ROCHESTER WATER WORKS.

(*Continued from first page.*)

of the city. These pipes were laid in the same trench and at the same time as the mains of the gravitation system from Hemlock Lake, and although the two systems are entirely independent of each other, they are connected together occasionally by means of interposed stop gates, so that in case of an emergency either water supply may be used in either system.

The building containing the direct-pressure pumping machinery is located on Brown's millrace, which takes water from the Genesee River, a short distance above the high falls. This water supplies the turbines which drive the pumps, while the water supplied to the suction pits of the pumps is received through a 24-inch wrought-iron pipe from another millrace, further up the river, where the water is not so greatly contaminated with sewage and the refuse of the many manufactories. This supply pipe and the principal distributing main of the Hemlock Lake system have been connected by pipes and valves, so that in case of necessity the lake water can be delivered into the suction wells of the engine house, and thence pumped into the mains of the direct pressure system.

The machinery of the direct pressure pumping system consists of three distinct parts: the first is a set of four combined steam piston engines, with cylinders 16 inches diameter and 27 inch stroke, arranged to exhaust into a condenser or into the open air.

To these four engines, four double acting pumps, 10 inches in diameter and 27 inch stroke, are attached, the piston rod of each steam cylinder being continued through the pump. These rods, however, are made in two pieces, so that they can be uncoupled if required. Any one of the engines may be disconnected from its crank pin, leaving the others free to work.

The second part of the machinery consists of a rotary steam engine, placed in front of the steam set, and operating two rotary pumps for throwing fire streams. The reciprocating engines may also be thrown into gear so as to operate one or both of the rotary pumps.

The third part of the works consists of eight double acting pumps, arranged in two sets, each having four cylinders, 9 inches in diameter and 24 inch stroke. Each of these sets of pumps is driven by a turbine working under a head of about 90 feet. These turbines, although only 25 inches in diameter, are rated at 250 horse power each.

The four combined steam piston engines will develop 300 horse power, and the rotary engines are equal to 150 horse power. Their pumping capacity is 3,000,000 gallons in twenty-four hours, and that of the water set is 4,000,000 gallons in twenty-four hours.

The amount of water supplied daily from Hemlock Lake is about 3,000,000 gallons. It will thus be seen that the city of Rochester is provided with two distinct and separate systems of waterworks, either of which may be furnished with water from the other supply, affording double security and insuring a continuous and plentiful supply.

For our information, and for the plans and elevations, we are indebted to Mr. J. Nelson Tubbs, Chief Engineer of the Rochester Waterworks Department. We are indebted to Mr. G. S. Allis, of Rochester, for the photograph from which we have taken our view of the fountain.

The Aniline Blues.

The finest aniline blues are the highest in price of all the anilines, the light methylene blue being quoted at 100 to 120 francs the kilo, or $9.00 to $10.00 per pound in Paris. They are much sought for, and the *Moniteur de la Teinture* brings an account of an analogous blue called *bleu d'æthylene*, symbol ÆB, which is reported to be made by Oehler, at Offenbach, in all the tints and shades, and with the full range of metallic basis—alumina, tin, zinc, antimony, and iron. Samples of these colors are given in the *Moniteur* as fixed upon loose cotton, cotton thread of various grades, and as printed on fine cotton cloth. They are very beautiful, and justify the claim that they perfectly penetrate the fiber of the cotton. It is claimed that these colors are equal to indigo in brilliancy and fixedness. Double combinations of insoluble metallic tannates are formed with the coloring matter, and these combinations of the astringent with a metallic salt may vary according to the shade desired. Thus we obtain:

1. A shade of pure blue with tannate of ammonia.
2. A deep blue, shading upon violet, with tannate of tin.
3. A rich pure blue with tannate of antimony.
4. A shade of pure blue tinged with red with the tannate of zinc.

The tannate of iron affords darker shades. Varying the proportions of tannate of iron with the æthylene blue, the results vary from a grayish blue to an indigo copper blue, and a full blue black.

By employing yellows and reds in the dying bath with the æthylene, ÆB, we produce a great variety of shades of green, brown, mode, etc. This æthylene blue resists light well, and also the fulling process. It is recommended especially for dyeing cotton *en flotte*, or loose cotton.—*Textile Record.*

THE American Institute of Mining Engineers will meet in Denver, Colorado, Aug. 19. The programme includes numerous excursions to neighboring mines and smelting works. The Denver exhibition of mining appliances, minerals, and so on, will add materially to the interest and profit of the meeting to the members.

A CHEAP COTTAGE.

Mr. J. F. Wellilver, Montour county, Pa., sends to the *Country Gentleman* the following design for a cheap and ornamental frame cottage, with descriptions in substance as follows: The house cost $1,000, and has on the first floor three good-sized rooms; a vestibule 5 by 6 feet, out of which a door leads to both parlor and dining room; a stairway leading to the chambers opens out of the dining room, and the stairs to the cellar are placed directly under, and open into the kitchen, which is of convenient size. Immediately back of it is placed the pantry, which is 5 by 6½ feet. A rear entry, 3½ by 5 feet, affords means of entrance to the house from the back porch. In the second story there are three good-sized bed-rooms, all nearly square, and each provided with a closet of convenient size. A center passage-way, which is lighted by a low window in the rear, affords means of communication with the several rooms. Space has been fairly economized throughout in the planning of this building. A cellar 6 feet 6 inches in height is under the entire building; there is to be a cistern under the pantry, the excavation for which is to be one foot deeper than that of the cellar. A sink in the corner of the kitchen next to the pantry will have a pump connecting with the cistern.

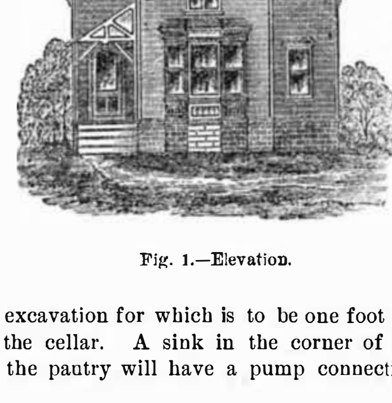

Fig. 1.—Elevation.

The foundation below the ground is of field stone, while that above the ground is of quarry stone; the walls 18 inches thick. All the rooms, with the exception of the rear chamber, are accommodated by the one central chimney, which starts from the bottom of the cellar. A grate is provided for the parlor, stovepipe thimbles being inserted for the dining room, kitchen, and the two front chambers. The frame is of sound hemlock, the principal sills being 4 by 8 inches, and the cross sills 6 by 10 inches; the joists are 2 by 9 inches; 16 inches between centers, with one course of bridging through the center. The studs for corners, windows, and doors are 4 by 4 inches, all others to be 2 by 4 inches, 16 inches between centers. The rafters are 2 by 4 inches, 16 inches between centers. Valley rafters, 3 by 7 inches; cellar beams, 2 by 6 inches; all timber well nailed or spiked together.

The exterior is sheeted with sound, seasoned and planed hemlock boards, over which is a simple course of 8-pound rosin-sized building paper. Good white pine siding forms the outside finish. The roof of the bay window is covered with tin, while the main roof is of the best quality of sawed white pine shingles, 18 inches long, and laid 5½ inches to the weather. The roof, preparatory for shingling, is sheeted with hemlock boards, laid with 1½ inch open joints. The

Fig. 2.—Plan of First Floor.

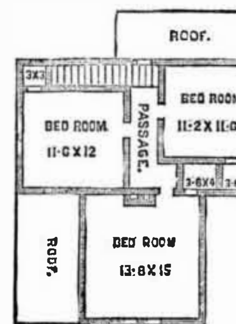

Fig. 3.—Plan of Second Floor.

cornice, window frames, corner boards, parlor bay window, and all outside casings and trimmings, are of good white pine lumber, thoroughly seasoned. The glass required is of the best quality of American, single thickness. The sashes are 1½ inches thick, fitted with pulleys and weights. The outside doors are 1¾ inches thick; the inside doors (with the exception of closets), 1½ inches thick, and the closet doors, 1¼ inches thick. All are four-paneled excepting the porch doors, which have glass above the middle rails. The hardware used about the doors is the best of its kind; the lower doors are hung with three bolts each, and provided with two tumbler mortise locks, with brass bolts and keys. The doors for the front vestibule, parlor, and dining-room are fitted with jet knobs, with bronze roses and escutcheons; all others have white porcelain knobs with porcelain escutcheons. The inside finish is white pine in parlor for all parts except the mantel, which is of white oak. The dining-room is fitted with ash wainscoting and casings, with cherry plinth, cap, and mouldings. The kitchen and other rooms are finished in white pine; the casings for the bed-rooms are 4½ inches wide. The roses are 5 inches wide. The pantry is ceiled up 2 feet 6 inches high to the counter shelf; above the counter shelf there are four shelves supported with rabbeted cleats. Cupboards are constructed under the counter shelf, having two shelves each. The closets have three shelves each. The plastering is put on in the best manner and of the best material. The exterior woodwork is painted with three coats of the best lead and oil; the color a light greenish drab with trimmings a few shades darker; the window blinds are of a color between the two.

The Magnaghi Floating Compass.

The floating compass, invented by Captain Magnaghi, is now in use on board the Duilio, and will probably be generally adopted in the Italian Navy. Its main feature, says *Engineering*, is the suspension of the needle in water, to which has been added one-tenth its volume of alcohol, contained in a vessel with a perforated bottom, which allows the liquid to rest ultimately on an elastic diaphragm. The addition of the alcohol prevents the water from freezing under low temperatures; and the elastic diaphragm allows it to expand and contract during atmospheric changes, without danger of breaking the glass which covers it, or admitting air. On this liquid the needle floats, inclosed in a hermetically-sealed ellipsoidal case, which is very delicately suspended upon a conical brass pivot. The pivot has a sapphire top and a jade point, and the friction is diminished to the utmost possible degree by the most perfect polish. The needle usually consists of six bundles, each made up of five pieces of the best ribbon steel, thoroughly tempered before being magnetized, and separately tested after. These pieces are kept apart by strips of cardboard soaked in oil, and their number can be increased if necessary. Wherever in the apparatus two metal surfaces or edges meet, friction is prevented, and closure secured, by a layer of blotting paper soaked in mineral wax. This is exclusively used for the purpose, because it is insoluble in alcohol; and even the marks and figures in the outside ring are rendered distinct by being filled in with the same substance blackened. All the interior parts of the instrument are silvered, in order to prevent oxidation and galvanic action between the various metals composing it, and to keep the fluid perfectly colorless and transparent. The compass proper (including the floating case with the needles) weighs in the air about 750 grammes; but in the liquid it exercises a pressure of only about 6 grammes on the point of support. The chief advantage claimed for this invention is that the resistance of water being great toward rapid movements and inconsiderable toward slight ones, it leaves the motions of the needle practically free, while shielding it (by its own incompressibility) from all shocks from without. The compasses of the Duilio were not in the least agitated by the discharge of the 100-ton gun, nor by the motion of the screw, although the supports on which they were placed were in such a position as to feel the vibration greatly. They were somewhat disturbed by the rolling and pitching of the vessel; and to meet this difficulty, modifications were made in the shape and arrangement of the different parts, so as to render the floating case thoroughly centrifugal, distribute great portion of the weight round the circumference, and fix the point of suspension very little above the center of gravity. The result of these arrangements is, that when the compass is tilted by the movement of the ship, the needle is so slow to change its position, that before it has again become horizontal the motion is reversed, and the inclination counteracted. The needle is also very little affected by changes in the angle at which the terrestrial magnetic current is inclined to the horizon, which varies in different localities, in consequence of the needles being so much shorter than the diameter of the compass, and being placed too low with regard to the point of suspension. This is proved by the simple test of holding a powerful magnet directly over the north point of the compass, when even this great increase to the vertical force produces only a very slight change in the inclination of the needle. The compass is fitted with a special sextant, in which various improvements have been introduced, to increase the facility and accuracy with which observations can be taken, especially in twilight and cloudy weather.

Danger of Handling Domestic Pets.

Dr. McCall Anderson, in a paper on "The Diagnosis of Diseases of the Skin," in the *Medical Times and Gazette* (p. 601), traces the development of the disease known as favus (*Porrigo favosa*) in human beings to mice suffering from the disease. Cats, which eat the mice, catch the disease, and have been known to communicate it to the children who handled them. Fowls have also been known to suffer from it. The danger of allowing children to handle domestic pets which are suffering from skin disease is probably often overlooked, and deserves to be made known more widely than it is at present.

Testing for Mineral Acid in Vinegar.

An Italian journal recommends the use of methylaniline violet, also called Hofmann's purple and Paris violet, for detecting free mineral acids in vinegar. A solution of this dye, although containing but 0.1 per cent of it, will be changed to an ultramarine blue by mineral acids, even when they are very dilute, while organic acids do not affect the color.

Honey Ants.

BY GRANT ALLEN.

The Garden of the Gods in Colorado is a bit of show-scenery of the true American type—a green amphitheater, studded with vast ledges and cliffs of red sandstone, weathered here and there into chimneys or pillars, in which a distorted fancy traces some vague resemblance to the sculptured forms of the Hellenic gods. Hither, a few years since, Dr. McCook, of Philadelphia, went on his way to New Mexico, where he wished to study the habits and manners of a famous, but little-known insect, the honey ant. To his surprise, he accidentally stumbled here upon the very creatures he had set out to find. There are two kinds of entomologists; one kind, now, let us hope, rapidly verging to extinction, sticks a pin through his specimens, mounts them in a cabinet, gives them systematic names, and then considers that he has performed the whole duty of a man and a naturalist; the other kind, now, let us hope, growing more usual every day, goes afield to watch the very life of the creatures themselves at home, and tries to learn their habits and customs in their own native haunts. Dr. McCook belongs to the second class. He forthwith pitched his tent (literally) in the Garden of the Gods, and proceeded to study the honey ants on the spot.

Like many other ants, these little honey-eaters are divided into different castes or classes; for besides the primary division into queens or fertile females, winged ants or males, and workers or neuters, the last-named class is further sub divided into three castes of majors, minors, and minims or dwarfs. But the special peculiarity which gives so much interest to this species is the fact that it possesses, apparently at least, a fourth caste, that of the honey-bearers, whose abdomen is distended till it is almost spherical by a vast quantity of nectar stored within it. Dr. McCook opened several of the nests, and found these honey-bearers suspended like flies from the ceiling, to which they clung by their legs and appendages. All over the vaulted dome of the ant-hill, these little creatures were clustered in numbers, their yellow bodies pressed tight to the roof, while their big round stomachs hung down behind from the slender waist, perfect globes of translucent tissue, showing the amber honey distinctly through the distended skin. They looked like large white currants, or sweet-water grapes; and as they were actually filled with grape-sugar, the resemblance was really quite as true inside as out.

Where did the honey come from? That was the next question. Everybody knows that ants are very fond of sugar, and they often steal the nectar in flowers which the plant has put there to entice the fertilizing bee. So much damage do they do in this way, that many plants have clothed their stalks with hairs, or sticky glands, on purpose, in order to prevent the ants from creeping up the stem and rifling the nectary. In other cases, however, plants actually lay by honey to allure the ants, when they have anything to gain from their visits, as in the case of those Central American acacias, mentioned by Mr. Belt, which have a nectar gland on the leaf-stalk to attract certain bellicose ants, which so protect them from the ravages of their leaf-cutting congeners. Of course, everybody has heard, too, how our own species sucks honeydew from the little aphides, or plant-lice, which have often been described as ant-cows. But it is not in either of these ways that the honey-ants get their sugar. Dr. McCook had a little trouble in settling this matter at first, for the honey ants are a nocturnal species, and he had to follow them through the thick scrub, lantern in hand; still, he satisfactorily settled at last that they obtain the nectar from the galls on an oak, where it must simply be exuded as an accidental product of injury. The workers take it home with them, and give it to the honey-bearers, who swallow but do not digest it. They keep it in their crops ready for use, exactly as bees keep it in cells of the honey-comb. When the workers are hungry they caress a honey-bearer with their antennæ, whereupon she presses back a little of the nectar up her throat, and the workers sip it from her mouth. The honey-bearers, in short, have been converted into living honey-jars. They are thus passively useful to the community, for in this curiously-ordered commonwealth they also serve who only stand and wait.

How could such a strange result as this have been brought about? Dr. McCook, though not himself an avowed evolutionist, has supplied us with facts which seem to suggest the proper answer to this difficult question. He has shown that the rotunds (as he calls them) are not, in all probability, a separate caste, but are merely certain specialized individuals taken at haphazard from the worker-major class. He saw himself in the nests many worker-majors, which seemed at that moment actually in course of transformation into honey-bearers. Now, it is easy enough to understand why these social insects should wish to store up food against emergencies. At all times, the queen, the young female ants, the males, and the grubs or larvæ are entirely dependent upon others for support. Hence, alike among bees and ants, stores of food are habitually laid by, sometimes in the form of honey in combs and bee-bread, as with the hive-bee; sometimes in the form of seeds and grains, as with the harvesting ants. During the winter months or the rainy season, when food fails outdoors, there must be some reservoir at home to meet the demand of the starving community. Under such circumstances, any trick of manner which tended to produce a habit of storing food would be highly useful to the nest as a whole; and, taking nests as units in the struggle for existence, which they really are, those nests which possessed any such trick would survive in seasons when others might perish. So the tendency, once set up, would grow and be strengthened from generation to generation, those ants which stored most food being most likely to tide over bad times, and to hand on their own peculiarities to the other swarms or nests which took origin from them.

A set of primitive ants, living upon the honey of the oak-galls, have no tendency to produce wax, like bees, because their habits with regard to their larvæ do not lead them to make such cells at all. The eggs and grubs simply lie about loose among the chambers of the ant-hill, instead of being confined in regular hexagonal cradles. Hence the bees' mode of honey-storing is practically impossible for them; they have not the groundwork habit from which it might be developed. But the ants have a crop, or first stomach, in which they store their undigested food, before passing it into the gizzard, exactly as in fowls. When ants come back from feeding, whether on flowers, on aphides, or on galls, their crops are very much distended; and they can bring back the food to their mouths from these distended crops, to supply the grubs and their other helpless dependents in the nest. If, therefore, some of the ants were largely to over-eat themselves, they would be able to feed an exceptionally large number of dependents.

Dr. McCook observed that some very greedy workers, returning to the nest, fastened themselves upon the roof in the same position as the honey-bearers, and in fact seemed gradually to grow into rotunds. The other ants would soon learn that such lazy, overgrown creatures were the best to go to for food; and, in time, these gorgers might easily become specialized into a honey-bearing set of insects. The workers would bring them honey, which they would store up and disgorge as needed for the benefit of the rest as a whole. If the honey passed into their gizzards and was digested, they would be a positive dead loss to the community, and so the tendency would soon be eliminated by natural selection, because the nests possessing such workers could not hold their own in bad times against neighboring communities. But as only a very small quantity is ever digested—just as much as is necessary to keep up the sedentary life of such immovable fixtures—the effect is about the same as if the honey were stored in cells of wax. The ants, in fact, utilize the only good vessel or utensil they have at their disposal, the flexible and extensible abdomen of their own comrades.

The greatest difficulty is to understand how the workers first acquired the habit of feeding these lazy members to such repletion; but as all ants "take toll" of one another, this is much less of a crux than it looks at first sight. A very greedy ant, which not only ate much itself while out foraging, but also took toll of all others in the nest, after it was too full to move about readily, would be in a fair way to become a rotund. And as it would thus be performing a useful function for the rest, at the same time that it was gratifying its own epicurean tastes, the habit would soon become fixed and specialized, till at last we should get just such a regular and settled form of honey-storing as we see in this Colorado species. Indeed, another totally distinct type of ant in Australia has arrived at exactly the same device quite separately, as so often happens in nature under similar circumstances. Whatever benefits one creature under any given conditions will also benefit others whose conditions are identical; and thus we often get adaptive resemblances between plants and animals very widely removed from one another in genealogical order.—*Knowledge.*

The Blue Process of Copying Tracings.

As we have had several inquiries recently in regard to the best method of copying tracings by what is known as the "blue printing process," we will give a brief description of the method employed by us; we do not say it is the best, but it certainly is as simple as any other, and has always given us perfect satisfaction.

The materials required are as follows:

1st. A board a little larger than the tracing to be copied. The drawing-board on which the drawing and tracing are made can always be used.

2d. Two or three thicknesses of flannel or other soft white cloth, which is to be smoothly tacked to the above board to form a good smooth surface, on which to lay the sensitized paper and tracing while printing.

3d. A plate of common double-thick window glass of good quality, slightly larger than the tracing which it is wished to copy. The function of the glass is to keep the tracing and sensitized paper closely and smoothly pressed together while printing.

4th. The chemicals for sensitizing the paper. These consist simply of equal parts, by weight, of citrate of iron and ammonia, and red prussiate of potash. These can be obtained at any drug store. The price should not be over 8 or 10 cents per ounce for each.

5th. A stone or yellow glass bottle to keep the solution of the above chemicals in. If there is but little copying to do, an ordinary glass bottle will do, and the solution made fresh whenever it is wanted for immediate use.

6th. A shallow earthen dish in which to place the solution when using it. A common dinner-plate is as good as anything for this purpose.

7th A brush, a soft paste-brush about 4 inches wide, is the best thing we know of.

8th. Plenty of cold water in which to wash the copies after they have been exposed to the sunlight. The outlet of an ordinary sink may be closed, by placing a piece of paper over it with a weight on top to keep the paper down, and the sink filled with water, if the sink is large enough to lay the copy in. If it is not, it would be better to make a water-tight box about 5 or 6 inches deep, and 6 inches wider and longer than the drawing to be copied.

9th. A good quality of white book-paper.

Dissolve the chemicals in cold water in the following proportions: 1 ounce of citrate of iron and ammonia, 1 ounce of red prussiate of potash, 8 ounces of water. They may all be put into a bottle together and shaken up. Ten minutes will suffice to dissolve them.

Lay a sheet of the paper to be sensitized on a smooth table or board; pour a little of the solution into the earthen dish or plate, and apply a good even coating of it to the paper with the brush; then tack the paper to a board by two adjacent corners, and set it in a dark place to dry; one hour is sufficient for the drying; then place its sensitized side up, on the board on which you have smoothly tacked the white flannel cloth; lay your tracing which you wish to copy on top of it; on top of all lay the glass plate, being careful that paper and tracing are both smooth and in perfect contact with each other, and lay the whole thing out in the sunlight. Between eleven and two o'clock in the summer time, on a clear day, from 6 to 10 minutes will be sufficiently long to expose it; at other seasons a longer time will be required. If your location does not admit of direct sunlight, the printing may be done in the shade, or even on a cloudy day; but from one to two hours and a half will be required for exposure. A little experience will soon enable any one to judge of the proper time for exposure on different days. After exposure, place your print in the sink or trough of water before mentioned, and wash thoroughly, letting it soak from 3 to 5 minutes. Upon immersion in the water, the drawing, hardly visible before, will appear in clear white lines on a dark blue ground. After washing, tack up against the wall, or other convenient place, by the corners to dry. This finishes the operation, which is very simple throughout.—*The Locomotive.*

Requisites for a Good Operator.

A correspondent writes that he is able to transmit forty-two words a minute, by the watch, for a considerable length of time, and to receive, without difficulty, the writing of a private line with forty offices, some of them occupied by Western Union operators, and he desires to know whether this degree of skill entitles him to be rated as a good operator. Inquiries of this kind are often received, implying that ability to transmit and receive a specified number of words per minute constitutes a standard by which a good or a "first-class" operator may be distinguished—an error very common to novices, and very mischievous. Speed, when combined with other qualifications, is certainly a very desirable accomplishment, but it is not the first requisite of telegraphic skill. Some of the men who have ranked highest in the profession have not been remarkable for speed. It is the old story of the tortoise and the hare over again; it is the steady gait and sound judgment that tell. If the correspondent can transmit forty-two words a minute in good, ringing Morse, and can transcribe from a line at the same rate, making every letter unmistakably legible (not necessarily ornate); if he can quickly adjust his instrument to every variation in the circuit, particularly in bad weather, or on a faulty line; if in sending he exercises judgment, and gauges his writing to the ability of the receiver; if he has that peculiar telegraphic sense which enables him to instantly detect an error, even in a cipher message; if he never "breaks" except when in doubt as to the correctness of a word, and then always breaks; if his habits are irreproachable; if he has the good sense never to allow his temper to be ruffled by anything that occurs on the line; if he can do and be and suffer all this for nine hours a day, without leaving his chair, then he may justly claim to be a good operator. If, in addition to these accomplishments, he can transmit forty-two words a minute with one hand, while "timing" with the other the messages he has sent, and can eat his frugal luncheon without suspending either of the other operations, he may be regarded as a first-class operator, and will probably have no difficulty in obtaining a position at from $70 to $80 per month. All that is then necessary is for him to become thoroughly conversant with the properties of electricity, and the applications thereof, and he is reasonably certain (if he lives) to reach the top of the profession, the length of time required depending to a great extent upon the maneuvers of a certain gentleman in New York, Mr. Jay Gould.—*The Operator.*

Delicate Tests for Sulphurous Acid.

L. Liebermann gives the following as the most delicate test for sulphurous acid in wine, cider, and other liquors: A portion of the wine is distilled off, about 15 or 20 c. c. (one-half ounce), and diluted with an equal volume of distilled water and a few drops of an iodic acid solution added. If sulphurous acid is present the acid acquires a yellowish-brown color; chloroform shaken with it becomes pink in color. If the liquid contains 1 part acid in 500,000 parts, 2 c. c. is sufficient to detect it. Or some of the wine is distilled, chloride of barium and hydrochloric acid added. The liquid remains clear until concentrated nitric acid is added and heated, when a white precipitate forms. It can also be converted into sulphydric acid by means of sodium amalgam and hydrochloric acid and then detected by lead paper.