DESTRUCTION OF LEATHER BY GAS.

By GEORGE E. DAVIS.

MORE than two months ago one of my clients brought me some books (cash books) which had been in daily use from 1855 to 1858 in a large office in Manchester. In the beginning of 1858 they were placed uncovered upon a shelf near the ceiling, where they remained until August, 1877. These books had been strongly bound in rough calf, and had red-basil lettering-pieces. Upon knocking the books, the leather from the backs came off as a mixture of dust and small pieces, which were very acid to test-papers.

Some of the leather carefully scraped from the back was treated with hot water, when it yielded a substance more nearly resembling India rubber than anything else I have ever seen; this, though, only when wet, for when dry the mass was very brittle and easily powdered.

The aqueous solution contained:—

	Per cent.
Combined SO ₂	2.847
Free SO ₂	1.920

The red-basil lettering-piece was next examined, and found not altered much in strength, though it had suffered somewhat. The leather on digestion with water had evidently undergone but little change, as the pieces retained their shape; the aqueous solution contained:—

	Per cent.
Combined SO ₂	0.99
Free SO ₂	0.87

The piece of leather underneath the letter-piece was next examined, as it was thought that the lettering-piece would have acted as a filter and kept back the SO₂ from the leather beneath it. It was very strong, though perhaps not quite as strong as new leather, and when treated with water the filtrate contained:

	Per cent.
Combined acid.....	0.39
Free acid.....	0.76

Now, knowing that all bookbinders use alum in the paste and that rough calf is tough to work, and therefore the paste is often put on in excess and allowed to soak in, it was thought advisable to examine another book in rather a different manner.

The back was scraped off and treated as before; part was boiled with soda, when it yielded 1.32 per cent. of ammonia.

	Per cent.
Combined acid.....	3.46
Free acid.....	2.18

The red-basil lettering-piece gave—

	Per cent.
Ammonia.....	1.28
Combined acid.....	0.87
Free acid.....	1.04

Here it will be seen that the ammonia is in excess of the acid necessary to form a sulphate; but it must be remembered that all lettering-pieces were in those days glazed over with "glaze," or white of egg.

A large piece was cut from the side of the book, and this side was not freely exposed to the air during the twenty years it remained on the shelf; therefore it only received the products of combustion, due to the circulation of air through the pile of books. This piece from the side gave:—

	Per cent.
Ammonia.....	0.46
Combined SO ₂	1.85
Free SO ₂	0.64

I am now repeating these experiments upon new leather, the results of which I will communicate when finished.—*Chemical News.*

Manchester, Oct., 1877.

ACTION OF SULPHURIC ACID AND OXIDIZING AGENTS ON MORPHIA AND ITS SALTS.

By DAVID LINDO.

OF the various tests for morphia, the color produced by oxidizing agents does not appear to have met with the attention it deserves. The well-known tint produced by adding nitric acid to the alkaloid or its salts is evidently the result of oxidation.

When the action of the acid is controlled in a manner to be presently described, a much deeper and more permanent red color is developed than can be obtained by applying the test in the ordinary way. Fresenius quoting from Otto makes the following reference to this modification of the nitric acid test:

"If morphia, or a compound of morphia, is treated with concentrated sulphuric acid and heat applied, a colorless solution is obtained; if, after cooling, 8 to 20 drops of sulphuric acid mixed with some nitric acid are added, and 2 or 3 drops of water, the fluid acquires a violet red coloration; gently heating promotes the reaction."

He then goes on to describe the further action produced on the addition of binoxide of manganese, or chromate of potash, either of which it is stated will develop a deep mahogany brown color in the mixture. The reaction with nitric acid and other oxidizing agents can be produced in the following simple manner:

Place a grain of morphia or any of its salts (I used the muriate in my experiments) in a small porcelain dish, add 20 minims in pure concentrated sulphuric acid, and apply a gentle heat for a few seconds. Let the mixture cool a little, then add cautiously 60 minims of distilled water. If a drop of this mixture is placed on a white porcelain surface and touched with a slender glass rod moistened with nitric acid, a beautiful deep red color will be developed, which remains unchanged for a considerable length of time.

The reaction is not confined to nitric acid; every oxidizing agent I have tried produces the same red color if applied to a solution of morphia in sulphuric acid prepared as above. All the following substances can be used in this way as tests for morphia: Iodic acid, ferricyanide of potassium, bichromate of potash, chlorate of potash, and most of the nitrates.

These reagents are best applied in small quantities in the solid state. Binoxide of manganese, peroxide of gold, and peroxide of lead can also be used.

It is indispensable that the concentrated sulphuric acid should be allowed to act on the morphia, or its salt (aided by a gentle heat), before water is added, for if the alkaloid or its

compound is dissolved at once in dilute sulphuric acid, the reagents will produce little or no effect on the solution.

If the tests are applied to a solution of morphia (or its salt) in concentrated sulphuric acid, to which solution no water has been added, some of them will not act at all, and others will produce reactions which are very well known already. On adding iodic acid, for instance, iodine will be set free; and a green color will be developed with bichromate of potash from reduction of the chromic acid.

The smallest visible quantity of morphia or its salts in the dry state can be tested by the method I have proposed. It is merely necessary to heat the particle gently with a small drop of sulphuric acid, add 2 drops of water afterward, and apply any of the oxidizing agents named above to the solution.

I give the preference to iodic acid, ferricyanide of potassium, nitric acid, and the nitrates; when the latter are used it is sometimes necessary to apply a gentle heat.—*Chemical News.*

LIQUEFACTION OF ACETYLEN.

By M. CAILLETET.

WHEN acetylen is compressed, its initial temperature being +18° at the pressure of 83 atmospheres, numerous drops are formed and flow along the inner sides of the tube. If the pressure is reduced some atmospheres the liquid is suddenly resolved into gas, and the tube is for a moment filled with a dense mist. Liquid acetylen is colorless and very mobile; it seems to refract light strongly; it is much lighter than water, in which it dissolves to a large extent. It dissolves paraffin and fatty matters. If liquid acetylen is cooled to zero in presence of water and linseed oil, there is formed a white, snow-like solid, which is again destroyed if gently heated, or if the pressure is reduced, with the evolution of numerous bubbles of gas. Acetylen is liquefied at the following pressures:—

At + 1°	48 atmospheres.
2.5°	50 "
10°	63 "
18°	33 "
25°	94 "
31°	103 "

Hydride of ethylen at +4° is liquefied at 46 atmospheres.

ALTERATION OF EGGS.

By A. BÉCHAMP and G. EUSTACHE.

HENS' eggs may be preserved for a long time in a medium abounding in infusoria without these being able to traverse the shell and penetrate into the interior. But microscopic moulds can penetrate both the shell and its lining, and develop themselves in abundance on its internal surface.

ACTION OF WATER CONTAINING CARBONIC ACID UPON CERTAIN MINERALS AND ROCKS.

By DR. J. MULLER.

THE minerals and rocks examined were adular from St. Gothard, oligoklas from Ytterby, hornblende rock from Altenburg, magnetic iron ores from the Zitterthal and from the Kaschberg in Bohemia, mercurite from Hammond, in St. Lawrence County; apatite from Katharinenburg; asparagite from Chili; olivine rock from the Ulenthal, in Tyrol; noble serpentine from Snarum. All these rocks and minerals were decomposed by water containing carbonic acid. Lime, potassa, soda, and the protoxides of iron, manganese, nickel, and cobalt were converted into carbonates. When alkaliferous silicates, such as adular and oligoklas, were acted on, small quantities of silicic acid were dissolved, probably as hydrate. Even alumina was dissolved in a minute quantity. The reddening of felspar is the first stage of decomposition, and the formation of kaolin the second. Augmented pressure promotes the action of carbonic acid water more than increased time. The behavior of magnetic iron ore with hydrochloric acid throws no light on its decomposibility by carbonic acid water. Apatite dissolves much more readily in such water than might be expected from its appearance under the microscope.

SODIUM SALICYLATE.

By GEORGE W. KENNEDY, Ph. G.

SODIUM salicylate having rapidly gained favor in my section of Pennsylvania as a remedy for rheumatism, I have been compelled to make it for the use of our practitioners. At first my method was to saturate the acid with sodium bicarbonate at the time of dispensing the prescription. This plan was slow and unsatisfactory, and to replace it I have devised the following: Take of solution of pure white caustic soda, of 20 per cent. strength, at pleasure; saturate with salicylic acid of known purity by adding the acid until no longer dissolved; filter, and evaporate on a water-bath until, by stirring, a fine white powder is obtained.

As thus prepared, salicylate of sodium is freely soluble in glycerin, making a straw-colored solution, and in water to the amount of 50 per cent., which solution is yellowish, of a sweetish taste at first, becoming quite acid and unpleasant after a little time. It is insoluble in the fixed oils, oil of turpentine, benzoin, and bisulphide of carbon, sparingly so in ether and 95 per cent. alcohol, though more freely when hot. Its exhibition in the dose of about 30 grains daily has been attended with some quite remarkable effects in some cases of rheumatism in which other remedies have failed.

SIMPLE MEANS OF DISINFECTION.

By A. ECKSTEIN.

THE author considers chloride of lime the most powerful agent for deodorizing privies. He proposes to use it wrapped up in parchment-paper to prolong its action. He found that the aqueous solution of 1 kilo. of copperas destroyed the odor of H₂S in a privy used daily by at least 100 persons. After twelve hours the action was at an end. The action of sulphate of copper was similar. 1 kilo. of solid copperas acted for two days. 1 kilo. of a mixture of copperas and sulphate of copper with carbonate of lime acted for two days. Liquid sulphurous acid acted very rapidly; for one hour it was oppressive to breathe, and its action had disappeared after twenty-three hours. Crude carbolic acid added to the extent of 30 grms. diffused so unpleasant a smell for two days that its local action could not be observed. 1 kilo. of copperas in a bag of parchment-paper only

began to act in two hours, and kept the place inodorous for three days. 1 kilo. of good chloride of lime in a similar bag acted perfectly for nine days. 60 grms. permanganate of soda acted immediately, but its effect ceased in twenty-four hours. If inclosed in parchment-paper it was efficacious for two days. Chloride of lime along with sulphuric acid is pronounced the most powerful disinfectant (deodorizer?) known.

PHOTOGRAPHS IN NATURAL COLORS.

By DR. H. VOGEL.*

IN my last communication I spoke of the remarkable so-called prismatic photographs in natural colors which Albert, of Munich, exhibited in the Nurnberg Exhibition, which have been the subject of a great deal of discussion. As I hear, the matter has already been ventilated in the general newspapers, and the statement has gone forth that photography in natural colors is already an accomplished fact. Nay, more. The public have already begun to ask for photographs in natural colors at the Berlin studios. I do not know personally what has been written on the subject, for it appeared in my absence; but as the pictures have at any rate been a good deal talked about, it will interest everybody to know something more about the prints in question. Herr Albert, during my sojourn in Munich, permitted me to see everything in the most friendly manner, plates, originals and proofs, and communicated to me sufficient of the process to permit me to form a judgment upon it.

The Albert pictures are in no way photographs of colored pictures taken direct from nature, but are simply prints in colors. If three pigments are used—red, blue and yellow—upon the same ground, all sorts of tints may be secured. If red is withheld, then green is the result; if all three pigments are printed off upon one and the same spot, then a sort of black is produced; if red and blue alone are used, violet is the result. Every picture may be regarded, therefore, as the result of mixing up red, blue and yellow, colors which are used in different quantities throughout. If one will imagine for an instant a colored carpet with a ground of aniline-red, yellow border, and green flowers, you have in the aniline-red a mixture of red and blue, in the yellow, as a rule, a mixture of yellow, some red, and a little green, and in the green a mixture of yellow and blue.

A skillful printer in colors reproduces a pattern of this kind by preparing several stones. Upon one he merely sketches the green flowers, on another only the aniline ground, and on the third only the yellow border. All three stones are then printed off upon the same paper, and yield a chromolithograph. It is exactly in this way that Obernetter does his work; only instead of stones he employs for his work Lichtdruck plates, and instead of sketching he prints off portions of a negative in certain tints.

Albert proceeds in this manner—he prints with three different Lichtdruck plates the three colors, red, yellow, and blue, one upon the other. He produces his three-color plates in a very original manner. The process comes originally from that of M. Ducos du Hauron, who, three years ago, essayed to prepare colored pictures by taking three negatives, secured respectively through red, green, and violet glass. In the negative taken through red glass the red light was supposed to be strongest; but, unfortunately, as we know, red light is very inactive. By making use of my discovery, however, Ducos was enabled, by the aid of tinted collodion, to secure three suitable negatives.

Albert proceeds in a similar manner. He produces three negatives, the first with a collodion which is sensitive for all tints with the exception of red; this subsequently produces a Lichtdruck plate for red. A second negative is secured with a collodion which is sensitive to all colors excepting yellow; and the result is a Lichtdruck plate for yellow. Finally, a third negative is secured, on which all colors excepting blue act; and from this a Lichtdruck plate for blue is secured.

Photographers will probably remark, in regard to the last, that such is an impossibility—that there is no plate or collodion which is insensitive to blue. To a certain extent they are right, but Albert helps himself in this way. He takes his picture through colored glass—a yellow glass put before the lens, for instance—cuts off the blue rays, and allows all others to go through, and it is then merely a question of making the collodion sensitive for all other colors—red, yellow, and green. This is done, as I have shown, by the addition of certain well-chosen substances. Thus, aldehyde green renders collodion sensitive to red rays, aniline-red makes it sensitive to yellow, and eosine to green. Of course, the manipulation of these pigments in collodion is by no means easy; they ruin the dipping-bath, and the plates require long exposures, while other defects crop up. That the problem may be practically solved, however, Albert has shown us; he has produced negatives of colored patterns in which the blue is the most transparent, and upon which, moreover, no traces of the retouching brush or pencil are to be seen.

Next comes the question as to the nature of the pigments to be employed in printing. There are, for instance, a hundred sorts of blue by means of which blue prints can be obtained, and the same may be said of blue and yellow. Which shall be taken? That which approaches most nearly to the original, is naturally the answer. And so it happens. The printer chooses the color to the best of his ability, and thus produces the nearest approach to the original; but he is not employing natural colors. The natural color of the original has, it is true, contributed to the production of the negatives; but it has nothing to do with the printing from the Lichtdruck plates. This is an operation entirely independent from the rest, and if the copies are like the original this is due to the skill of the printer in matching the colors; the finished tint is more or less like nature, but nature has had nothing to do with their application. So much must be said on the score of truth, although I do not wish to detract one jot from Albert's very difficult and interesting *modus operandi*.

AMONG the impurities recently detected in the waters of the Rhine by Dr. Vohl, of Cologne, are large quantities of arsenious and phosphoric acids. The latter is a valuable fertilizer, and its removal to the sea in this manner is detrimental to the German soil. The arsenious acid is supposed to come from the dyeing establishments in the Rhine Valley.

A CAREFUL series of experiments by Professor J. Plateau, of Ghent, indicates that insects are never so far deceived by artificial flowers as to alight upon them in search of food. It is probable, however, that the bright colors of such flowers serve to attract insects from a distance into their neighborhood.

*Photographische Notizen.