

A Marvel of Egyptian Antiquity.

The question of the irrigation of Lower Egypt is now, owing to the high Nile, attracting increasing attention. Under these circumstances it can hardly fail to interest our readers to have recalled to their minds the theory connected with the name of Mr. Cope Whitehouse, as to the locality of Lake Mœris. Briefly this was described by Herodotus, who wrote, moreover, of what he had himself seen, as a lake not far from Memphis (Cairo), some 450 miles in circumference, and fifty fathoms deep, full of fish of twenty-two species, used as a receptacle for the surplus waters of the Nile in flood, whence, when the Nile was low, sufficient water could be drawn to raise the river level again to the height required for the continued supply of Lower Egypt. Of this marvel of human ingenuity and industry Herodotus could find no words adequate to express his admiration, excelling, as it did, in his opinion, the Labyrinth, which again excelled all the Pyramids together, though any one of these was a match for the greatest works of Greece. Diodorus Siculus described the lake in almost similar terms, and Strabo, Pliny, and Mutianus all testified to its existence, while the Ptolemaic map gives a representation of it, not, indeed, indicating such enormous dimensions, but still indicating a vast body of water to the south and west of the Fayoum. Careful collation of all the old accounts enabled Mr. Whitehouse, as he thought, to fix the latitude and longitude of this abyss before he ever set foot in Egypt, and whether or not what he found was the site of the ancient Lake Mœris, this much is incontestable—namely, that he found a vast depression in the hills toward the Libyan desert, the depth and extent of which had never been suspected even by those who had tracked across it. This depression is known as the Wady Raiyan, and lies to the south and west of the modern province known as the Fayoum, from which it is separated by a narrow ridge. Herodotus described Lake Mœris as having its greatest length from north to south. This would be true of either the Fayoum or the Wady Raiyan separately (this latter having a singular prong of great length, called the Wady Muellah, stretching away toward the southeast), and it would be equally true if, as is probable from the dimension given, the lake covered both the Fayoum and Wady Raiyan together. If the entrance from the Nile Valley at El Lahun is not altogether artificial, the whole double basin was probably originally a great natural backwater for the water of the Nile in high flood. Mr. Whitehouse considers that the Fayoum was in great measure reclaimed when the Bahr Jusuf was made and dams erected at El Lahun, presumably between B. C. 1500 and 1800, and certainly not later than the Hyksos period; and in the name Bahr Jusuf, or Canal of Joseph, and the persistent Mohammedan tradition that the canal was made by the patriarch Joseph, he sees evidence that these great reclamation works were carried on during Joseph's premiership, and very likely in the main by the Israelites. There can be little doubt that Goshen, where they dwelt, was this district.—*London Saturday Review*, September 24.

Vanilla.

Notwithstanding the various preparations that have lately been put upon the market as substitutes for the vanilla for flavoring purposes, a great deal of attention is still directed to the cultivation of the plant and the preparation of the fruits for commercial purposes. Perhaps the most recent and formidable rival in the cultivation of vanilla is Fiji, from whence some good samples have more than once been received. The first consignment sent to London brought from the consignees a very congratulatory report on the prices realized, namely, 22s. 6d. per pound for three-fourths of the consignment and 21s. 6d. for the remaining fourth. The consignees further say that "unless the quality had been very satisfactory no such price could have been obtained, and if further consignments are up to the quality now sent in, we can say that Fijian vanillas will command a good price and a great sale. Speaking from an experience of nearly forty years, during which we have handled a considerable quantity of vanillas, we can unhesitatingly say that the quality of that sent here is equal to any vanilla grown in the Mauritius or elsewhere. The beans are plump and well cured, and are beginning to throw out splendid crystals. In future consignments it will be necessary to sort the vanillas and tin them according to lengths, and to take care not to pack the tins too closely."

In connection with the subject of the preparation of vanilla for market, one of the most striking departures from the ordinary mode of drying the pods seems to be that of keeping them moist, or rather wet, for some sample pods have recently been received in London preserved in alcohol. They are described as of fine appearance and good aroma, though, of course, partly exhausted by the action of the spirit, which, it has been suggested, will probably be sold with the beans. It is said that "by placing the pods in alcohol when freshly gathered, a much more fragrant tincture is obtained than by exhausting the cured beans purchased in Europe."

CONJOINED TWINS.

These new "Siamese Twins" do not come from Siam. They are natives of Orissa, in India, and the following description is sent to us by a correspondent, who saw them the other day in Poona. They are to appear, we believe, at the Aquarium, previous to fulfilling their engagement at the World's Fair, Chicago. The names of the children are Radica and Doddica. The two little girls are three and a half years old, and are really pretty children. The peculiarity of their connection is that there is a flexible bony attachment from breast to breast, and below this there is visceral connection. There is only one navel. If food is given to one the other is satisfied, and if medicine is administered to one the other is affected, but not to the same extent as the one to which it was given. The most curious circumstance is that when a sentence is begun by one child the other frequently finishes it. When sleeping, one child lies on her back and the other on her side, which gives an idea of the great flexibility of the connection. The children are very good friends, and seldom quarrel, but when younger their proceedings were not marked by that unanimity which they have since discovered to be essential to their circumstances. As might be expected, when their relations became strained there was considerable tension between them, but when it gradually dawned upon their



THE ORISSA TWINS.

(From a photograph.)

infantile intelligences that when one was hurt the other had to cry out of sheer sympathy, a mutual understanding was arrived at that "rows" should be discontinued, and now balmy peace reigns supreme. For their age, the twins are particularly intelligent. They have been taught English for the last three months, and, although they do not speak more than a few simple words, they seem to understand it fairly well already. The twins have excited a good deal of interest among the medical profession in India.—*Pall Mall Budget*.

Analysis of Coal Tar Preparations.

Messrs. Helbing and Passmore's latest investigation is on the valuation of disinfectants prepared from coal tar. In their report they state that, since the bactericidal properties of these preparations reside in the phenoloid bodies contained therein, the chemical estimation of such bodies is a measure of their activity, so that a bacteriological examination becomes unnecessary. Tar oils contain acids (so called), bases, and hydrocarbons which are more or less present in preparations made from them. A method of chemical analysis applicable to the one is, therefore, suited to the other within certain limits, which are laid down in the report. For determining the hydrocarbons (benzene, anthracene, naphthalene, and the like) the acids in 50 grammes or more of the oils are fixed and removed with 10 per cent caustic soda solution, the oils having first been diluted with an equal volume or more of ether. The ether dissolves the hydrocarbons and bases, and the small quantity of the latter, washed out by the soda, is also removed with ether from the alka-

line liquors. The combined ethereal liquids are next washed with 1 to 4 sulphuric acid to remove bases, after which the ether is treated by washing and evaporation for hydrocarbons.

By fractional distillation the character of these may be studied and the bases may be estimated in the acid liquor by neutralizing with soda, evaporating to dryness, and extracting with spirit, whereby only the salts of the organic bases are dissolved out. The acid constituents of tar oils are phenol and its homologues. Strictly they are not acids, but they associate themselves readily with the soda in the preliminary treatment, and are to be sought for in the alkaline liquors. The process which Helbing and Passmore suggest for this is simple, viz., to acidify with sulphuric acid and extract the "acids" with ether, which, on evaporation, yields a residue of the phenoloid bodies. It is impossible, the authors say, to separate carbolic acid from its homologues by practical distillation, owing to the close proximity of their boiling points, and the only method which they found practicable was to fractionally precipitate the alkaline solution of tar acids with small quantities of mineral acid, whereby the carbolic acid is concentrated in the first fraction. So working they were able to satisfy themselves that Jeyes' fluid contains less than 0.25 per cent of carbolic acid and 48 per cent of other phenoloid bodies.

An Australian Scymnus Established and Described in California.*

BY C. V. RILEY.

The rapidity with which the Australian *Vedalia cardinalis* has established itself in California is familiar to every one. But the vedalia was not the only scale-feeding Coccinellid which was sent or brought over by Mr. Koebele on his first trip to Australia in 1888-89. Among others he brought several species of the genus *Scymnus* which, in due time, were set at liberty in the vicinity of Los Angeles. One of these, subsequently described by Dr. D. Sharp as *Scymnus restitutor* (*Insect Life*, I, p. 364), was lost sight of, while another much smaller species, originally collected by Mr. Koebele near Sydney, New South Wales (see Bull. 21, Division of Entomology, p. 24), turned up the present year in a rather amusing way. In the March number of the *Entomological News* (vol. iii., 1892, p. 51) Dr. F. E. Blaisdell describes a new Californian *Scymnus* under the name of *S. lophanthæ*. He found it preying upon the San Jose scale (*Aspidiotus perniciosus*), which infested the limbs of *Acacia lophanthæ* at the Coronado Parks near San Diego, in Southern California. It is a very inconspicuous species of reddish color, the thorax often having an indefinite dark spot on the disk, and the elytra being of a blackish bronze color. The last mentioned character is foreign to our native species of *Scymnus*, which never show any traces of metallic color, and, for this reason, I at once suspected, upon reading the description, that *S. lophanthæ* was one of the species introduced from Australia. Upon comparing Dr. Blaisdell's description with the sample specimens sent by Mr. Koebele from his first and second trips to Australia, I had no difficulty in identifying *S. lophanthæ* with the species from Sydney mentioned above. Subsequently Mr. D. W. Coquillett sent me a specimen recently captured near Los Angeles which fully confirmed this identification. Whether or not the species has been previously described from Australia, I have no special means of knowing; but it does not appear to be among those described by Mr. Blackburn in 1889 (*Trans.*, etc., Royal Society, South Australia, xi., pp. 191-198). It is closely allied to *S. fagus* Brown, from New Zealand, and distinguished therefrom only by its finer and sparser elytral punctations and the greater extent of the pale thoracic color.

Dr. Blaisdell does not mention in his description the structural characters of the species, the more important of which are as follows: Prosternal lines long, straight, and converging slightly anteriorly; post-mesocoxal line slightly reascending externally; post-metacoxal line complete, almost reaching the first abdominal suture; elytral epipleurae horizontal, reaching beyond third abdominal segment, slightly concave; inner marginal line not leaving the margin.

The beetle and its larvae are quite abundant in the Coronado Parks, according to Dr. Blaisdell; and since it also occurs near Los Angeles, there can be no doubt that this useful little Coccinellid has fully established itself in Southern California.

MacKey's Gang Sawmill.

This mill—the name of the inventor of which was inadvertently printed MacRey in our issue of October 15—is adapted for the cutting of lumber into bevel siding or boards, etc., by the addition of any of the ordinary feed motions, as well as the cutting of shingles. The mill is the invention of Mr. William T. MacKey, of Vancouver, British Columbia, and is being placed on the market by the MacKey Patent Gang Mill Co., of Vancouver, Toronto, and Canada.

* Read at the meeting of the Association of Economic Entomologists, Rochester, August 17.

A Railroad on Ice.

The communications between the two shores of the St. Lawrence River at Montreal are made, as is known, by means of the Victoria tubular bridge, constructed some thirty-five years ago, which is the longest in the world, the metallic span being 6,500 feet long.

But from this point to the Atlantic, for a distance of 1,000 miles, there is no other bridge, and all the railroads established on both sides of the St. Lawrence have necessarily to cross it. The company of the Grand Trunk Railroad, which built it, levies a right of way toll of \$10 per car and eight cents per passenger. To avoid payment of these moneys the S. E. Railway Co. had the idea, some ten years ago, of constructing in winter a communication between the two shores by means of a railroad established on the ice. Every winter the work is done over again, and it amply pays for the outlay. The length of this ice road is about two miles, between Hochelaga and Longueuil. The roadway is easily built. The track leaves the main track parallel to the shore, then curves gradually in such a manner as to be perpendicular to it, and then, again, before it strikes the other shore, it curves anew so as to become nearly parallel to the opposite side, and then it is connected with the main track on this shore. Mr. Senical, the engineer of the line, constructed it as follows: Pine timbers, about 10 by 12 inches, and from 16 to 25 feet long, are placed like ties on the rough surface of the ice, being blocked so as to be horizontal in a direction perpendicular to the roadway by means of blocks of ice, and according to whatever grade may be adopted in the longitudinal props.

These long cross ties are placed at about 7 feet 3 inches from center to center, and they receive two parallel lines of longitudinal timbers of the same dimensions, 10 by 12 inches, distant also from each other in the length of the track of 7 feet 3 inches. Over these longitudinal ties, or stringers, and perpendicular to them, are placed, in the usual manner and at the ordinary distance from each other, the small cross ties used in railroad construction, to which are spiked the rails as it is customary. In this manner the rails are laid on a sort of crib, about 30 inches high above the level of the ice. No spokes, no joints of any kind, are used to fasten timbers or ties together, every piece of timber being merely laid down and blocked to its proper position or level with ice blocks. The whole crib is then filled with broken pieces of ice up to the level of the bottom of the rail, and this kind of ballasting is even made to project beyond the ends of the first timbers laid at bottom. Holes having been dug through the ice surface, the water of the river is pumped over the whole, and, in twenty-four hours or thereabout, a perfectly solid and compact track is obtained, over which trains can run. The thickness of the ice of the river in winter in these latitudes is never less than 16 inches, and this does not include the ice ballasting of the tracks. It is much more, if we refer ourselves to the preceding experiments, than is required to support any charge which can be placed upon it, specially if we consider that, from this mode of construction, each lineal foot of track corresponds to at least twenty-five square feet of ice to bear the load it may have to support. The same timbers can be used, of course, the following year.—*Ice and Refrigeration.*

Bright Streaks on the Full Moon.

In *Astronomische Nachrichten*, No. 3111, Professor Pickering gives a brief condensed account of the investigation that has been carried out at Arequipa with regard to the systems of bright streaks, especially round prominent craters, that are visible on our satellite at the period of the second and third quarters. The instrument employed was the 13-inch, and the magnification ranged from 450 to 1,120 diameters. The chief results noted were: (1) That the streaks of the systems round many of the large craters are not oriented to the center of the prime crater, but toward other craters whose dimensions are considerably smaller. (2) These minute craters are extremely brilliant, and rarely exceed one mile in diameter. (3) Some streaks are found to lie across or upon ridges; these are very seldom connected with small craters. (4) In the case of Copernicus, streaks are found to start from craterlets inside the rim and low up the inner side of the walls, and down the other side. The rim of Tycho also contains similar craterlets, but the streaks do not extend very far. (5) A difference in color was noticed between the streaks systems of Copernicus, Kepler, and Aristarchus, and those of Tycho, the last mentioned being considered whiter than the others. (6) There are no very long streaks; their general length may be reckoned from ten to fifty miles. What have been previously taken for long streaks are found, by minute observation, to be simply a series of these smaller ones connecting up, apparently, many small craters. That extending from the regions of Tycho across the Mare Serenitatis is so constructed. In seeking an explanation to account for the origin of these bright streaks, Professor Pickering suggests that if, for example, the craterlets on the rim of Tycho were constantly emitting large quantities of gas or steam, which in other regions was being absorbed, "we should

have a wind uniformly blowing away from that summit in all directions." Should other craterlets in the vicinity "give out gases mixed with any fine white powder, such as pumice, this powder would be carried away from Tycho, forming streaks." This hypothesis, besides explaining the presence of the streaks themselves, satisfies very well the fact that they can only be seen after and before the first and last quarter of the moon phase, for it is only at this time that the contrast would be best seen.—*Nature.*

SCIENTIFIC NOTES.

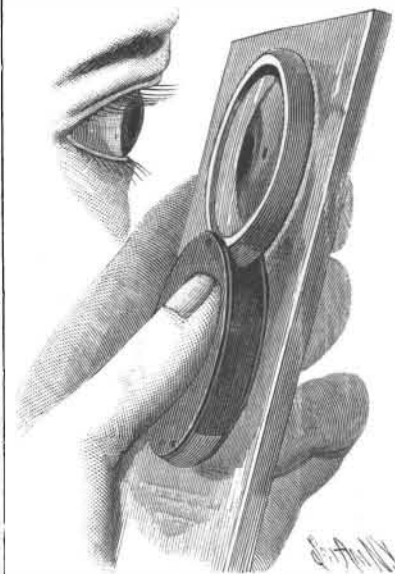
BY GEO. M. HOPKINS.

REMOVAL OF FOREIGN BODIES FROM THE EYE.

When a cinder, a piece of rock, steel, or other foreign substance gets into the eye the sufferer is desirous of being relieved as quickly as possible, not only on account of the pain and discomfort, but also on account of the apprehension of the object becoming more and more deeply embedded in the tissues, and the production of serious inflammation which accompanies any intrusion of this kind, and which is likely to last for some time after the removal of the foreign substance.

We are usually averse to allowing any one to meddle with our visual organs, especially when it involves anything akin to a surgical operation, so that if we can help ourselves when we meet with a misfortune of this kind, it is our pleasure to do so.

When the object is of such a size as to be readily visible in an ordinary mirror, persons with normal eyesight can easily locate it, and, in ninety-nine cases in a hundred, can remove it without aid by using a finely pointed pine stick, the extremity of which is moistened and bruised between the teeth sufficiently to destroy its rigidity and make it brush-like at the very point. Often the foreign body is so minute as to be undiscoverable by the means named, or the vision may be such



MAGNIFYING GLASS AND PLANE MIRROR USED AS A SUBSTITUTE FOR A CONCAVE MIRROR.

as to necessitate the use of spectacles. In either of these cases the ordinary mirror will not answer; a concave or magnifying mirror is needed. This will show the object without using spectacles.

When the foreign substance consists of finely divided particles such as sand or dust, a wet camel's hair brush may be used to advantage. When the substance cannot be removed in either of these ways, the services of an oculist should be secured as early as possible. If the magnifying mirror is not available, a pocket magnifier having a diameter of 1 or 1 1/4 inches and about 2 1/2 or 3 inch focus may be used in connection with an ordinary mirror, by placing the magnifier in contact with the face of the glass, as shown in the engraving.

AID TO VISION.

When age creeps on and vision fails so that eye glasses are essential to the close examination of near objects, it is vexatious when a person dependent on eye glasses finds his glasses have been left or lost just when they are needed most. If the light is strong, the angle of vision may be increased as the angle of the photograph lens is increased; that is to say, by the use of a diaphragm. The reading or seeing is to be done through a pinhole in a card, or better, in a piece of thick tin foil. The perforated card must be placed as near the eye as possible to secure the best results. It is not supposed that this device will take the place of glasses, but as a makeshift in an emergency it is valuable.

STOPPING LIGHT WITH TRANSPARENT GLASS.

One bright day, not long since, a reader of the SCIENTIFIC AMERICAN astonished a glazier by placing a few sheets of clear glass in such relation to each other as to almost entirely prevent light from passing through them, although the same panes of glass when piled together parallel with each other allowed objects to be clearly seen through them. This is how he did it. He placed 8 or 10 sheets parallel with each other and arranged them at an angle of 35° 25' (the complement of the polarizing angle) with a given plane. Then he placed a similar bunch of the plates at the same angle with the plane at right angles to the first. In the first bunch of plates about one-half of the light was reflected to one side, while the remainder, which was polarized, passed on and was practically extinguished in the second bunch of plates.

A LESSON IN COMPLEMENTARY COLORS.

A gentleman whose power of observation is active recently retired in a room having white walls and ceiling and furnished with yellow window shades which were drawn down. He was awakened in the morning by the sunlight pouring in through the yellow shades. The walls and ceiling of the room appeared to him to be of a light green color. His explanation of this phenomenon was this: The light in passing through his eyelids was tinted red; by continual exposure of the optic nerves to red light they became tired, so that when the red screens (the eyelids) were removed by opening the eyes, the sensation of the complementary color was experienced, and as a result, the walls and ceiling appeared green. After gazing at the ceiling until the green color had vanished, he closed his eyes and covered them to prevent light from entering through the lids, when a vivid purple, the complement of the yellow or orange shades, was seen.

Hamburg Water.

BY JOHN B. COPPOCK, F.C.S., ANALYST TO THE LONDON WATER CO.

The spread of cholera at Hamburg has been one of the most noticeable points in the present cholera scare.

The connection between cholera and its diffusion in a polluted water medium has been strengthened and developed by many remarkable outbreaks extending over the last thirty years. The ravages of the disease have been shown to be coincident in time and space with the use of water from impure wells, the introduction of a pure and fresh supply bringing about the abatement of the outbreak.

Whether cholera can be produced by animal organic matters not of a specific nature has not yet been proved, but it has been proved that a polluted water supply is a splendid medium for the propagation of the cholera poison; anyhow, the endemic area of cholera approximates very closely to the area supplied with a polluted water.

By the kindness of a friend I have been enabled to get a sample of Hamburg water, taken from the mains by an ordinary tap, just as it is supplied for drinking purposes to the houses. The water gave the following results:

PHYSICAL EXAMINATION.

Appearance	Turbid, very yellow.
Taste	Slightly unpleasant.
Odor	Extremely small.
Deposit	Small, dirty looking.

MICROSCOPIC EXAMINATION.

Animal and vegetable matters ..	Inorganic particles.
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QUANTITATIVE RESULTS (MEAN OF TWO ANALYSES).

Total solids ..	81.25	grains per gal.
Chlorine	33.04	"
Free ammonia	0.0746	"
Albumenoid ammonia	0.0205	"
Sulphates	2.37	"
Nitrates	1.95	"
Oxygen (consumed in 15 mins) ..	0.065	"
" (consumed in 4 hours)	0.24	"

Cultivation in nutrient gelatine produced the usual crop of bacteria, bacilli, micrococci, and fungi, but the consumption of the water has not produced any choleraic symptoms in a cat. The water is very likely not specifically polluted, it producing a lowered state of the system and tendency to diarrhoea, favorable to the specific contagion. As the water is originally taken from the Elbe, it may with fairness be described as little short of "dilute sewage." The Senate of Hamburg is going to be asked to authorize the immediate construction of artesian wells for the production of a pure water supply—not too soon to take such steps in the present condition. A better water supply might have saved Hamburg from the present epidemic.—*Chemical News.*

Colors from Metals.

A thin, reguline, and coherent film of a metal transmits light of a color remarkably similar to that emitted by its incandescent vapor. The color of the vapor of a metal varies with the temperature. Just above its boiling point the vapor of sodium is purple; at incandescence, yellow. The vapor of potassium is green; at incandescence, violet. Silver in distilling gives off a blue-white vapor, while that volatilized by the electric arc passing between silver electrodes emits yellowish green light. The color of the film obtained in many cases agrees very well with that of the incandescent vapor. In some instances, however, there is no similarity, a fact which is probably due to failure to obtain the proper conditions for the volatilization and deposition. The perfection and continuity of the deposit is easily destroyed by very slight changes in the conditions.

The color of a film will vary somewhat with the thickness, but as far as I have observed the colors extend over a very limited portion of the spectrum. Each metal possesses a strong tendency toward a characteristic color, which is produced when the film is as thick as it can be to transmit any light.—*W. L. Dudley, in Am. Chem. Jour.*