BABY BRUTES.

The Central Park menagerie, or rather Mr. P. T. Barnum, who is the proprietor of most of the animals exhibited free to the public during the winter, has recently become possessed of a litter of panthers, two lions, a baboon, and a dromedary, all born in the cages. Of the baby lions and panthers, engravings are given herewith. The lions are now nearly four months old, and are about as tall as a moderate-sized terrier dog. They are exceedingly fat, and, like all young of their species, are covered with a short downy fur, profusely mottled. They possess, in brief, all the characteristics of kittens, except gracefulness of motion; for they are the personification of clumsiness. Their legs are thick, short, and bent, their paws, which already possess formidable claws, appear too large, and their bodies are long and ungainly. The temper of the infants, despite their innocent and childlike expression, is none of the best; for they show ranges of white sharp teeth, and spit viciously on any stranger approaching their cage. The cubs are of especial interest to zoölogists from the fact of their being the offspring of a cross between the Asiatic and African species of lions. This mingling of breed has not before been attempted, and the characteristics of the young will be carefully watched.

The panthers are of the ordinary variety, peculiar to this country. As is the case with most untamable brutes, they breed unfrequently in captivity. The cubs are of the same age as the young lions; and were it not for their peculiar markings, resembling closely those of some species of young deer, they might well be mistaken for good sized cats. Their behavior, when stirred up, is a ludicrous mixture of fear, curiosity, and defiance. A slight poke from the end of a cane causes the cub touched to beat a speedy retreat toward the mother; then it turns and watches the stick with intense interest, relieving its feelings by an occasional spit. Finally one paw flies forward, and a spiteful dig is administered, and then another retreat takes place. This is continued as long as the intruding object remains in the cage.

It is curious to notice, both in the lioness and in the panther, that peculiar pride in showing their offspring which the domestic cat manifests in the most unmistakable manner. It seemed also as if the old animals regarded raps on the bars of the cage, or the introduction of canes to induce their progeny to take better attitudes for sketching purposes, in the light of grateful attentions; as, no matter how much the young ones spit and scratched, the mothers never showed the slightest resentment, but quietly crouched and stared at the interloper in abstracted calmness. The writer saw the lioness deliberately wake up her cubs, who were cuddled into an undistinguishable ball of fur, and spread them apart with a blow of her paw, for no reason that could be divined other than that she wished to display them. They manifested no hunger, but sat up, as they are shown in our engraving, and blinked like suddenly awakened babies, until their eyes became accustomed to the light.

Plating of Iron and Steel with Nickel and Cobalt by Immersion.

Mr. F. Stolba—in a German periodical which we should be glad to give credit to, if there were not six words and fifty-seven letters (including forty-two consonants) in its name—proposes the following simple process for nickel-plating polished iron and steel articles. To a dilute solution (5 to 10 per cent) of as pure chloride of zinc as possible, there is added enough sulphate of nickel to color it strongly green. This is heated to ebullition in a porcelain vessel. The objects, being completely cleaned of grease, are then suspended in the liquid so that they touch each other as little as may be; and the boiling is kept up for from half an hour to an hour, water being from time to time added in place of that evaporated. The nickel is precipitated in a brilliant white layer wherever the surface of the object is not greasy or rusty. The operation can be continued for several hours if desired; but the plating will not thus be rendered much thicker.

After removing the objects, they are washed with water holding chalk in suspension, and carefully dried. They may afterward be cleaned with chalk, and they take a fine yellowish-toned polish. The chloride of zinc used should contain no metal precipitable by iron. When it cannot be obtained of sufficient purity, it may be made by dissolving zinc scraps in hydrochloric acid, and allowing the solution, containing an excess of metallic zinc, to rest, in order that the metals precipitable by the zinc may separate. Filter at the end of 24 hours, and the solution is ready for use; each portion of zinc dissolved corresponds to about 2·1 parts of chloride of zinc.

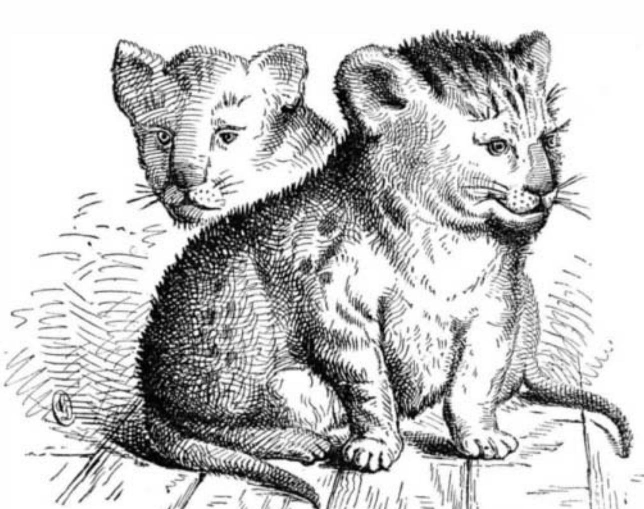
The sulphate of nickel should also be as pure as possible, and the cold solution should not precipitate when a plate of iron is plunged in it, as would happen, for example, if it contained copper. When during the operation the liquor becomes a pale green, owing to the precipitation of nickel, more sulphate must be added until the intense green is regained. When the used liquid is exposed to the action of the air, it deposits hydrated oxide of iron, coming from the dissolved metal. It should be filtered, and more chloride of zinc and sulphate added, when it may be again used.

In the same way, polished iron and steel objects may be covered with a brilliant plating of cobalt, by using a sulphate of cobalt solution. The appearance of this plating differs little from that of polished steel. The distinguishing characteristic is the light rose-colored tint. The author states that the plating wears well.

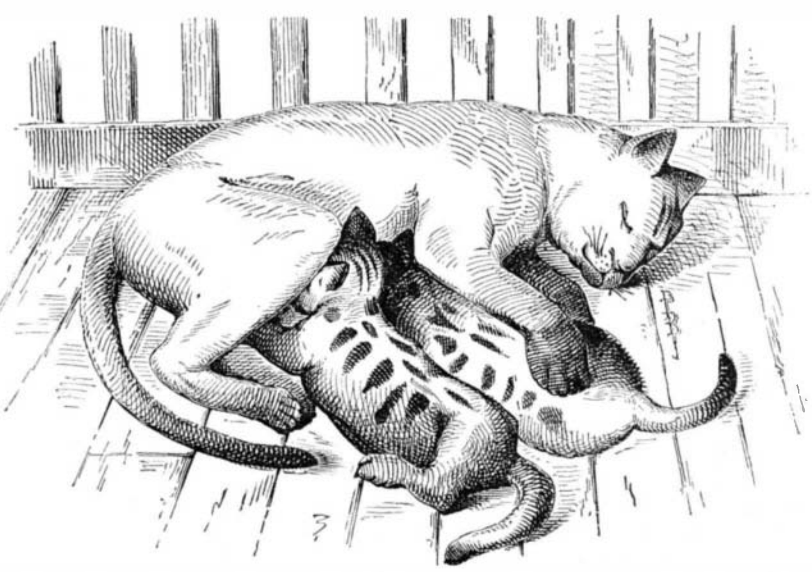
A New Class of Blowpipe Reagents.

Of all methods of analysis, that performed in the dry way by means of the blowpipe deserves the palm on the score of simplicity. The reagents are only four or five in number, the apparatus so small and portable that it can be carried in the breast pocket; and yet in most cases, with a little skill, the results are quite as satisfactory as those obtained in a completely equipped laboratory. There are, however, some cases, unfortunately but few, where the blowpipe reactions are not as simple as might be desired: such are those with boron and the iodides; but Messrs. Ihles and Devereux recently have overcome these. One necessity of every blowpipe set has always been a bottle of strong mineral acid for decomposing carbonates, detecting limestones, etc. On a journey, as at all times, acids are unsafe companions in pocket or portmanteau. A recent discovery of Dr. H. Carrington Bolton helps us over this quicksand, and enables the analyst to dispense with liquids entirely. The new departure (which is original, we believe, with Dr. Bolton) consists in the use of dry crystalline organic acids, such as tartaric, citric, and oxalic. When required for use, a few crystals are thrown into water; the mineral to be tested, which must be in a very fine powder, is introduced; and then, with or without heat, as the case may be, solution is accomplished. The facility with which the mineral dissolves in one or the other acids aids to determine its name. Even sulphides and silicates may, in several cases, be brought into solution by organic acids; and when the acid alone fails, it can be mixed with saltpeter (potassic nitrate) and the mineral thus decomposed.

A new field of very wide extent and unlimited interest opens here, and we hope Dr. Bolton will explore it to its furthest boundaries. Perhaps a new kind of analysis will be developed, to which we would give the term organo-wetish-dry testing.



YOUNG LIONS IN CENTRAL PARK, NEW YORK.



PANTHER AND HER YOUNG, CENTRAL PARK, NEW YORK.

SOMEBODY has perpetrated the following on Captain Eads' work on the Mississippi: "Those willow mattresses at the mouth of the Mississippi make the bed of the river more comfortable, to be sure. But still the shipping don't lie there nearly as long as formerly. If they are bound to New Orleans, they 'get up' as soon as possible."

ZINC, it is said, may be purified by precipitating its sulphate with an alkali, mixing the oxide thus produced with powdered charcoal, and exposing the mixture to a red heat in a covered crucible.

Dangers from the Dead.

That the dead should kill the living seems a paradox; yet nothing is more true. Indeed, we venture to say that every year, in our land, corpses murder more people than assassins do. Not only have intramural interments poisoned whole blocks and quarters, not only has drinking water contaminated by graveyards yearly spread disease and death through country hamlets, but, before the process of decomposition commences, there is often a great and pressing danger from infectious disease. We quote a recent instance:

"Dr. Goldie, the Medical Officer of Health for Leeds, England, in his report to the local authority, states that every one of thirty people who attended the wake of an Irish girl, who recently died in that town from typhus fever, were attacked by the same disease, and no fewer than nine of the cases ended fatally."

So strongly have the needless dangers of exposure at funerals impressed the medical mind, that the Health Board of New York have now issued a circular recommending that no public or church funerals should be given to persons dying of either diphtheria, scarlet fever, measles, or whooping cough.

In Chicago, also, where scarlet fever and diphtheria have been severe this past winter, the recommendation of one hundred medical men in council was in these words:

"There should be no public funerals of any patient who has died of any infectious or contagious disease. Remember that the separation of the sick person from the well is the most certain means of preventing the spread of the disease."

A writer in the Baltimore *Physician and Surgeon*, last December, went so far as to advocate the passage of a law on the subject (the average American man looking upon a "law" as the cure-all on every occasion). He thought it should embody the following provisions:

1. Whenever any one dies of contagious disease, the publication announcing the death should state the cause of death.

2. No person except the immediate family should be permitted to attend the funeral, and the handling and burying the body should be intrusted to persons who devote themselves to that business.

3. A sufficient number of carriages should be kept for the special purpose of attending these funerals, and the hiring them for other purposes should be prohibited, under the severest penalties.

These are good suggestions, but people should learn and obey them out of a natural sense of sanitary propriety, not out of obligation to a statute.—*Medical and Surgical Reporter.*

On Vegetarianism.

A discussion on this subject took place at a recent meeting of the Medical Society of London. True vegetarians, it was urged, eat neither butter, eggs, nor milk.

Sir Joseph Fayrer related his experience of the effects of this diet among the natives of India, and said he had no doubt that people could live on vegetables alone. He had seen some of the finest specimens of the human race, as regards strength, power of endurance, and physical development, among the inhabitants of the northwest provinces of India, who were pure vegetarians; but he accounted for their condition from the fact that their food consisted chiefly of leguminous seeds, such as peas, beans, and the like, which contained a larger amount of nitrogen than other vegetables.

The President, Dr. Buchanan, remarked that in the discussion several factors should enter—as age, which was a considerable element, as no doubt people advanced in years appear to thrive on a vegetable diet, whereas children require almost a pure animal diet. Again, climate was a great factor; and in the treatment of disease it could be strongly advocated; while, lastly and chiefly, temperance must be strictly enforced, avoiding excess in the use of animal food, and taking, in fact, a middle course.

A Torpedo that Travels 275 Miles an Hour.

The most terrible invention for warfare that has ever been devised—if we may trust the reports of our English contemporaries—has recently been submitted to the Admiralty by a clergyman, the Rev. C. M. Ramus. The Whitehead fish torpedo has already proved its capability of travelling beneath the surface of the sea at the rate of 20 miles per hour; but the "rocket float," as the new machine is called, weighs 50 tons, and is propelled on the surface at the rate of 275 miles per hour for a distance of four miles. The apparatus is a timber or iron vessel, the bottom of which is a series of inclined planes. In the head is the explosive, and enough gun cotton can be carried to blow up the largest ironclad in existence, while the rocket, by the combustion of which the craft is impelled, is laid along the deck. The vessel is said to be easily guided by a rudder of very thin sheet metal.

If the coming British experiments substantiate the foregoing, it would seem that armor-plated ships have had their day, and that the naval vessel of the future should be of cork.

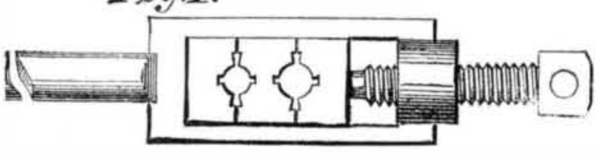
[For the Scientific American.]

A CURIOUS PIECE OF MECHANICAL MANIPULATION.—CUTTING RIGHT OR LEFT HAND THREADS WITH RIGHT HAND DIES.

If there were any one mechanical operation that it would seem the height of absurdity to attempt to accomplish, it would appear to be that of cutting a triple left hand thread with an ordinary pair of right hand dies; but it has been done, and, indeed, is very easy of accomplishment.

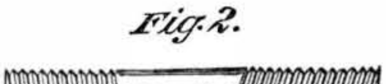
A short time since Mr. J. J. Bingley, Master Mechanic of the Hanover Branch Railroad, wrote to me, saying that a workman in Hanover, Pa., had accidentally cut a *treble* left hand thread with a pair of right hand *single thread* dies, and requested a solution of the mystery. Upon request, Mr.

Fig. 1.



Bingley forwarded both the screw and the dies, and the mystery was readily solved, resolving itself into a mechanical operation which may in many cases be turned to excellent account. In Fig. 1 are shown the dies, and in Fig. 2 are a single right hand and a treble left hand thread cut with them. The machinist who cut the first treble left hand thread did so from a combination of manipulative errors, each one of which was necessary to his accidental discovery. First, the dies with which he operated were of a wrong shape, and secondly, the iron upon which he cut the thread was larger in diameter than such a pair of dies should be applied to; thirdly, he wound the dies the wrong way; fourthly, he put a pressure upon them in a direction wrong with relation to the direction in which the dies were wound upon the work.

Fig. 2.



Referring to the first point: Dies for use in hand stocks, that is to say, adjustable dies that are made in two pieces, and are intended to pass more than once along a thread before finishing it, should be, and are almost universally, cut with a hub or master tap larger in diameter than the bolt they are intended to cut threads upon, for the following reasons: In Fig. 3 is shown a pair of dies tapped with a ⅝ inch master tap or hub, and in Fig. 4 is shown the same pair of dies, opened out and placed upon a ⅞ inch bolt. Dies made in this manner, it will be observed, when opened out to take the first cut upon the bolt, have nothing to steady them, since only the very corners of the teeth contact with the bolt; and the sides of the thread and the length of the teeth of the die have a great deal of clearance upon the bolt, and the consequence is that they operate very unsteadily until the thread is cut to some depth upon the bolt. The edges of the teeth, at A and B, perform all the cutting duty; and as the thread approaches completion upon the bolt, the friction becomes very great unless the dies are given clearance in the thread. It is usual, therefore, to cut such dies with a master tap of larger diameter than that of the bolt upon which the dies are intended to operate. How much the excess of the diameter of master tap should be is a disputed question. In some cases an amount equal to twice the depth of the thread is used, and in others once that depth is preferred. The dies shown in Fig. 5 are twice the depth of the thread larger in diameter than the size of the bolt; and as a result, when placed upon the bolt, the teeth fit closely to it, and therefore operate very

Fig. 3.

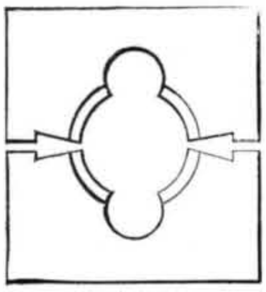


Fig. 4.

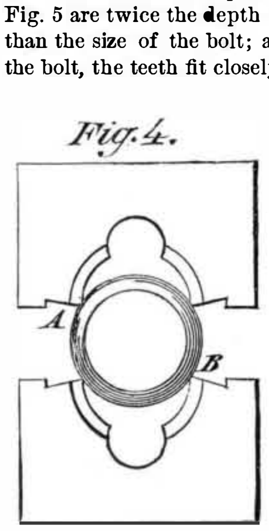
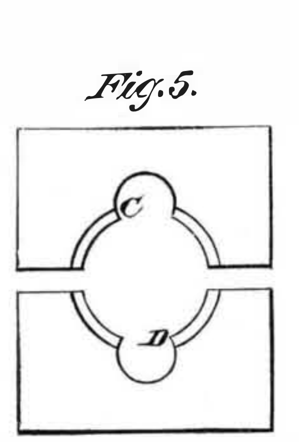


Fig. 5.



steadily, the cutting edges being in this case at C and D. It is obvious that here the dies require to close nearer together than would otherwise be the case; hence a piece of metal equal in thickness to, or rather more than, twice the depth of the thread is placed between the dies while they are being drilled and cut by the master tap. With dies cut in this manner, the sides and length of the teeth fit so closely to the thread, as shown in Fig. 6, as to preclude the possibility of their cutting a thread any different from that of their own teeth, and the cutting edges are well supported by the metal behind them; whereas, in dies cut as shown in Fig. 4, the teeth are very liable to break off, as well as to dull very rapidly. Therefore it is that such dies are wrong in construction. The dies sent to us by Mr. Bingley are of this construction; and it will readily be perceived that, even when applied to bolts of the same diameter as the die itself, the teeth bear upon such fine points, and the back of them is so well clear that, by taking a very fine cut and putting a pressure upon them, they would act as chasers, well canted over; and they would travel in whichever direction the pressure determined. As the die teeth, however, enter the bolt, the sides of the thread would come into play, and would steady and force the dies to cut correct grooves.

These dies are tapped with about ½ inch taps, and the iron upon which the right and left hand threads are cut is full $\frac{5}{16}$ inch in diameter; and as a consequence, we have the condition of things shown in Fig. 7, in which the very points of the teeth only have contact with the bolt. As a result, the thread may be cut the full depth, without the sides of the thread upon the bolt and those upon the die coming into contact at all. If, then, the dies are placed upon the bolt, and set to take a very light cut, the direction of the up or down pressure placed upon the dies will determine the direction in which the dies will travel and the thread be cut. If the dies are wound from right to left while pressed downwards, the thread cut will be a left hand one, and *vice versa*; and whether the thread so cut will be a single, double, treble, or quadruple one, depends upon the size of the bolt and the amount of the pressure; for though the size of the bolt may afford sufficient clearance to the sides of the die teeth to cut a quadruple thread, yet, if the vertical pressure placed upon the die moves it at the necessary speed, only a double thread will be cut. In other words, the thread cut will be in all cases proportionate to the amount of vertical movement of

Fig. 6.

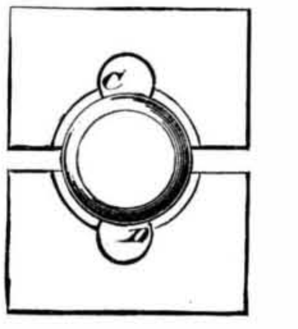
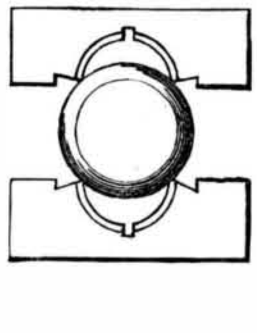


Fig. 7.



the dies. Of five threads cut with the dies shown in Fig. 7, three were treble left hand ones, one was a double left hand, and one a single right hand one. I find as a rule that the thread is apt to be as coarse as the clearance between the threads will permit; and this occurs because of the difficulty of judging the exact amount of vertical pressure necessary to cut any particular pitch. And since the pitch of the thread cut cannot in any event exceed such an amount as will bring the sides of the threads into contact, it becomes easier to cut that extreme pitch than any less one. In cutting the left hand threads, it is necessary to reverse the natural order of things by moving the dies backwards when the pressure is placed forwards, and *vice versa*. By a simple attachment to regulate the vertical motion of the dies when starting, the double or treble threads might be cut with accuracy and certainty. J. R.

On the Use of Tannic Acid for Testing Potable Waters.

The importance of using pure water, in order to prevent disease and death, cannot be too frequently impressed upon the minds of the public. At all seasons, but more especially in the spring and summer months, persons who use well water are in danger of taking into the system the germs of typhoid and other fevers. These dangerous constituents seldom influence or mar the taste of the water, and are not suspected until they have lain one or more victims on a bed of sickness.

In a recent number of the *Journal für Practische Chemie*, Hermann Kämmerer says, in regard to the reagents employed by chemists for testing potable water, that for the most part they merely show the presence in water of organic matter; but some kinds of organic matter may be present in large quantities without causing epidemics or sporadic diseases. Most methods for the chemical analysis of water do not determine the nature of the organic matter which is dissolved in the water, and, at most, a conclusion is drawn as to the presence or absence of nitrogenous organic matter from the odor emitted on charring the residues left by evaporation of the water. This is very uncertain, because the presence of two kinds of compounds frequently frustrates this distinction, or the presence of a large amount of nitrates prevents the production of the characteristic odor by completely oxidizing the compound.

For hygienic purposes, it is very frequently of the greatest importance to know whether water contains putrefactive matter, especially of animal origin, since the present state of Science points to these as the probable bearers or producers of the real causes of disease. Hence the introduction of reagents which shall enable us to detect animal matter with certainty, and also its approximate quantity, is exceedingly desirable when testing water for hygienic purposes. Kämmerer believes that tannin or tannic acid is a very valuable reagent for this purpose. Tannin is really a group reagent for a large number of bodies of animal origin, which readily suffer decomposition or decay, such as albumen, gelatin, etc. These can easily find their way into the water of the soil, rendering it impure, and, according to our present views, must render such water very dangerous.

Tannin has been recommended before this as a test for water, but has as yet attracted but little attention, although Kämmerer proceeds to prove that it is very excellent for this purpose. He thinks it would be very interesting to prove directly whether putrefactive matter be present in well water which is near enough to receive the drainage of graveyards, factories where glue, blood, and similar substances are used, and in many other cases.

Lefort recently directed attention to the probable presence of gelatin or glue in water from churchyards. In an analysis of water taken from a well at a distance of ten rods from the churchyard of St. Didier, made by him in 1873, he obtained a residue, which, when boiled with hydrochloric acid, and on charring, emitted an odor which he thought could only be produced from glue. Lefort does not seem to have sought or obtained any further reaction characteristic of gelatin.

When analyzing three specimens of well water from a churchyard in St. Leonhard, near Nuremberg, Kämmerer observed a similar reaction of the residues of evaporation, and then tested the water directly by means of tannin. For this purpose 18 cubic inches of the water to be tested was placed in a glass cylinder; to each sample was added 0 18 cubic inch of a freshly prepared, cold, saturated solution of tannin, and left standing in vessels closed and airtight. The first sample instantly became cloudy by the separation of a rapidly increasing, curdling precipitate, which, at the end of an hour, formed a thick gelatinous precipitate, and after standing for days did not settle clear and colorless. The sample from the second well acted in a similar manner; at the end of an hour there was a heavy, gelatinous precipitate, which soon took a gray, then light green, and finally dark green color, due to a trace of iron in the water. The third sample retained its clear appearance a longer time, and in the first four hours only a slight turbidity could be observed, yet in 24 hours a thick starchy precipitate had formed. The organic nature of the precipitate was undoubted, but was further proved by charring it, when it gave off, like the residue from evaporation, a strong odor of burned horn, and left behind a very small amount of ash in proportion to its volume. For the purpose of testing for volatile organic acids, sulphuric acid was added to a few quarts of each sample of water, which was then distilled off to one fifth its original volume; a very small quantity of the tannin solution added to the residue caused an immediate coagulation to a stiff jelly also in the residue of the water from the third well, which, when treated directly with tannin, was not entirely precipitated for 24 hours. Since sulphuric acid precipitates tannin from its aqueous solution, and this precipitation looks milky and is difficult to clarify, it was thought possible that the strong reaction in these residues might be referred to the precipitation of the tannin by the sulphuric acid. But this supposition did not agree very well with the volume of the precipitate, which seemed disproportionately larger than the quantity of tannin employed. Comparative experiments were made with tannin precipitated by sulphuric acid, and gelatin precipitated by tannin, and showed that, on heating, the tannin dissolved in the sulphuric acid and water before it reached the boiling temperature, and, on cooling, was precipitated again and soon settled, leaving the liquid clear. The precipitate formed by tannin in a solution of gelatin is not dissolved by dilute sulphuric acid even when boiling, but seems rather to increase. The precipitate formed by tannin in the residues from distillation reacted precisely like the latter; on heating to boiling, they seemed rather to increase than to diminish.

After he had found, by further experiment, that the turbidity produced by tannin solution in the three samples of water were not caused by albumen, but by gelatin, Kämmerer feels that he is justified in drawing the following conclusions:

1. There can no longer be any doubt of the presence of gelatin in well water. In some cases it is found in comparatively large quantities.

2. Tannin is a suitable reagent for detecting this and similar substances, and this test ought never to be omitted in analyses of water for hygienic purposes.

3. The presence of salts and other compounds found in water may retard the precipitation by tannin. To judge of the purity of water from the tannin reaction, it must stand at least 24 hours.

4. Every water that suffers considerable turbidity with tannin must be held to be dangerous for drinking. It seems to make no difference whether the precipitate falls at once or only after some time, as the time depends less on the substance to be precipitated than on the other substances dissolved in the water which retard the precipitation.

Bichromate of Potash an Antiseptic.

M. Langeroy states that one per cent of bichromate of potash in water will prevent putrefaction in animal and vegetable substances immersed therein. Meat, after being kept in the solution for several months, becomes like gutta percha, and the author has struck medals from pieces of it. It is no longer eatable, however, and it is even said that dogs refuse to touch it.