

Suggestions for Fat People.

It is Brillat-Savarin, we believe, who, in his immortal book on gastronomy, avers that no one is entirely satisfied with his weight; every one wants to be somewhat fatter or somewhat leaner; or if he or she really is just about as he would be in this respect, he imagines a tendency one way or the other, which he feels he must be on his guard to correct.

There is enough truth in this to make it an object for that enterprising class of individuals who make their money out of the weaknesses of their fellows to advertise pretty constantly various secret fat producing and fat decreasing nostrums. The extraordinary sale of Banting's famous pamphlet, which reached sixty or seventy thousand copies, attests the same. And almost every year there is some new remedy offered to the regular profession, either to make fat or to disperse it.

The larger class, or, at any rate, apparently the more anxious class, are those who are too fat, and who wish to grow leaner. Of the various drugs proposed to accomplish this, acids, in the form of vinegar, and alkalies, especially liquor potassæ, are the best known. No doubt both these produce the effect desired, but they both do it at the cost of profound disturbances of the nutritive functions, and, in many cases, serious danger to life.

The *fucus vesiculosus* has been extensively lauded. It probably acts through the iodine in it, actively stimulating the secretory organs; and has, therefore, the injurious effects known in chronic iodism. We have seen letters from some who have used the extract to diminish their weight. The effect desired was produced, but the patients generally spoke of sensations of prostration, sinking, loss of appetite, etc.

The Banting system of diet has in many cases been tried with success; but it, too, carried out without intelligent knowledge of the patient's condition, has at times led to severe and dangerous disorders of the excretories. In the case of a friend, of general fine health, and in early middle life, it has on several occasions, when he has tried it, resulted in rapid muscular debility and mental lassitude. In all such cases it should not be pushed.

Recently Dr. Tarnier has called attention (in the *Ann. de la Soc. de Med. de Gand.*, No. iv. 1877) to the success of a milk diet in these cases. He commences by allowing three fourths the usual food and one liter of milk the first day; one half the usual food and two liters of milk the second day; one fourth the food and three liters of milk the third day; and thereafter four liters of milk daily and nothing else.

Often, however, it is better to allow a small proportion of the usual food each day, to prevent the patient becoming tired of the milk. Should diarrhea set in, the milk should be suspended for awhile, and then resumed. The treatment may be continued until the fat is reduced. Dr. Tarnier claims that this treatment is always successful, and entails no danger whatever.—*Medical and Surgical Reporter.*

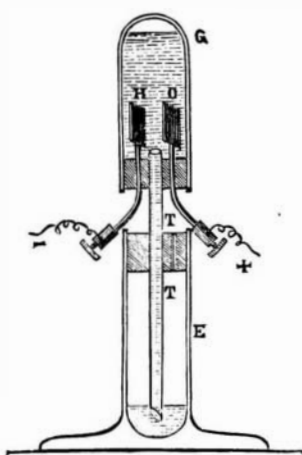
Remarkable Echoes.

In the sepulcher of Metella, the wife of Sulla, in the Roman Campagna, there is an echo which repeats five times, in five different keys, and will also give back with distinctness a hexameter line which requires two and a half seconds to utter it. On the banks of the Naha, between Bingen and Coblenz, an echo repeats seventeen times. The speaker may scarcely be heard, and yet the responses are loud and distinct, sometimes appearing to approach, at other times to come from a great distance. Echoes equally beautiful and romantic are to be heard in our own islands. In the cemetery of the Abercorn family, at Paisley, when the door of the chapel is shut, the reverberations are equal to the sound of thunder. If a single note of music is breathed the tone ascends gradually with a multitude of echoes till it dies in soft and bewitching murmurs. In this chapel is interred Margery, the daughter of Bruce, and the wife of William Wallace. The echo at the Eagle's Nest, on the banks of Killarney, is renowned for its effective repetition of a bugle call, which seems to be repeated by a hundred instruments, until it gradually dies away in the air. At the report of a cannon the loudest thunders reverberate from the rock, and die in seemingly endless peals along the distant mountains. At the Castle of Simonetta, a nobleman's seat about two miles from Milan, a surprising echo is produced between the two wings of the building. The report of a pis-

tol is repeated by this echo sixty times; and Addison, who visited the place on a somewhat foggy day, when the air was unfavorable to the experiment, counted fifty-six repetitions. At first they were very quick, but the intervals were greater in proportion as the sound decayed. It is asserted that the sound of one musical instrument in this place resembles a great number of instruments playing in concert. This echo is occasioned by the existence of two parallel walls of considerable length, between which the wave of sound is reverberated from one to the other until it is entirely spent.—*The World of Wonders.*

A Detonating Voltmeter.

The following experiment, due to M. Bertin, is but little known, yet is exceedingly interesting, inasmuch as it puts on evidence certain phenomena connected with the polarization of electrodes which always take place under different conditions. The simple apparatus, represented in the en-



graving, consists of an inverted bell glass, G, closed with a cork, through which pass two platinum wires provided at their ends with broad plates, H O, of the same metal. It is supported by a glass tube, T, open at both ends, and fixed in the cork which closes the mouth of a test glass, E. Two wires from the batteries are connected with the platinum wires by means of ordinary binding screws. The bell glass, G, is filled with water acidulated with one-tenth of its volume of sulphuric acid. If this mixture be now decomposed by a strong current from a Bunsen battery of 50 elements, the water will be seen to lower very rapidly; and when the bell glass is almost full of gas, the mixture will detonate spontaneously, and be seen to take fire. This experiment is not attended with any danger whatever; the recombination of the products of electrolysis takes place immediately, and during the passage of the current. It is necessary that this polarization current should have a certain tension; the phenomenon does not take place with a battery of 30 elements, but is at once spontaneously produced when the 20 elements that are necessary to make up the complement are added. With 30 elements, instead of a detonation there will be observed a phenomenon of a different nature, but none the less curious. The water, which at first lowers very rapidly to some millimeters below the platinum plates, all at once stops, in spite of the disengagement of gas on the wires. The plates recombine above what the wires decompose below.

By using pure water the decomposition takes place more slowly, and the detonation is not produced, even with 50 Bunsen elements. Still, a curious phenomenon is produced: the water lowers to the base of the plates, and then does nothing but oscillate between the base and top of these. The water is decomposed below and recombined above. A weaker current, of 30 elements, decomposes the whole.

These curious phenomena are due to the polarization of the electrodes and not to the catalytic force of the platinum, for they may be obtained with electrodes of various metals.

Artesian Wells in England.

The lower greensand has just been penetrated at Her Majesty's Dockyard at Chatham, by a boring conducted by Messrs. Docwra & Son. The stratum was reached at a depth of 903 feet from the surface, and the water has risen so high as to overflow the top of the well. A year ago the boring had been carried down to a considerable depth in the chalk, when the character of the water was unsatisfactory, being brackish. The authorities at the Admiralty then consulted Professor Ramsay, the Director General of the Geological Survey, as to the probability of reaching the lower greensand if an attempt were made to penetrate the gault. The opinion given was decidedly in favor of the effort, the dip of the lower greensand in the Maidstone area being in the direction of Chatham. Professor Ramsay was also of opinion that the quantity of water to be thus obtained would be considerable. In accordance with this advice the boring was continued, and the anticipations expressed appear to have been fully verified, helping to throw further light on the geological aspect of the water supply in the southeast of England and the vicinity of the Metropolis. Some years ago Messrs. Docwra & Son tapped the lower greensand at Caterham, but as the boring was very small it became choked with sand. The lower greensand has also been found, somewhat recently, at Loughton, in the district of Epping Forest, about four miles southeast of Waltham, an ample supply of water being obtained from this stratum, at a depth of 1,092 feet.

Sea Sickness and its Treatment.

By a number of observers, nitrite of amyl in five drop doses is said to exert a favorable influence in sea sickness. A writer in the *Lancet*, Dr. J. R. Leeson, says, on the subject:

There are two theories about sea sickness: one that it is owing to the food tossing about in the stomach, and teasing it and the diaphragm with its jactitations, nausea and vomiting being the natural consequence; the other that the stomach has nothing to do with it, its cause being a congestion of the brain and cord, which acts in a reflex manner on the stomach. Those who hold the latter, of course, would expect great things from nitrite of amyl, and knowing, as we do, the marked effect it has on the "status epilepticus," one might become too sanguine. Which of these two theories is right I do not pretend to say, but I have an idea that most cases are due to a little of each, and that, with a loaded stomach and congested liver, we may expect but little from amyl; whereas in cases more purely nervous, especially as are seen in women, we have a very fairly successful remedy, and one that warrants much more varied and extensive trial than it has hitherto received.

Glycerine as an Anti-Ferment.

Mr. Munk states, in the *Chemical Journal*, that glycerine retards the lactic and alcoholic fermentations. One fifth of glycerine added to milk, at a temperature of 15° to 20° C., prevented it from turning sour for eight or ten days. One half or one third of glycerine, at the same temperature, postponed the fermentation of milk for six or seven weeks. At higher temperatures, larger quantities are needed to produce the same results.

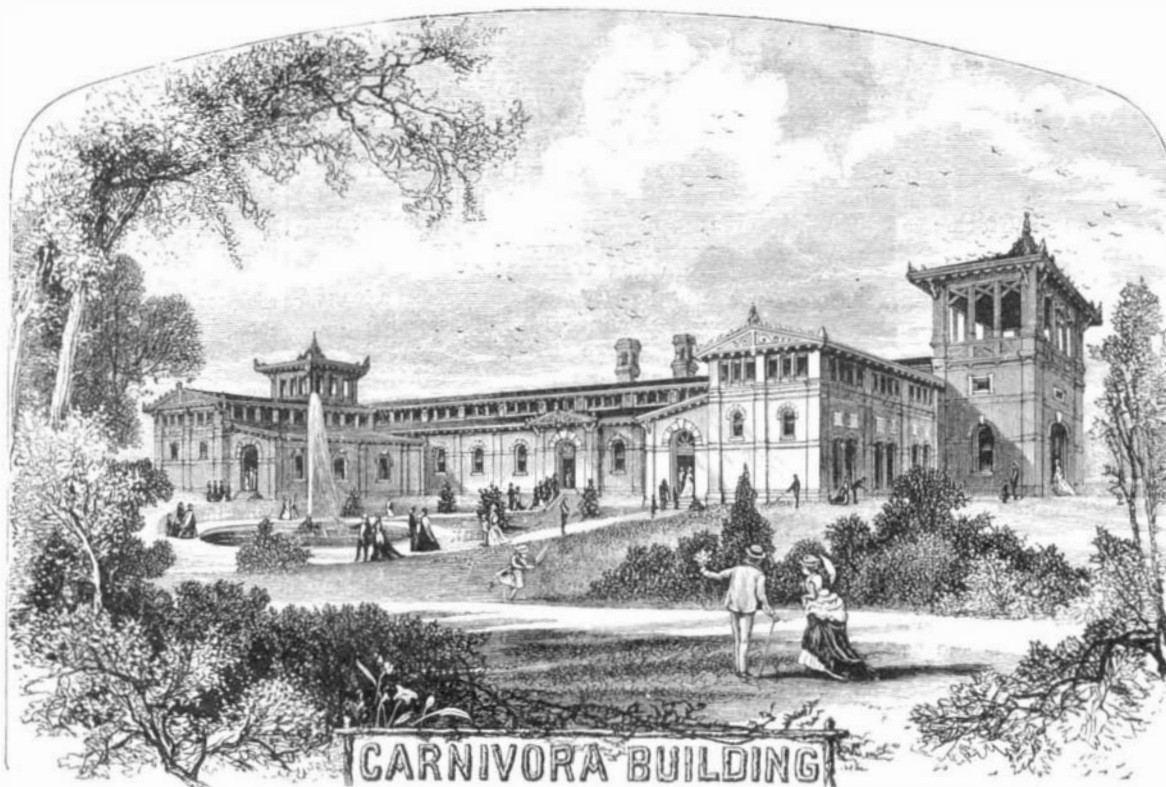
ZOOLOGICAL GARDEN AT FAIRMOUNT PARK, PHILADELPHIA.

In a recent issue we illustrated some of the buildings of the Zoölogical Society of Philadelphia, and we give herewith engravings of the Aviary, the Bear Pits, and the Carnivora Building. These, as well as the buildings previously described, are fine examples of architecture and fit ornaments for the noble park in which they are situated.

The Aviary contains many rare specimens of the feathered tribes from all parts of the world. The Bear Pits are constructed in accordance with the requirements of these peculiar animals, and are arranged to confine them while, at the same time, they afford facilities for the exercise of their climbing propensities.

In the Carnivora Building are found the lions, tigers, hyenas, leopards, and all of those animals that one prefers to see behind strong bars.

During the year which closed on the 28th of February last, there have been added to the collection of the Society 237 mammals, 149 birds, 109 batrachians,



and 192 reptiles, making the total number of specimens now living in the garden 1,008. Of this number 434 are mammals, 453 are birds, 58 are batrachians, and 63 are reptiles. The total valuation of these specimens is \$57,623.

The Society numbers 960, exclusive of loan holders, and is holding its own notwithstanding the stringency of the times.

How Calicoes are Made.

The editor of the *New England Farmer* gives the following interesting description of his visit to Southbridge, Mass., and the Hamilton Woolen Company at that place:

Southbridge is a very enterprising town of nearly six thousand inhabitants, the majority of whom are engaged in some form of manufacturing. The Quinnebaug River passing through the town affords excellent water power, which is fully utilized. Steam power is also used to a large extent in several of the leading establishments. We were aware that our companion had used the influence of his *Journal* for a long time in trying to instill into the minds of his readers advanced ideas concerning the laying out and ornamentation of highways, and both public and private grounds, but we were hardly prepared to find in one of the central portions of the village quite a long row of fine residences on either side of the street, entirely unprotected by hedge or fence along the line of the street, nor do we often find a pleasanter street anywhere in our travels. The residences are really first class, are set back at such a distance from the street as to escape much of the dust and noise, and have neatly kept lawns in front, which are separated from the street by a light stone curbing, which simply defines the line where private property and the public thoroughfare meet. No hedge rows of brush or briars, no prison yard palings, obstruct the view or deface the beauty of the landscape. One needs only to witness such models of perfection in dooryard surroundings to fall in love with them on the spot, and well will it be when more of our village journals enlist in the work of cultivating an improved taste in this direction.

THE CALICO WORKS.

After dividing the night far too equally between the requirements of nature and the demands of the printer, the following beautiful morning found us in a mood for a visit to the great calico and delaine printing works of the Hamilton Woolen Company, a corporation with an assessed valuation equal to about one-third of the whole town, and giving employment to a very large proportion of the resident population. Obtaining a permit from the office and an introduction to Mr. Whitaker, superintendent of the printing department, we were shown through the acres of brick buildings used for carrying on the various processes required in changing plain, unbleached cotton and woolen cloth into beautiful and attractive dress goods. First, we were shown through the engraving department, where

tons and tons of copper rollers are being engraved both by hand and by machinery, and fitted for giving the desired impression to the finished goods. The rollers are about three feet long, and, when new, some six inches or more in diameter, but as the fashions change, the figures are turned off, the rollers growing a trifle smaller at every change in the designs.

In the designing or pattern rooms are machines of the nicest workmanship for enlarging and transferring designs from paper to the copper rollers, requiring a high degree of skill in the attendants, who are chiefly girls, and who make good wages. Indeed, skill and faithfulness is well paid for almost anywhere, in any department of industry. Just how many names are upon the pay roll of the company we did not learn, but the number is very large, and the range of wages very wide. Men and boys stand here with their hands and feet in river water, pulling strips of cloth from one tub or vat into another, or simply watching and tending the machines which do most of the work, from morning till night, for wages which do not allow of many luxuries, nor should they be spent for foolish vices, though we notice that in too many cases the vices, as drinking and smoking, are first provided for.

Skilled workmen, especially those who run the printing machines, are well paid, the present rates being from twenty-five to thirty dollars per week,

but the work is of the most difficult and perplexing character, except to the most skillful and long-trained mechanics. Five years is the shortest time allowed for learning to run one of these machines, and many would fail to learn in a lifetime, so nice and difficult is the work.

Let the reader imagine a collection of cast iron, copper, and steel, in the form of pulleys, shafting, cog wheels, and rollers, making a machine as large as a small corn crib, every part being so nicely arranged that, although the cloth to be printed passes alternately under the pressure of as many as eight or ten different copper rollers, each of which revolves

will change clean white cloth to the most beautiful styles of prints, nearly or quite as fast as a horse will walk.

The coloring department is also a place of much interest, especially to a chemist, for every shade of color may here be found, adapted either to cotton or woolen fabrics, for different materials are required for different classes of goods. The cotton prints are, many of them, colored with dyes which require exposure to the air or to certain liquids, in order to bring out their hues.

No one visiting print works will fail to look into the singeing room, where the fine, loose fibers of cotton and wool ad-

hering loosely to the cloth are burned off by passing the web first through a flame of burning gas, then over red hot iron rollers, from which the sparks fly off as from a blacksmith's forge. It is claimed that the cloth is not injured, and yet we all know that plain, unbleached cotton cloth grows no stronger or more durable from the many processes it passes through between the loom, the bleaching, the dye house, the printing and finishing rooms. Every operation gives it a pull or a twist, which only anticipates the pulling and twisting it will receive at the hands of the wearer, and yet calico, reps, and delaines are in better demand and bring higher prices than plain, brown sheeting, for the simple reason that man admires the beautiful and willingly spends his time, a portion of it at least, in adding beauty to utility. And it would almost seem that our faculty of discovering beauty in form and color was given us that we might thus innocently use what would otherwise be idle and wasted time, for were the efforts of mankind directed wholly to the production of plain food, and plain clothing and houses, one hour a day, with the aid of our labor-saving machinery, would probably supply all our needs; so we will not quarrel with those who cultivate a taste for the refined, the polished, and the beautiful, even though sometimes that taste is cultivated slightly at the expense of strength and durability.

Elks in Harness.

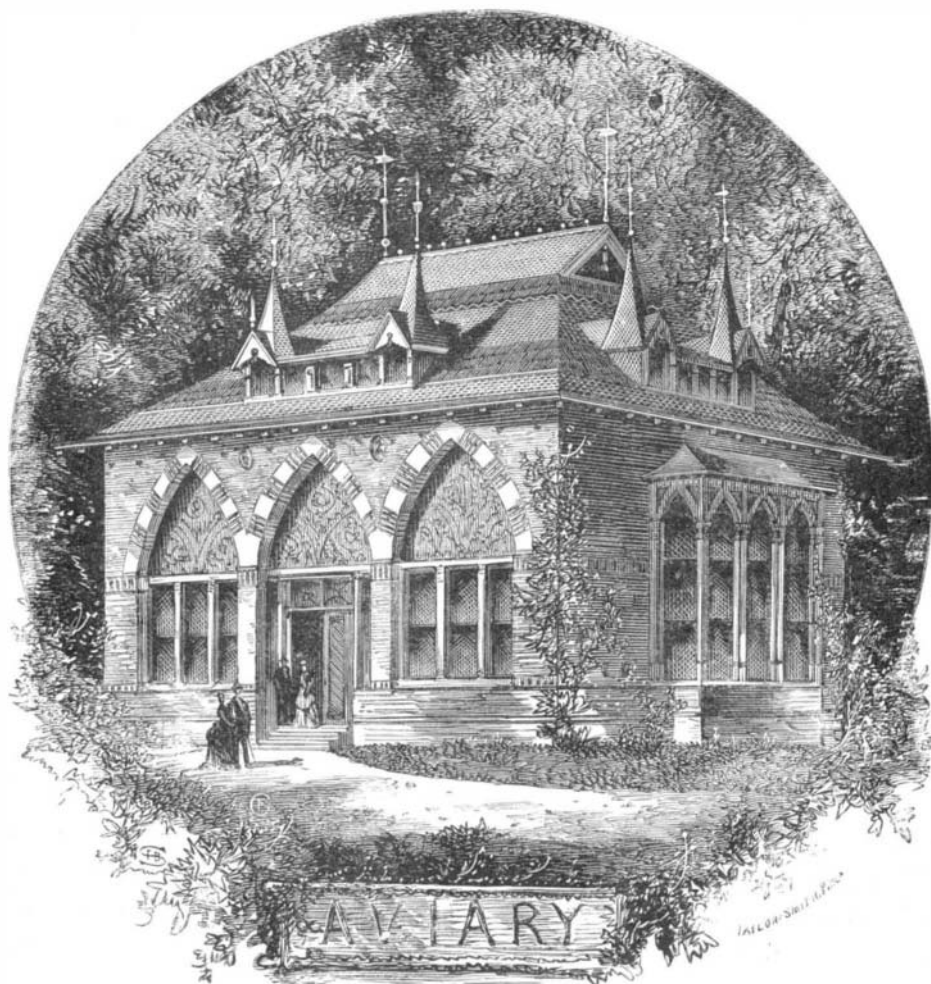
The St. Paul (Minn.) *Globe* describes the performance of a span of elks, recently on exhibition at a fair in that city. Their names are Dexter and Dasher; weight of each, about 500 lbs. They are two years old, well broken to harness, and the owner says they are so well trained that a woman can drive them. They were captured on Rice River, eight miles south of Fargo, Dakota, when four or five days old. It is an easy matter for them to travel sixteen miles an hour and have two men and a buggy, and it is said they can travel one hundred miles as easy as a horse team can fifty. This being true, these animals must be well worth domesticating.

One Way to Kill Moths.

Not long ago a large hotel was burned at Selma, Alabama, and during the burning a continuous swarm of moths from the cotton fields on the other side of the river, attracted by the light, poured into the flames. There were not thousands, but millions of them; and the volume did not diminish while the attraction lasted. Hundreds witnessed the scene, and all were surprised at the number of moths thus tempted to destruction. It is suggested that bright fires of brush or other waste material, during the season of moths, might be an effectual and economical means of getting rid of these pests, or rather their voracious and expensive offspring.

Gnoscopine.

The well known English chemists, T. and H. Smith, announce the discovery by them of an hitherto unknown alkaloid of opium, which they have named gnoscopine. This new principle is characterized by forming readily crystallizable salts, which have an acid reaction. That its salts possess this reaction, as also the fact that gnoscopine is quite insoluble in water, marks its strong resemblance to the papaverine group. Hence, also, it is easily separated from narceine which is moderately soluble in boiling water, and freely so in alkalis. Gnoscopine when pure is in the form of long, thin white needles, having a woolly character when dried. It is soluble in 1,500 parts of cold water, and melts at 233° C. It is insoluble in aqueous or in spirituous solutions of caustic soda, also in min-



eral spirit and fusel oil, but is soluble in chloroform and bisulphide of carbon, and slightly so in benzole.

Extraction of Steel and Iron from the Eye by the Magnet.

BY W. A. M'KEOWN, M.D.

The following cases will doubtless be of interest, taken in conjunction with that not long ago brought before the Clinical Society of London by Mr. M'Hardy.

Dawson B—, aged twenty-four, smith's helper, applied to me at the hospital on January 16, 1877. He stated that three days previously his right eye had been wounded by a small piece of metal. I observed that the iris was attached to the lens at the outer part of the pupil by recent lymph, and that there was a limited opacity of the lens. There was a small clear metallic body sticking at the margin of the adherent pupil. I made a small section of the cornea, more peripheral than the pupil, introduced a pair of iridectomy forceps, and seized the body and a little piece of iris; but the body slipped from my grasp, and was gliding out of my reach. Fortunately, I had anticipated such an untoward event, and took care to have a pointed permanent magnet at hand. I introduced it into the wound. The metal was instantly attracted and withdrawn. The patient continued under my observation till February 16. The opacity of the lens remained limited to the part wounded. I believe the wound in the capsule was closed by lymph and healed. I have not seen or heard from the patient since.

Moses E—, aged thirty-two, millwright, consulted me at the hospital on November 20, 1877. He stated that three quarters of an hour before his visit his right eye had been wounded by a chip of steel from a hammer. I observed a wound a little more than a line long in the ciliary region, just at the corneo-sclerotic junction. One end of the wound penetrated the anterior chamber, as shown by the evacuation of the aqueous humor and a slight displacement of iris toward wound. The wound was quite clean, and no foreign body was visible. Media clear. Ophthalmoscope did not disclose presence of foreign body. I put the point of the magnet cautiously into the wound, and at once it proved the presence of metal within the sclerotic by the click and the attraction. By a little patient and careful use of the magnet the metal was brought into the wound, and the end of it exposed so far as to enable me to seize it with forceps. Having caught it, I easily extracted it. The fragment was a thin piece about a line and a half long, one line in width at one end, half a line at the other end. The patient recovered completely, and returned to work on December 10 following.

There can hardly be a doubt that the magnet saved the eye in both cases. In the first case, to have followed the sharp fragment with forceps would probably have inflicted irreparable damage, and, indeed, the body might have got out of the way altogether. In the second case, the metal would probably, but for the magnet, have remained undetected, and have afterward lighted up destructive inflammation. Even had it been detected, it would not have been possible, but for the magnet, to have extracted it without enlarging the wound, and that is not desirable in any part of the eye, much less in the ciliary region. By the magnet the diagnosis was established, and the extraction effected in the most delicate way.—*Lancet*.

A New White Pigment.

Prof. Phipson, of London, in a paper read before the International Health Congress, at Paris, in August, remarked that for several years efforts had been made to discover some white substance to replace white lead for painting buildings, ships, etc. He himself had devoted several months to this important subject, but without success. There has been found, it is true, in oxide of zinc a substance less poisonous than lead, and serving very well as a white pigment in oil painting; but its production is very expensive, and its mechanical properties as a color in oil are not pronounced enough to allow it to compete in commerce with white lead. Such is not the case, however, with an invention of Mr. Thomas Griffiths, of Liverpool, who has succeeded in obtaining a very interesting product. This new preparation, which is being manufactured at the present time on a pretty extensive scale, has for its base sulphide of zinc (or an oxy-sulphide of that metal), the properties of which as an oil color are of the most remarkable character. It is prepared by precipitating one of the salts of zinc by a soluble sulphide, and washing and drying the precipitate. The latter is then calcined at a red heat, with some precautionary measures, then taken from the furnace, and, while still warm, thrown into cold water. It is afterwards levigated and dried. The result is a white pigment, very fine, and of great beauty. Regarded from a hygienic point of view, Griffiths' new white is infinitely superior to white lead, as it also is in its practical bearing; it possesses no injurious qualities; its manufacture and use do not affect the health of workmen; its durability in climates of the most diverse kinds is, so to speak, illimitable; it is altered neither by gaseous emanations nor by dampness; and its price is comparatively low. The most remarkable thing about this new white is that it covers much better than white lead, while it use is not only deprived of all danger to health, but it is much more economical than white lead. Prof. Phipson stated to the Congress that he regarded this new chemical preparation as being among the most ingenious and useful products that have been discovered in our time.

Direct Positive Process.

Herr Pillet produces, by means of this process, dark images upon a white ground, which may hereafter be strengthened or tinted by hand. The process rests upon the liability of chloride of iron to decompose in light when it is changed into the sub-chloride. The latter salt is not acted upon by a solution of red prussiate of potash, while the chloride at once becomes blue on treatment.

The paper on which the print is to be secured is prepared by dipping into a solution of water 30 grammes, chloride of iron 3 grammes, oxalic acid 1.5 gramme. The oxalic acid may be replaced by an equivalent of another similar organic acid. In the event of the paper not being properly sized, a little dextrine may be added to the bath. The paper is dried in the dark, and may be kept for an indefinite time without losing its sensitiveness.

In order to reproduce a design, sketch, or drawing of any kind, it is simply necessary to place the same upon a sheet of this sensitized paper, and cover the whole with a glass plate.

The printing is very rapid, for in summer only thirty seconds are necessary for exposure, and in winter from forty to seventy seconds in the sunshine. In shade, a much longer time is, however, required. From four to six minutes suffice in fair weather; but on a dark, dull day, sometimes forty minutes are necessary.

The electric light has been found to act very vigorously; the time of exposure depends upon the distance from the light, and the density of the original drawing or cliché.

After exposure the plate is dipped into a solution of water 500 grammes, red prussiate of potash 80 grammes. This colors all unchanged portions of the surface blue. The print is then washed in plenty of water and fixed in a solution of water 500 grammes, pure muriatic acid 50 grammes. Finally the print is washed and dried.—*Photographisches Wochenblatt*.

Cobalt in Electro-Metallurgy.

In studying some of the properties of magnetic metals obtained by means of galvanism, the attention of M. Gaiffe was attracted by the beauty of cobalt, and its hardness, which is much superior to that of iron and nickel; and the thought struck him that it might be possible to utilize this metal under certain circumstances, should it be found as easy to deposit it by the battery as it is the metals just mentioned.

It is well suited, for instance, to take the place of iron and nickel as a protective coating for plates used in copper-plate engraving. It does not oxidize like iron, and demands but little care for its preservation; it is dissolved with the greatest ease by weak acids which do not attack the copper, while nickel deposited on a copper plate cannot be renewed without injury to the latter. Its beautiful color will also cause it to be used for the decoration of other metals. The bath with which M. Gaiffe obtained very beautiful specimens was a neutral solution of double sulphate of cobalt and ammonia, which requires for its preparation scarcely as much care as baths of nickel. The anode may be a sheet of platinum, or, better yet, a plate of cobalt, either cast or forged. In this, cobalt differs from iron and nickel, which are soluble in thin baths only when they are in contact or combination with a body that is electro-negative with respect to them. In order to obtain a white, adherent deposit, the electric current should be regulated in the beginning at 6 volts, and should be reduced to 3 volts when the whole surface of the piece to be covered has become white. With a proper intensity of current, the deposit of cobalt takes place almost as rapidly as that of nickel. In four hours a layer of cobalt 0.025 millimeter thick may be obtained. When it is desired to obtain a very regular deposit, it is indispensable to fix the object to be "cobalted" to the electrode of the battery before immersing it in the bath. Without this precaution there would be produced an appearance of marbling, only removable by recommencing the process.

Journal Boxes for Steamers.

The advantages of a good lining metal for journal boxes and bearings have been clearly illustrated in the case of the ship *Gleneagle*, one of the tea clippers taking part in the annual race from China to London.

Last year this vessel lost the race by about one day and a half, and this was attributed to the bad working of her bearings, which were this year refitted and lined with Parson's white brass, and the crank pin brasses were replaced by manganese bronze.

The result of this alteration, we learn from a London paper, was that three more revolutions per minute were got out of the engine. The bearings ran without the slightest signs of heating, and the speed of the vessel was increased so that she made the passage in rather under two days less than she did last year, beating her former successful competitor by about one day.

Assuming the other vessel's speed to be about the same year as last the actual gain in the speed of the *Gleneagle* in the whole run from China, resulting from the adoption of the manganese bronze and the white brass, amounted to about two and a half days; the passage from Woosung to London, including detention at Singapore and the Suez Canal, having been accomplished in thirty-eight days two hours, said to be the quickest passage on record. On examination in London the bearings were found to be in the most perfect order, and so little worn that the vessel has been started on another outward voyage.

Wages in England.

The secretary of the Iron and Steel Association has received from a special correspondent in England the following particulars with regard to the wages paid there in April last:

WAGES PAID EMPLOYEES ON THE MIDLAND RAILWAY—Enginemmen, per day: first six months, 5s. 6d.—\$1.34; second six months, 6s. 6d.—\$1.58; four years, 7s.—\$1.70; full pay, 7s. 6d.—\$1.83; permanent shunter, 6s.—\$1.46. Firemen, per day: first twelve months, 3s. 6d.—85c.; afterward, 4s.—97c.; passed as drivers, 4s. 6d.—\$1.10. Guards or brakemen, per week: passenger, main line, 21s. to 29s.—\$5.11 to \$7.06; passenger, branch line, 21s. to 25s.—\$5.11 to \$6.09; freight, main line, 24s. to 30s.—\$5.84 to \$7.30; freight, branch line, 24s. to 29s.—\$5.84 to \$7.06.

WAGES PAID EMPLOYEES IN THE NORTH OF ENGLAND IRON MILLS—Puddling gray iron and mixtures, per ton, 8s. 3d.—\$2.01; prize money per week of full heats, 2s. 6d.—61c.; prize money per shift to underhands for full heats, 6d.—12c. Heating rails, large mills, per ton, 1s. 4½d.—33c.; heating rails, small mills, per ton, 1s. 8½d.—42c.; reheating rails, large mills, per ton, 8½d.—16c. Rolling rails, large mills, per ton, 1s. 9d.—42c.; rolling rails, small mills, per ton, 2s. 2½d.—54c. Laborers, mills and forges, per shift, 2s. 9½d.—67c.; laborers, blast furnaces, per shift, 3s.—73c.

Labor in Belgium.

James R. Weaver, United States consul in Antwerp, Belgium, reports to the Department of State that labor is rarely performed in that country by the piece or job. The men oppose vigorously any attempt to change the present custom of work by the hour or by the day. They work 12 hours a day in summer and 10 in winter. They keep Sundays and numerous holidays, averaging only 22 working days in a month. The whole family works. Mothers leave their babies in the *creaches* (nurseries), where they are kept almost gratuitously, while the mother is at work with her older children. Since the extensive importation of American bacon, the poorer classes can indulge in meat as a small part of their food. The middle classes breakfast at six on pork, bread, butter and coffee; at ten o'clock they have bread, butter, and a glass of gin; at noon soup of meat and vegetables; at 4 P. M., bread, butter and coffee; in the evening, potatoes, buttermilk, broth, bread and butter, and occasionally tea. "Economical kitchens" have been successful in providing the poorer classes with good meals at small prices. The surplus earnings of the laborers too often go to the dramshops. When health fails, the father dies, and starvation threatens, the poor house is of easy access. The state, the church, and charitable institutions provide the means of existence or the cost of burial in such cases. None are permitted to beg. If too lazy to work they go to the workhouse; if sick or infirm, to the hospital or almshouse.

New Theory as to the Effects of Phylloxera.

M. Millardet, professor of botany at Bordeaux, has just communicated to the Academy of Sciences an entirely new theory in regard to the destructive action caused by the phylloxera.

According to him the rotting of the knots and tubers on the roots of the vines is to be attributed solely to the development in the tissues of certain fungi; and, in certain rare cases, to other parasitic organisms. Indeed, he asserts that he finds the mycelia belonging to various fungi of constant occurrence in the nodosities when they begin to decay. These same mycelia are also found in the body of the root itself, small or large, just as soon as it begins to rot. Their constant presence in the nodosities, tubers and body, even, of the roots affected by the malady, shows that they are intimately connected with the pathological state of the plant; they are the cause of the alteration of the roots, not the effect of it. They do not spread through the latter because they are rotten, but they at once determine such rotting by their development. Indeed, we always detect them at the origin of the trouble, that is to say, in the very smallest decaying spots; and in such cases even in the midst of apparently healthy tissue.

Rails.

The writer of a paper recently read before the British Iron and Steel Association estimates that 30,204,000 tons of iron rails have been laid down during the past ten years, and that the quantity annually required for repairs is 3,020,400 tons; for new lines, etc., 1,090,000 tons; a total of 4,110,400 tons. He also estimates the annual production of rails at 2,745,000 tons, 879,000 of which are turned out in the United States. This shows a current deficiency of production to meet the proper demand of 1,365,000 tons. That orders for this amount have not been given is attributed to the economy or necessity which has forced railroad companies to postpone repairs as long as possible, and in some measure to the substitution of steel rails, which have a longer life.

In an experiment recently made in Bombay, India, to determine the power of solar heat for governing steam, nine gallons of water were put in a small boiler, and boiled by the rays of the sun in exactly thirty minutes. After boiling one hour the focus was turned off, when it was found that 3¾ gallons had been evaporated. In the experiment 198 glass mirrors, each 15 inches by 8½, were used.