the bromine, may be varied, or chloride of iodine even used instead, for mixture with the bromine (though with the latter I was not quite as well satisfied); but the hydrate of lime must be as stated in order to obtain the full benefit of the process.

##### AN ICE MONOPOLY.

The high degree of temperature experienced throughout a great portion of the year in Chili and Peru would seem to point them out as good fields for the exportation of such machines. It is well, therefore, they should be advised that such restrictions are placed on the trade in ice or frozen snow, which have been made the subjects of a monopoly by the municipalities that no one is permitted to supply the articles except with the consent of these bodies, and after paying very heavy demands, according to the importance of the locality, for the privilege.

##### SOFTENING STONE.

I have seen some ingenious laborers on the Oregan railway, who had made a contract for excavation in very hard ground, make a good thing of it by digging a narrow trench and leading water on to it. There are certain kinds of metallic ores which, from their hardness or toughness, are tedious and troublesome to pulverize, yet which, from the fact of their containing saline or other more or less soluble or easily softened constituents, might be advantageously treated by immersion for a time in water, previous to grinding. It is known that the stones in the old palace of the Incas in Cuzco fit so closely together, without any binding material, as not to admit a knife edge between them; and it has been supposed that they were possessed of the secret of softening the surface of stone preparatory to working it. A circumstance which has come to my knowledge gives a coloring to this supposition. A friend of mine, travelling a long way into the interior to the north of Peru, came across an Indian who was engaged in making a preparation for the purpose of softening some silver ores he was working. It consisted of urine, the juices of the leaves and stalks of three kinds of plants, and those extracted from the roots of two others. The leaves of one of the plants were about a foot long, and resembled those of the common dock leaf. This was all he was able to ascertain, as the Indian was chary of communication, and took pains to conceal the elements of his preparation.

##### THE IQUIQUE EARTHQUAKE.

Iquique was not "destroyed" by the earthquake of May 9th last, and succession of tidal waves which occurred, commencing about a quarter of an hour or twenty minutes afterwards, and continuing until late in the day on the 10th. At about half past five P.M. of the 9th, or three hours before the earthquake, the pivoted reflector employed in the office of the Submarine Telegraph Company in this city turned suddenly round, and persisted in such a manner in maintaining this reverse position that the operator at work at the time had to reverse it (by turning the little hollow metallic plug it is swung in on its center) to be able to continue his communications.

The highest of the waves here did not exceed twenty feet, its mark having been left at about that height above the level of the water in a salt water well close to the beach; but it is said to have reached the height of sixty feet at Pabellon de Pica, and also, I believe, the port of Megillones, in Bolivia. I do not, however, place perfect reliance on these reports.

##### New Agricultural Devices.

An improved Baling Press for baling cotton, hay, and similar articles, devised by Mr. Solomon S. Laird, of San Obispo Cal., embodies a powerful mechanical arrangement. Upper and lower pawls actuated by levers alternately engage ratchet bars and cause a follower to move forward. Then, when the bale is sufficiently compressed, it is tied and forced out at the end of the press by continuing the movement of the levers.

A new Farm Gate, by Mr. Malcom J. McPherson, of West Campbell, Mich., may be raised vertically before being turned on its hinges, to clear it from snow or other obstructions. It also may be raised and fastened without turning, so as to allow small animals to pass under it, while the escape of large cattle is prevented. Useful for pasture lots.

A Roof and Stock Pen for Platform Scales, by Mr. Adam E. Karsner, of Florida, Ohio, includes a structure which covers the platform scales and protects it from the weather. The pen may be arranged to receive stock when being weighed, and it may be turned back when loads of hay, etc., are put upon the scales.

A new Cotton Harvester has been invented by Mr. William J. Powell, of Marshfield, Mass. As the machine is drawn forward over a row of cotton plants, aprons are rotated and wire teeth thereon remove the ripe cotton and deliver it to boxes. One set of aprons work on the sides, another on the top of the plants, and they may be adjusted as desired. There is great demand for machines of this description, and the present device will, we think, be found well worthy of examination and trial by planters.

Mr. Mastin C. Randol, of Huntington, Tenn., has invented a novel Corn Planter, which may be adjusted to plant the seeds at any desired distance apart, and any desired amount in a hill. It opens the furrow, drops the seed, cultivates the soil on both sides of the furrow, covers the seed, and rolls the ground.

For Stretching Wire Fence, Mr. Hubert Schülgen, of New York city, attaches a U-shaped clamp to each wire. In connection with this there is a winding up roller, turned by a key and locked by recesses in the clamp binding on an inclined projecting tooth of the roller. This is a simple and effective contrivance for extending wires of trellises for vines.

A very convenient form of Butter Package, which may be commended to the notice of dairymen, has been devised by Mr. George Kater, of Northville, Mich. It consists of a cylindrical wrapper of wood with overlapping edges, which is prevented from opening by detachable top and bottom covers. Within is a loose partition wall for separating the prints.

A new Harness for Breaking Horses, which is so constructed as to enable the operator completely to control the horse without being liable to injury himself, is the invention of Mr. Charles H. Bowin, of Rocheport, Mo. Ropes are connected with the fore and hind legs, and so arranged that the animal may be easily thrown upon his belly. The harness

prevents the horse from running, rearing, or kicking, and admits of his easy control.

The new feature in an ingenious Corn Planter devised by Mr. Alfred F. Hammond, of Berlin (Loramies P. O.), Ohio, is an arrangement whereby the same devices that press down and flatten the loose earth above the seed also act upon buffing and friction wheels that are pivoted to rods, by which the said slides are vibrated. Said rods are connected with the seed slide levers. The marking devices, transporting wheels, and hoppers are arranged in line.

Mr. William H. Mellon, of Fern Valley, Iowa, has devised a new Rotary Cutter for plows, which is so constructed that the sand cannot get into or wear its journal. An ingenious device is added for bending down weeds, grass, etc., so that they will be turned under and fully covered by the furrow slice.

Mr. Joseph P. Terry, of Lake City, Florida, has devised a new Plow and Cultivator, the novel features in which are as follows: The shanks of the curved iron standards are bent upward and laterally at right angles, and also provided with a lateral flange to adapt them to be secured to the beams. The beams are three in number, and one of them is hinged to adapt it to be set at an angle to the others.

Those of our readers who may desire further information concerning any of the above described inventions, can obtain the same by communicating with the inventors at the addresses named.

##### Manganese Bronze.

Manganese bronze, the new alloy, has been found to greatly exceed in tensile strength both Muntz or yellow metal and gun metal. At recent experiments made at the Royal Gun Factories, England, a cold rolled rod was found to have remarkable strength, sustaining a strain of 34 tons before stretching, with an ultimate strength of nearly 40 tons per square inch, and an elongation of 11.6 per cent, of its length places it on a level, and, in respect of its elastic limit, above the best steel used for constructive purposes. The weakest quality is 50 per cent stronger than Muntz metal, and at the same time sufficiently ductile to be rivetted cold. It has been successfully converted into sheets and plates, wire and tubes, in all of which forms it possesses a great superiority over brass, being twice as hard and twice as strong. The *Engineer* says that the greatest heat it is likely to be subjected to in a locomotive, or other high pressure boiler, does not in the least reduce either its strength, toughness, or hardness, so that it would appear particularly suitable for boiler and condenser tubes.

##### Damages of Illuminating by Gas.

Professor A. H. Church states, in the *Chemical News*, that the injurious influence of the products of combustion of coal gas upon the leather bindings of books is only too well known. Vellum seems unaffected; morocco suffers least; calf is much injured, and Russia still more so. The disintegration is most rapid with books on the upper shelves of a library, whither the heated products of combustion ascend, and where they are absorbed and condensed. By comparing specimens of old leather with specimens of new it is quite clear that the destructive influence of gas is due mainly to its sulphur. True there are traces of sulphates in the dye and size of new leather bindings, but the quantity is insignificant, and there is practically no free sulphuric acid. That leather may be destroyed by the oil of vitriol produced by the burning of gas in a library is proved by the following observations and analysis:

The librarian of one of our public libraries forwarded to me the backs of several volumes which had been "shed" by the books on the upper shelves in an apartment lighted by gas. The leather of one of these backs (a volume of the "Archæologia") was carefully scraped off so as to avoid removing any paper or size from beneath. This task of scraping was easy enough, for the leather was reduced to the consistency of Scotch snuff. On analysis of the watery extract of this leather the following figures were obtained: Free sulphuric acid in decayed leather, 6.21 p. c.; combined sulphuric acid in decayed leather, 2.21 p. c.; total, 8.42 p. c.

##### Iodide of Starch.

The iodide of starch is a definite compound, its composition being represented by the formula  $(C_{12}H_{10}O_{10})_2I$ . It is decomposed, with regeneration of the original starch, by all sources of nascent hydrogen, and is again produced by the limited action of oxidizing agents in the cold, even by the mere action of the atmosphere. Except when present in excess, iodine is not eliminated by its solvents, such as potassium iodide, benzol, carbon bisulphide, etc., except alcohol, whilst these solvents separate it from the red compound which it forms with dextrin *a*. If kept suspended in water for a year it is slightly decomposed; a portion becomes soluble in water, which then contains dextrin *a*, colored red by iodine, and hydriodic acid, but no glucose. The insoluble portion retains the same composition.—*M. Bondonneau.*

##### Solidification of Carbon Bisulphide.

M. Mercier finds that if bisulphide of carbon be added to a mixture of a drying oil and protochloride of sulphur at the moment of mixing, it is entangled in the jelly formed by the oil and protochloride. With boiled linseed oil and ten per cent of the protochloride a transparent elastic mixture can be obtained containing 70 per cent of bisulphide of carbon. The substance ignites only with difficulty, and loses the contained bisulphide but slowly.