The accompanying diagram, half natural size, plainly exhibits the simplicity of its construction.

A small petroleum cistern containing 120 c.c. has inside a small perforated petroleum chamber with a soldered edge, by which it hangs on a water vessel of 300 c.c. The one fixes the other. The lid of the petroleum cistern has a rectangular edge, and is closed by an iron stang fixing the lid with the cistern. In the lid four parts are to be noticed: (1) A cap of 2 c.m. high; (2) a mixing rod with knob; (3) a small brass plate; (4) an aperture for the thermometer. The cap has, 1 c.m. above the lid, a brass disconnector; in its center is a little hole, which is closed by means of a thin brass plate moving on the disconnector. The object of the brass disconnector is to fix a small tube, in which is placed a cotton wick. By adding that under the water vessel there is a good spirit-lamp, I complete the description of the apparatus.

A SIMPLE PETROLEUM TESTER.

The petroleum to be examined fills the vase up to the edge of the interior chamber which is to receive the cotton wick. The lid being put on, the spirit lamp is lit along with the little lamp in the cap. The knob is now to be turned from time to time, and the thin brass plate to be drawn out. Nothing else is required. In about ten minutes the examiner will have ascertained the inflammability (flashing-point) of the petroleum. For the very moment inflammable gases begin to issue through the aperture under the little flame they ignite, and the flame is extinguished with little loss. The spirit-lamp is then to be put out, the lid to be removed, and the thermometer to be placed in the petroleum chamber now prepared for it. Now and then a burning match is quickly brought in contact with the petroleum, and, after blowing it out, the igniting temperature is read, when the whole surface will be in a blaze and continue burning.

The experiments made with this apparatus by several chemists have produced the most favorable—and in each case invariable—results.—*Chem. News*.

THE ACTION OF CERTAIN ORGANIC SUBSTANCES UPON THE ROSE COLOR PRODUCED BY THE SOLUTION OF PLATINIC IODIDE IN POTASSIC IODIDE.

By FREDERICK FIELD, F.R.S.

SOLUTIONS of starch, cane and grape-sugar, gum, dextrin, gelatin, glycerin, nitrous and oxalic acids, and many other substances have no perceptible action upon the rose color, even when they are highly dilute. Neither has urea nor uric acid; but urine, albumen, tannic, gallic, and pyrogallac acids, potassic cyanide and sulphocyanide, and the liquids in which meat or vegetables have been boiled, destroy the color with greater or less rapidity.

It occurred to me that these facts might have some value, as, although the results were not conclusive as to the actual existence of any one body in the liquid, the negative result, in this instance, viz., the non-change of color, would be a tolerable certain evidence of the freedom of the added solution from substances possessing a deleterious influence. Thus, although the presence of gallic or tannic acids would cause the disappearance of the tint, albumen, urine, sewage water, and the water of wells near a cesspool, would have a similar effect. The resistance of the color to the influence of the liquid would prove the absence of all the above substances, whether baneful or harmless.

A solution was made containing one part of platonic chloride in 500,000 of a very dilute solution of potassic iodide. 50 c.c. of the liquid were placed in a series of wide glass test-tubes, and a similar volume (50 c.c.) of the following were added to each, and thoroughly mixed. The original solution had a clear bright rose color.

Water from the Thames taken at high and low tide at Lambeth.—No great effect. There was a simple dilution of color owing to the addition of the colorless liquids.

Water from the various London companies.—No perceptible changes, but in one or two instances the color faded considerably in the course of twelve hours.

Water from the main drainage, after the sewer had been recently "flushed."—Speedy decolorization.

Water from same sewer, having a slightly disagreeable odor.—Instantaneous destruction of color, even when diluted with ten times its volume of pure water, i. e., 5 c.c. of sewage to 45 c.c. water.

Water in which vegetables and meat had been boiled.—Similar result.

1 c.c. urine added to 49 c.c. water destroyed the color after a few minutes.

1 c.c. solution of albumen prepared by dissolving the white of one egg in 200 c.c. water, immediately discharged the color from the platinum salt.

Dilute solutions of gallic, pyrogallac, and tannic acids.—Same reaction; as well as potassic cyanide and sulphocyanide.

Saliva also destroyed the color.*

On the contrary—

Solution of urea.	No effect
uric acid.	"
starch.	"
gum.	"
dextrin.	"
cane sugar.	"
grape sugar.	"
glycerin.	"
gelatin.	"
oxalic acid.	"
tartaric acid.	"
citric acid.	"
acetic acid.	"
carbon disulphide.	"
alcohol.	"

From the above experiments it would appear that many organic substances which speedily decompose potassium permanganate do not affect the platinum salt. As it was thought that the platonic iodide employed was rather too dilute, 1 part in 200,000, in place of 1 in 500,000, was employed. This solution has a rich ruby color, and seems affected in the same degree, though perhaps not quite so readily. The reaction of a solution of albumen is by far the most striking of any of the results mentioned above. The splendid red tint on the addition of a few drops of that liquid instantaneously disappears. This would be a good lecture experiment, although by no means conclusive of the existence of albumen.

Such are some of the observations which have been made, and must be regarded merely as observations, having, perhaps, no great scientific interest in themselves. It may be, however, of some importance to the chemist to know that an equal volume of water added to a solution of platinum iodide of the strength above given, and retaining its color, may be regarded as comparatively free from sewage contamination and from albuminous matters, although it may contain nitrites and nitrates. The water from wells, unfortunately near a cesspool, could thus be easily tested. The destruction of color might give a false alarm; the retention of tint would, to say the least, be consolatory.—*Chemical News*.

ON OZONE.

HAUTEFEUILLE and CHAPPUIS have further studied, by means of the spectroscopic, the formation and destruction of ozone with the following results: The absorption bands of ozone, pure and dry, and formed from oxygen free from nitrogen, disappear slowly at ordinary temperatures, rapidly at red heat; and this takes place whether the ozone is inclosed in a vessel or is in the form of a gaseous current, the spectrum finally becoming continuous without the appearance of any new lines. The same phenomenon is observed in the destruction by heat of ozone mixed with nitrogen, the latter not having been exposed to electrical influence. There is no indication of the formation of hyponitric acid. It is admitted that in ozonizing oxygen in the presence of nitrogen at low electrical tensions, no hyponitric acid is formed. But the authors find that in ozonizing at ordinary temperatures a mixture containing one-seventh nitrogen, there is always produced a new substance, indicated by remarkable absorption bands differing from those of electrified nitrogen, of nitrous, hyponitric, and nitric acids. If the gas be passed through water the latter becomes acid, and the gas shows the spectrum of ozone only. So, too, if the gas be not dry, the new lines rapidly disappear. The same gaseous mixture is quickly destroyed at red heat, the bands of ozone and of the new substance disappearing, and those of hyponitric acid appearing and persisting. If the slow decomposition at ordinary temperatures be followed with the spectroscopic, it is seen that the new bands disappear in from 24 to 48 hours before there is a trace of hyponitric acid. The latter then slowly appears; from which the authors conclude that the new substance decomposes into oxygen and nitric anhydride, and the latter into oxygen and hyponitric acid. Berthelot had observed that a mixture of hyponitric acid and oxygen subjected to electrical influence became colorless, and the authors, in repeating the experiment, find in the resulting mixture the new substance, but no hyponitric acid. They suggest the probable existence of a pernitric acid analogous to the persulphuric acid discovered by Berthelot.—*Comptes Rendus*.

ON NITRIFICATION.

SCHONBEIN attributed the formation of nitrates to the union of ozone and nitrogen, but Berthelot has stated that this union does not take place directly. Hautefeuille and Chappuis have shown, however, that it does take place under the influence of electricity of low tension with the production of a new substance, probably pernitric acid. The gaseous mixture was subjected to the influence of electricity of very low tension. The ozone was so diluted that it did not show absorption bands in a column two meters long, but there was a suspicion of bands of pernitric acid. When the current was heated with an alcohol lamp these appeared distinctly. The electrical tension was then increased as much as the apparatus would allow. The amount of pernitric acid formed increased progressively, but no hyponitric acid was obtained directly. The authors suppose that the formation of hyponitric acid, even at high tensions, may be due to the decomposition of pernitric acid by the greater heat of discharge.

Studying the effect of heat alone upon pernitric acid, they find that it is decomposed at all temperatures, but that at 130° the decomposition is completed in a few seconds, yielding oxygen and hyponitric acid. In order that the formation of pernitric acid should take place in the atmosphere, the presence of water vapor must be no obstacle. The authors found, however, that the absorption bands of pernitric acid did not appear if the gas was not perfectly

* I am not aware that it is generally known that iron cannot be recognized in urine (the metal as a ferric salt) by means of potassic sulphocyanide, unless excess of hydrochloric acid is present. This must be due to the phosphates, which destroy the red color. Potassium sulphocyanide exists in saliva, and it is a well-known experiment to add a drop of ferric chloride to that secretion and mark the characteristic tint. If a trace of sodic phosphate be present there is no change of color, which is developed, however, on the addition of hydrochloric acid.

dry, but in this case liquid acid condensed upon the walls of the containing vessel. Thus by passing three liters of air with water vapor through the apparatus, they obtained 0.054 gramme of nitric acid. From these experiments it is seen that nitric acid may be formed under varying conditions by the union of oxygen, or ozone, and nitrogen under the influence of electricity of low tension, pernitric and hyponitric acids being intermediate products.—*Comptes Rendus*.

HOW WE ARE POISONED.

At a recent meeting of the Lancaster, Pa., Agricultural Society, Dr. C. A. Greene read a paper on the above subject in which we find the following:

Thousands of persons die every year from poisons taken into the stomach. I propose briefly to show in what manner it is done, and also to show that thousands of persons also suffer pains, some of them almost indescribable, from the absorption of poisons into the body. On the outside of the body are millions of little holes called absorbents, which have the power like a suction-pump of drawing into the body almost anything that may come in contact with the skin. Hence it is a self-evident fact that under no consideration should poisons of any kind be handled nor should they be taken into the alimentary canal. The object of a man or animal's stomach and intestines is to convert food into blood, and any foreign substance in these organs acts (like a splinter in the flesh) irritantly. Hence they are contraindicated. Newspapers throughout our commonwealth often publish receipts and items on physiology that are truthless and worthless and often exceedingly injurious. In a March number of the Philadelphia *Record* sulphate of zinc and foxglove (or digitalis) are called a sure remedy for smallpox, and yet both of them are powerful poisons; one grain of foxglove, which is the 1480th part of an ounce, has been known to produce vertigo, extreme pains, dimness of vision, and a reduction of the pulse from 80 to 40 beats a minute. In the same issue was the following receipt:

"A solution of oxalic acid is the best for scouring and polishing copper. Finish with whiting."

Now as editors are not chemists or physicians, why will they in this reckless manner give such statements to their readers? The blacksmith who never saw an astronomical instrument does not force his crude conceptions of celestial bodies upon the people. Oxalic acid is also a very dangerous poison, and only a few grains of it taken into the stomach will produce disastrous symptoms and death, and merely handling it may introduce into the system sufficient to produce thousands of unnecessary pains and aches. It should never be found in your home; it is as dangerous as a rattlesnake.

COPPER UTENSILS.

Many farmers do a large amount of cooking for themselves and their cattle, poultry, etc., in copper and brass kettles. Any of them when not used for a time are lined with verdigris, called in the books subacetate of copper, also oxide of copper, and it is soluble in water and is a virulent poison. Brass kettles are made from copper and zinc. Any acid will always act upon metals. If you stew apples, cranberries, tomatoes, or any fruit or vegetable that is of an acid nature, the acid eats or corrodes the copper or zinc and forms usually acetate of copper or zinc. No matter how small the quantity swallowed it is a foreign substance, as well as poisonous and produces indigestion. The acid of apples is called malic or sorbic acid, and if it comes in contact with copper, zinc, lead, or tin, will produce malate of copper, zinc, lead, and tin. The fermentation of apples or cider, made from apples, produces vinegar, which is dilute acetic acid, and it will also produce the same chemical changes if it has the opportunity, and the results will be acetate of copper, acetate of zinc, lead, or tin. When the milk becomes sour it produces lactic acid, which will act in the same manner as the two acids, and form lactate of copper, lead, zinc, and tin, and all of these metals are poisonous, and every one injures the health of the individual who has eaten them in his or her food. Dyspepsia in some of its forms, paralysis, neuralgia, and affection of the organs of the body, are the sequences. I would as soon have a copperhead snake in my house as a brass or copper utensil for cooking purposes. If they are scoured ever so clean, the acid will act upon them even more readily. It is a common occurrence when pickles become a little changed in the spring, to put pickles and vinegar in a copper or brass kettle and boil them for a time and they come out much improved in appearance and handsomely greened. This bright color is acetate of copper. Tin vessels also lose their luster by long exposure, and forms a poison called oxide of tin. Lead pipes have been used for many years to convey drinking water; if it stands for some time in the pipe the oxide of lead is formed, and any one drinking it is poisoned.

The quail and partridge in the cold winter months eat poison berries, and in this way they contaminate their flesh and injure the health of the one who eats it. Acetic acid is distilled vinegar. If you take one pint of acetic acid and seven pints of water, and unite together, you have eight pints of vinegar.

SOAP.

Some soap makers, regardless of the consequences, take the tallow or fat of diseased animals and make them into soap. The unchanged virus is absorbed into the body while being used for washing purposes. If you cook lemons in a brass or copper kettle, the acid of the fruit, called citric, will act upon the metals in the same manner and form citrate of copper, zinc, etc.

HAIR BRUSHES.

Many persons use the hair brush of another individual, or the barber uses upon a hundred or a thousand heads the same brush. If any of his patrons have tetter, eczema, syphilis, or other skin disease, it can be readily conveyed to any one whose head is briskly rubbed with it. In the above and many other ways are poisons conveyed into the body, and the victim of the virus may suffer all his life from the effects. I have brought for inspection some of these poisons, and to show how small a quantity of copper will by the laws of affinity make itself known. I propose to add one drop of a solution of nitrate of copper to one hundred drops of water, and then add one drop of aqua ammonia to the colorless liquid, and it will at once become beautifully blue. I will conclude by saying that there is a friend of mine in this city who has over 100 tumors on his body occasioned by his handling paints.

At the close of his essay Dr. Greene made a number of chemical experiments with the poisons referred to in the essay.

Mr. Engle said it was news to him that the souring of milk in tin cans produced a poisonous acid, and yet there seemed to be no doubt it would do so.