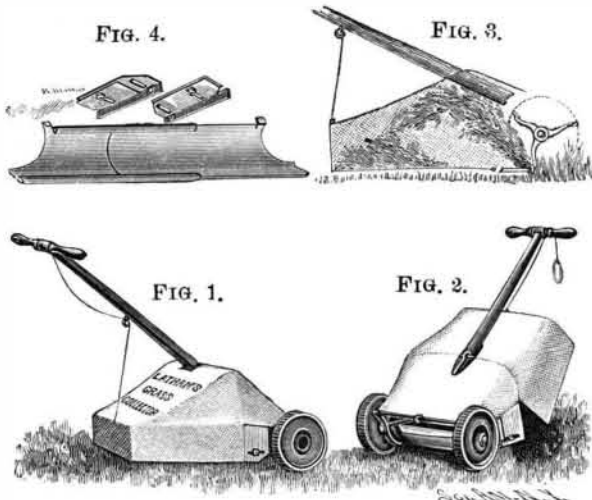


**LATHAM'S GRASS COLLECTOR FOR LAWN MOWERS.**

Every one who has used a lawn mower knows that the most disagreeable and most unsatisfactory part of cutting a lawn is raking the grass. The lawn usually looks well after the mower has passed over it, but the rake is likely to tear and pull up the roots of the grass more or less and make the lawn look rough. If the grass is gathered in a collector, the lawn is left smooth and velvety, and the grass thickens until the



LATHAM'S GRASS COLLECTOR FOR LAWN MOWERS.

ground is completely covered with a thick green mat. The grass collector shown in accompanying illustrations does away with the disagreeable work of raking a lawn and does away with the rake entirely. The collector is made of canvas, with a galvanized iron frame, and is readily attached to the mower, and weighing but 2½ to 3½ pounds, according to size, it does not add materially to the weight, and is so arranged as to be entirely out of the way. The cut grass can be instantly emptied by pulling the cord shown in Fig. 2, and as the collector is behind the cutter, the cut grass can be left in heaps or a windrow similar to that made by a horse rake, and is easily collected. In Fig. 3 we show the action of cutter, which throws the grass entirely over the cutters back into the canvas collector, so that it does not clog the machine. The plates shown in Fig. 4 are extensible, so as to fit almost any machine, and are all galvanized. This collector is the result of much experiment, and has been used with the most satisfactory results. It is very useful around borders, edges of walks and drives. It is quite inexpensive and thoroughly well made. It is manufactured by C. H. Latham, of Lancaster, Mass.

**SOME SUGGESTIONS IN MICROSCOPY.**

BY GEO. M. HOPKINS.

An object which always interests the microscopist, and excites the wonder and admiration of those who

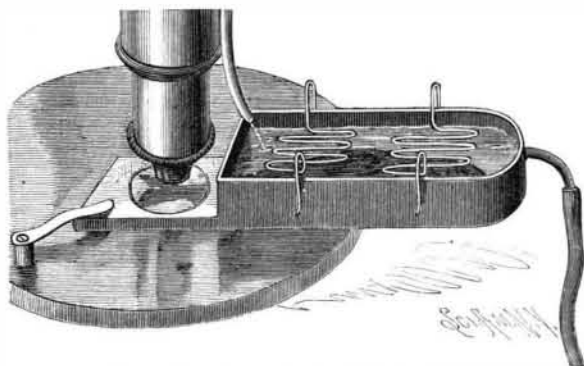


Fig. 1.—FISH TROUGH WITH GRIDS AND CONTINUOUS WATER SUPPLY.

regard things microscopic from the point of popular interest, is the circulating blood in living creatures. Nothing in this line has proved more satisfactory than the microscopic view of the circulation of blood in the tail of a gold fish. Thanks to Mr. Kent's invention of the fish trough, the arrangement of the fish for this purpose has been rendered comparatively simple and easy.

The trough consists of a metallic vessel provided with a thin extension at one end near the bottom furnished with glass-covered apertures above and below. The body of the fish between the gills and tail is wrapped with a strip of soft cloth, and the trough being filled with water, the fish is placed therein, with its tail projecting into the extension between the glass

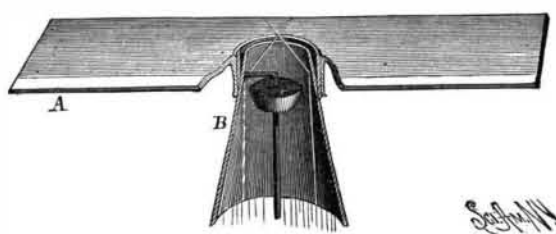


Fig. 2.—DARK GROUND ILLUMINATOR.

covers. The tank is arranged on the microscopic stage with the tail of the fish in position for examination. So long as the fish remains quiescent, all goes well, and the beautiful phenomenon may be witnessed with great satisfaction, but the subject soon becomes impatient, and at the most inopportune moment either withdraws its tail from the field or jumps out of the tank, thus causing a delay which is sometimes embarrassing.

The uneasiness of the fish is caused partly by its unnatural position, and partly by the vitiation of the water. The latter trouble has been remedied by the writer, by inserting a discharge spout in one end of the trough, and providing a tube for continually supplying fresh water. The other difficulty has been surmounted by providing two wire grids (Fig. 1), each having spring clips at their ends for clamping the walls of the tank. These grids are pushed downward near the body and head of the fish, so as to closely confine the little prisoner without doing it the least injury. With these two improvements the examination may be carried on comfortably for an hour or more.

In Fig. 2 is shown a simple device for dark ground illumination. Although it does not take the place of the parabolic illuminator, or the spot lens, for objectives of low angle, it answers an excellent purpose. To a metallic side, A, having a central aperture surrounded by a collar is fitted a funnel, B, of bright tin or nickel plated metal, which is provided with a downwardly projecting, axially arranged wire upon which is placed a wooden button capable of sliding up or down on the wire, the button being of sufficient size to prevent the passage of direct light to the objective. The light by which the illumination is effected passes the button, and striking the walls of the conical reflector, is thrown on the object.

**Uranium in the Black Hills.**

BY HERMAN REINOLD.

Among the ores recently found in the Black Hills has been that rare and valuable mineral uranium. Although it has only appeared in one place, situated in the Bald Mountain district, it is found there in such large quantities as to warrant the prospect of early production of uranium salts, as well as the metal uranium, in the United States.

At present uranium mining is carried on only in two places in the world, namely at Annaberg, Saxony, and Redruth, Cornwall, and the scarcity of the mineral has been the cause of its not being used for a very important purpose, the manufacture of steel.

In Europe uranium has only been found in pockets in form of pitchblende, which is uranous and uranic oxide (40 per cent of uranous and 54 per cent of uranic oxide) combined with silica, lead, iron, and manganese; the other uranium ores appearing in such small quantities as not to be commercially valuable. The writer, who has made an examination of the different uranium ores on the Bald Mountain, has found the following minerals in a depth of only a few feet, the rock being of the archæan formation:

1. Uranit (uranium glimmer) embedded in the rock and the seams, in greenish yellow scales, the vein running vertically and being forty feet wide on the surface. An analysis showed it to be  $(U_2O_3) 2 PO_4, Cu$ . As a source for uranium this mineral cannot be used, the costs of concentrating being too high.
2. Pitchblende. This mineral appears in seams, together with the above mentioned scales. From all appearances the rock contains large quantities in greater depths, the conditions being analogous with those at Cornwall. Its composition is  $U_3O_8$ , with iron, lead, magnesia, and manganese, also silica.
3. Uraniumochre  $(U_2O_3) 3 SO_3$ , and uranochalcit  $U_2O_3 (Fe, Ca) O SO_3, H_2O$ , in large bodies of kidney-shaped form; and
4. Trogerit,  $3 UO_3, As_2 O_5$ .

All these ores, with the exception of the first one mentioned, may be converted into uranium salts, which are commercially valuable. The chloride, nitrate, and sulphate of uranium are used in the manufacture of stained glass, producing a greenish yellow tint, peculiar to them. They are also used in coloring porcelain (black porcelain), and to some extent in photography. Germany and France are the principal consumers, and lately the output in Europe has decreased, and the price of uranium advanced materially, its cost being now \$10 a pound.

But the uranium find in the Black Hills may be of still greater importance in another direction, as the use of the salt in the manufacture of glass and porcelain is naturally limited.

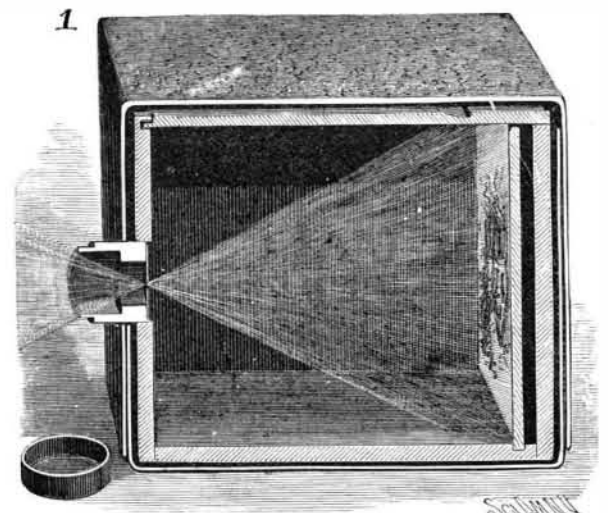
Experiments and tests which have been made by the great steel and gun manufacturers in England and Germany have shown that the addition of a small percentage of uranium to steel increases its elasticity, and at the same time its hardness, to an extent that makes its use in the manufacture of guns, armor plates, etc., most desirable, but the scarcity of the material and especially the great difficulty in reducing the ore to metal makes the price of uranium steel too high. But since then great improvements have been made in the manufacture of sodium and electricity has been called to the

aid of metallurgy; so if large deposits of uranium are found, the metal can be produced for the same price as aluminum. That there are large bodies of uranium in the Black Hills there can be no doubt, and it may be that in no distant time manganese and nickel steel will be superseded by uranium steel.

**A ONE DOLLAR PHOTOGRAPHIC OUTFIT.**

One would have supposed that the photographic craze had reached its climax when cameras costing from ten to fifty dollars were produced, together with conveniences which would enable almost any one to take photographs, but it appears that a large field has been left unoccupied. A camera has been needed which could produce a good picture with a small outlay.

Such a camera is shown in the annexed engravings. The instrument, together with the entire photographic outfit, including chemicals, is sold for one dollar. and this is the chief novelty of the outfit. This instrument is known as the "Glen Camera," made and sold by Ives, Blakeslee & Williams Company, of 294 Broadway, New York. Inasmuch as all the light used in this camera enters through a pinhole instead of a lens, a rather longer exposure is required than with an ordinary camera, but the results obtained are very good and pictures 2½ inches square are produced.



LONGITUDINAL SECTION OF GLEN CAMERA.

The construction of the camera will be understood by referring to the longitudinal section, Fig. 1. The light coming from the object passes through the pin hole, producing the image on the plate held by a groove in the rear portion of the camera box. As there are no plate holders, the camera must be taken to a dark room for an exchange of plates.

With the camera is furnished the materials and appliances shown in Fig. 2, consisting of six dry plates, a package of blue process paper, one ounce of hyposulphite of soda, a package of developing powder, card

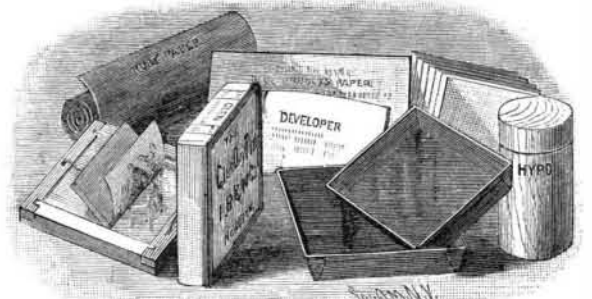


Fig. 2.—MATERIALS AND ACCESSORIES.

mounts, a printing frame, two japanned trays, together with a sheet of ruby paper for making a red light for the dark room. With these the amateur photographer may make, develop, print, and mount his pictures.

The camera is put up for mailing, and the package contains full instructions for making the exposure and all the operations for the completion of the picture.

**Wealthy Electricians.**

Lucre has smiled on the explorers in the field of electrical science, says the St. Louis *Globe-Democrat*. No scientific body in the country has so many millionaires as the American Institute of Electrical Engineers. At the top of the list is Alexander Graham Bell, whose profits on the telephone are represented by eight figures. Next comes Edison with a seven figure fortune. Brush, of electric light fame, and Elihu Thomson, whose financial future is perhaps brighter than any of the others now, are more than millionaires. Frank J. Sprague was a junior officer in the United States navy six years ago. He is now living in the mansion which was built for the Grants. His company sold out to the Edison Co., for \$1,000,000, and half of it went to the inventor. Franklin L. Pope, of New York, and a score of others have independent fortunes. Most of these men were telegraph operators, and most of them began their experimenting and study without a dollar.

### The Actual Number of Tubercle Bacilli which may be Present in Tuberculous Sputum.

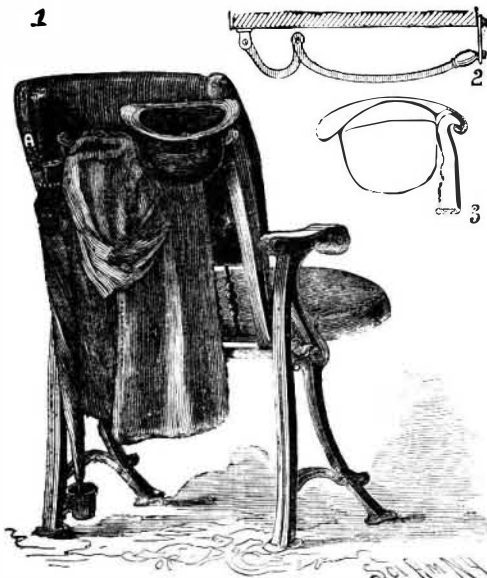
Dr. George H. F. Nuttall describes in the last number of the *Johns Hopkins Hospital Bulletin* a method by which he has been able to make accurate estimates of the actual numbers of tubercle bacilli present in tuberculous sputum. His communication is accompanied by cuts of the apparatus used. The methods heretofore employed for estimating simply the relative number of tubercle bacilli in sputum are condemned as unscientific. Nuttall's observations for the first time give us an idea of the enormous number of tubercle bacilli which a patient may expectorate in the course of twenty-four hours. In three cases undergoing the Koch treatment observations on the numbers of bacilli in the sputum were made every few days. In the first case the patient expectorated 2,000,000,000 bacilli during the twenty-four hours. After the patient was inoculated with tuberculin the number rose to between 3,000,000,000 and 4,000,000,000. After the inoculations ceased the number fell to what it had been originally. In the second case the number of bacilli varied between 20,000,000 and 165,000,000 on the days preceding the Koch inoculations, rose irregularly to 283,000,000 after the first inoculation, and fell to only 265,000 by the time the sixteenth inoculation had been reached. The third case showed a decrease from 70,000,000 before the inoculations to 12,000,000 and 19,000,000 after the treatment had been begun. A great rise in the number of tubercle bacilli in sputum was observed in the case of one patient (not undergoing the Koch treatment) to occur simultaneously with the appearance of elastic tissue. The number of bacilli in this case rose from between 300,000,000 and 400,000,000 to over 4,000,000,000. The accuracy of the method is shown by a number of test and culture experiments. Nuttall believes his method will prove valuable in any experiments where it is desirable to introduce a definite number of organisms into culture media, disinfectants, etc. In point of accuracy, it far surpasses the loop method generally employed. With such organisms as the tubercle bacillus this method will enable the experimenter to determine the number he is inoculating into an animal in a way that has not been possible hitherto. Inoculations made under such conditions will clearly show the difference in degree of virulence possessed by various organisms, as also the relation between the number of bacteria introduced and the progress of the disease. This method, finally, brings us a step nearer to solving the problem of the significance of involution and degeneration forms of bacteria.—*N. Y. Med. Jour.*

### RACK ATTACHMENT FOR THEATER CHAIRS.

A novel rack for attachment to the backs of chairs or seats in theaters, public halls, and places is shown in the annexed engraving, Fig. 1 being a perspective view of a chair with the attachment applied, Fig. 2 a plan view of the attachment, and Fig. 3 a side elevation of the hat support.

This device affords a convenient support for a coat or other outer garment, a place for an umbrella or cane, and a standard for retaining a hat.

The principal part of the rack consists of a bar hinged at one end to one of the chair posts, curved outwardly for receiving the umbrella handle, and con-



HERMANN'S ATTACHMENT FOR THEATER CHAIRS.

nected by a standard with the longer curved portion designed to receive a coat. The rack is pivoted to swing in an inclined plane, so that it will close automatically, and thus be prevented from offering any obstruction to a free passage through the row of seats.

Although the rack is designed to close automatically, a hook is pivoted to the side of the chair for engaging the end of the rack arm and preventing it from swinging out accidentally.

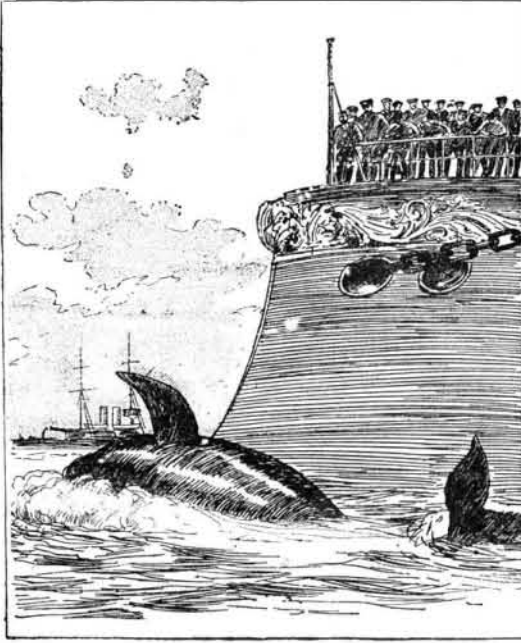
To the free end of the rack arm is attached a standard, as shown in Fig. 3, having its upper end curved over to form a hook for receiving the turned-over portion of the hat brim, as shown in Fig. 3. To the leg of

the chair below the curved portion of the rack designed for receiving the umbrella handle is secured a drip cup, in which the tip of the umbrella is placed.

This invention has been patented by Mr. George Hermann, 34 E. 10th St., New York.

### A WARSHIP RAMS A WHALE.

While cruising with the Channel squadron, writes an officer of H. M. S. *Immortalité*, at nine o'clock on the morning of the 26th of May, in lat. 38 deg. 7 min. N, long. 9 deg. 19 min. W, steering S $\frac{1}{4}$ W (about



midway between Sardinia and the African coast), and going at a speed of thirteen knots, we struck a whale, about forty-five or fifty feet long, with our ram. It was unable to clear itself, which necessitated our going full speed astern, when the whale sank. It must have been asleep. At the same time we noticed another quite close on our starboard bow.

### Fracture of the Clavicle from the "Kick" of a Rifle.

In the *Edinburgh Medical Journal*, Mr. James B. Simpson records the case of a member of a rifle club, a strongly built slate quarrier, thirty years old, who, after having fired several shots at 200 yards, feeling a "kick" not severe enough to cause actual pain, fired several more at 500 yards, lying down and resting on his elbows, and finally a shot at 600 yards, likewise in the prone posture. This shot broke the clavicle near its middle. The fracture was treated according to Sayre's method, and healed well. "When he recovered," says Mr. Simpson, "I asked the man to show me how he held his rifle while firing at 500 and 600 yards. On his raising the 'sight' and lying down and taking aim, the explanation of the fracture was clear. Instead of holding the butt of the rifle well on to his shoulder, he rested the upper end of the butt directly on the most prominent part of the clavicle. One could easily pass one's hand between the lower two-thirds of the butt and the man's chest, and it was therefore clear that when he fired all the force of the recoil came upon the clavicle. The farther he retired from the target, the more he necessarily elevated the muzzle of the rifle, and consequently the more did the upper end of the butt rest upon the clavicle, until at 600 yards so entirely was this the case that the bone gave way under the concentrated force."

### Integrity of Quality.

Probably it is of as much importance to know how to retain a market as to know how to get it. Integrity of quality in goods is indispensable.

Not many years ago English manufacturers of cotton goods came near ruining valuable markets for such goods in the East, by sending to these markets miserable, sleazy, light weight goods loaded with size to give them artificial weight and the appearance of better cloth. These markets have never been the same to them since. Lost confidence is not easily restored. If, as a celebrated English statesman once remarked, "confidence is a plant of slow growth," it is certainly also a hard plant to nurse back into vigorous life when its roots have been cut by commercial deceit. A case in point occurs to us.

The late B. T. Babbitt, the famous and wealthy manufacturer of soap, established his business on the basis of strict commercial integrity, and his name was always honored among New York merchants. Some twenty years before his death, he made the European tour, leaving at the head of his business a young man of great energy and executive ability, but, as the sequel will show, of rather elastic principles. It was arranged with this deputy that in addition to his regular salary he might have during Mr. Babbitt's absence a certain share of all the profits of the business, whereupon immediately, as soon as his chief was out of sight,

he put into practice a scheme of adulteration of the soap without a corresponding reduction of price. The soap selling freely upon the strength of its former reputation, the immediate returns were large, and the profits (?) divided unto the enterprising schemer from this selling out of his chief's business were, before Mr. Babbitt's return, enough to enable the trusted agent to retire with sufficient capital to start and conduct a large manufacturing business of his own. In narrating to the writer this disagreeable episode not many years after its occurrence, Mr. Babbitt said it cost him nearly a quarter of a million of dollars to remedy the injury to his business thus effected by a few months of sharp practice. He sent to his customers, all over the United States, letters requesting a return of the inferior goods, which he replaced with those of standard quality, and by a judicious but enormous expenditure in advertising gradually recovered the lost trade.

### Cotton Oil in Lard.

The authors use Bechi-Hehner's silver nitrate test and Labiche's lead acetate reaction. For the former test 10 grms. of the filtered anhydrous lard are heated with 5 c. c. of silver nitrate solution (1 part silver nitrate, 200 alcohol, 40 ether, and 0.1 part nitric acid) in the water bath for fifteen minutes, shaking continually. The mixture, according to its proportion of cotton seed oil, turns more or less deeply reddish brown to black. Pure lard, poppy, olive, and sesame oils are not affected. For the Labiche test, 25 grms. of the clear melted sample are mixed with 25 c. c. of a solution of lead acetate, heated to 35°, and well mixed after the addition of 5 c. c. ammonia. The emulsion thus obtained, if cotton oil is present, soon shows a yellowish red color, which becomes more intense after standing for a day. Poppy-rape, sesame oils, and pure lard are not affected.—*A. Bujard and J. Waldbauer, Zeit. Ange. Chemie.*

### GUNNER'S ARM REST.

An arm rest for the use of sportsmen and others in shooting offhand is shown in the annexed engraving. The rest is made portable, and when desired for use it is attached to an ordinary cartridge belt and supported by a strap extending over the shoulders.

The rest consists of three principal parts, a sleeve having a clip for engaging a loop on the belt, a ratchet bar sliding in the sleeve, and a U-shaped bar attached to the ratchet bar for receiving the arm of the gunner. The sleeve is provided with a spring bolt which strikes the clip and holds it on the loop of the belt, and it is also provided with a spring key which engages the ratchet bar so as to hold the arm loop at any desired height. In addition to the key, the sleeve is provided with a thumb screw which enters a groove in the back of the ratchet bar and prevents the ratchet bar from turning. It may also be used for clamping the bar, thus affording additional security.

The device may be extended by simply pulling the arm loop upward, but to reduce its length the spring key which engages the ratchet bar must be pressed before the bar can be moved downward. At the upper and lower ends of the ratchet bar there are square notches for receiving the spring key. When



SPROUL'S ARM REST FOR GUNNERS.

the key is in engagement with these notches, the bar is prevented from moving in either direction.

By the use of this device the arm is held steadily in an extended position, so that shooting may be done offhand as accurately as when firing over a stationary gun rest. For further particulars about this useful invention, address the patentee, Mr. Robert B. Sproul, or Mr. David S. Dickson, of Quartz, Montana.

ERRATUM.—In Mr. Wyatt's interesting article on phosphates in last issue, the analysis of South Carolina phosphates contained an error. "Phosphates of iron and alumina" should read oxides of iron and alumina.