

THE YOUNG CHEMIST.

LESSON V.

CHLORIDE OF SILVER.

MATERIALS AND TESTS REQUIRED.—Some glass tumblers, glass rods, test tubes, distilled water, a solution of common salt, a solution of ammonia (hartshorn) in a stoppered bottle, a solution of hyposulphite of soda. Hydrochloric acid in a stoppered bottle, sulphuric acid in a stoppered bottle, some chloride of lime, (bleaching powder) in a corked bottle, a solution of chloride of potassium.

The young chemist should make his own solutions when the substance to be dissolved is a solid; for this purpose add as much of the solid to distilled water as the latter will dissolve. Chloride of silver—the white curdy precipitate generated by bringing nitrate of silver into contact with common salt, as explained in Lesson II—is never thrown away in laboratories, but is preserved and reduced, when the quantity accumulates, to metallic silver. It must not be regarded therefore as a mere casualty, but as a substance of very great importance, and the starting point of further lessons in analysis.

Prepare some chloride of silver, by adding a solution of common salt to a solution of nitrate of silver, in a glass tumbler; it may happen that the chloride will not settle at once, but assume a milky appearance; on agitating the tumbler the small particles of the chloride will adhere to each other, leaving the fluid quite clear. No other precipitate has this peculiar flocculent appearance to such an extent as chloride of silver.

Take some of the newly prepared chloride of silver, and expose it to the sun's rays, it will speedily become black; this is another evidence either of chloride of silver or of a few other silver salts which will be described hereafter. It has been seen in Lesson II, that ammonia (hartshorn) dissolves chloride of silver, but there is another solvent for it, the hyposulphite of soda, which is extensively used in photography.

Add a little of the solution of the hyposulphite of soda to a small quantity of the chloride of silver; before the chloride becomes black from exposure to the light it will speedily be dissolved. Now take some chloride of silver which has been blackened, and it will be found that the blackened portions are no longer soluble in the hyposulphite of soda. It will from this experiment be easy to understand the chemical fact on which photographic art is based; for when the paper, or the collodion film on glass, impregnated with the chloride of silver, is exposed to the action of the light, wherever most light falls there will result most darkening, and the reverse. Now if the paper or collodion plate in this stage be exposed to the dissolving agency of hyposulphite of soda, it follows that that portion of the chloride darkened would remain untouched while the non-darkened part would be dissolved out.

Chloride of silver has been hitherto generated by bringing a solution of chloride of sodium (common salt) into contact with nitrate of silver, but, generally speaking, any substance which contains chlorine will also afford a precipitate of chloride of silver when brought into contact with a silver solution, not containing ammonia.

In illustration take a solution of chloride of potassium (chlorine and potassium) and add it to a little of the nitrate of silver solution, observe that a precipitate occurs endowed with all the properties possessed by the precipitate generated when common salt (chloride of sodium) was used.

Again dip the end of a glass rod in a solution of nitrate of silver, and hold it over the unstoppered mouth of the hydrochloric acid bottle; the fumes arising from the acid will decompose the silver solution on the rod, and it will become covered with a deposit of chloride of silver which being washed off may be proved to be so, by the tests already described.

Again, pour a drop of hydrochloric acid into a test tube, add to it a little of the nitrate of silver solution, and remark again the deposition of chloride of silver. These last two experiments demonstrate that hydrochloric acid contains chlorine. Take now, of powdered chloride of lime (bleaching powder) as much as will lie on a ten cent piece, and having put it carefully into a dry test tube without soiling the sides of the tube, drop in again, without touching the sides; one drop of sulphuric acid (oil of vitriol); take a glass rod moistened with the nitrate of silver solution, and hold it over the mouth of the test tube, it will be found that chloride of silver forms on the rod, caused by the

chlorine set free by the sulphuric acid from the bleaching powder (chloride of lime). It has now been demonstrated that a soluble silver salt is a test for chlorine in many states.

1st. It has been demonstrated a test for chlorine when the chlorine exists in solid combination with other elements, viz. chloride of sodium and chloride of potassium.

2nd. It has been demonstrated to be a test for chlorine in a state of liquid acid combination and in a state of acid gaseous combination, namely, hydrochloric acid and the gaseous fumes or vapour of hydrochloric acid escaping from a bottle containing that acid; and lastly, it has been demonstrated to be a test for chlorine when the chlorine is uncombined with any element, as proved by the experiment with the chloride of lime.

Hence it may be stated that soluble silver salts (that is, silver in combination with an acid) are tests for chlorine in every condition of vapour, gas, or fluidity.*

J. W. F.

STRANGE STORIES.

FROM a recently published work entitled "The Romance of London," a collection of scenes, adventures and vicissitudes associated with the great city, we extract the following strange stories:—

In the public life of the metropolis, the pugnacity of Lord Camelford most strangely displayed itself. On the night of April 2nd, 1799, at Drury Lane Theatre, he assaulted and wounded a gentleman, for which assault a jury of the Court of King's Bench returned a verdict against him of 600*l*. Soon after this affair he added an attack upon four watchmen in Cavendish Square, when, after an hour's conflict, his lordship and the other assailants were captured, and, guarded by twenty armed watchmen, were conveyed to the watch-house. In another freak of this kind, on the night of a general illumination for Peace in 1801, Lord Camelford would not suffer lights to be placed in the windows of his apartments at a grocer's in New Bond Street. The mob assailed the house with a shower of stones at the windows, when his lordship sallied out, and with a stout cudgel kept up a long conflict, until he was overpowered by numbers, and retreated in a deplorable condition. His name had now become a terror. Entering, one evening, the Prince of Wales's Coffee House in Conduit Street, he sat down to read the newspapers. Soon after came in a conceited fop, who seated himself opposite his lordship, and desired the waiter to bring a pint of Madeira, and a couple of wax candles, and put them into the next box. He then drew to himself Lord Camelford's candle, and began to read. His lordship glanced at him indignantly, and then continued reading. The waiter announced the fop's commands completed, when he lounged round into the box and began to read. Lord Camelford then, mimicking the tone of the coxcomb, called for a pair of snuffers, deliberately walked to his box, snuffed out both candles, and his lordship deliberately returned to his seat. The coxcomb, boiling with rage, roared out "Waiter! who is this fellow that dares to insult a gentleman? Who is he? What do they call him?" "Lord Camelford, Sir," replied the waiter. "Who?" "Lord Camelford!" returned the fop, in a tone of voice scarcely audible, terror-struck at his own impertinence. "Lord Camelford! What have I to pay?" On being told, he laid down the money, and stole away without daring to taste his Madeira.

The following humorous sketch describes the attempt made in the year 1738 to exclude the ladies from the gallery of the House of Lords, and the signal and most merited failure in which so ungallant an attempt resulted.

"The ladies, headed by Lady Huntingdon, the Duchess of Queensbury, Lady Westmoreland, Lady Cobham, Lady Archibald Hamilton, Lady Charlotte, Edwin, and others, presented themselves at the door at nine o'clock in the morning, and were informed by Sir William Saunderson that the Chancellor had made an order against their admittance. The Duchess of Queensbury, as head of the squadron, pushed at the ill-breeding of a mere lawyer, and desired him to let them up stairs privately. After some modest refusal he swore he would not let them in. Her Grace, with a noble warmth, answered that they would come in, in spite of the Chancellor and the whole House. The

stratagem by which their entrance was at length secured, reflects great credit on their sagacity.

"The Amazons showed themselves qualified for the duty even of foot soldiers! they stood there till five in the afternoon, without sustenance, every now and then play lug volleys of thumps, kicks and raps against the door, with so much violence that the speakers in the House were scarce heard. When the Lords were not to be conquered by this, the two Duchesses (very well apprised of the use of stratagem in war) commanded a dead silence of half an hour; and the Chancellor, who thought this a certain proof of their absence (the Commons also being very impatient to enter), gave order for the opening of the door; upon which they all rushed in, pushed aside their competitors, and placed themselves in the front rows of the gallery. They stayed there till after eleven, when the House rose; and during the debate gave applause, and showed marks of dislike, not only by smiles and winks (which have always been allowed in such cases), but by noisy laughs and contempt,—thus completely triumphing over the tyrannical Chancellors, and illustrating the well known couplet.

When a woman wills, she will, you may depend on't.
When she won't, she won't, so there's an end on't.

REMARKABLE SWIMMING FEAT.—Dr. Dulk, who is forty-five years old, has carried his plan of crossing the Lake of Constance at its greatest width about with him for five years, and only this year succeeded in it. In July, 1860, he had gone more than half the distance, and been for three hours and a half in the water, when a thunderstorm arose, and the lake became so disturbed that Dr. Dulk thought it wise to give up the attempt. In 1863 the very same thing happened again; after the bold swimmer had already spent three hours in the water, a violent wind agitated the waves of the lake in such a manner that he had to return. At length, in 1865, the feat was accomplished. A boat followed at the distance of twelve feet; the swimmer only stopped once, to swallow a little wine handed to him from the boat. Arrived on the other shore, and landing near the Castle of Friedrichshafen, Herr Dulk enjoyed a good draught of beer, and afterwards felt no other inconvenience than that of his face and back having to wait for a new skin, the old one having been completely scorched off by six hours and a half exposure, under an almost tropical sun.

A SECRET FOR AMATEUR GARDENERS.

IT spoils the bellows when the boy cut them open to see where the wind was, but it never hurts a cutting to take it out at any time that it may be done without injuring the incipient roots. Suppose you find the roots pushing like teeth or claws, your best course is at once to pot them all separately, and shut them up in a frame over a gentle bottom heat. It may be that the roots have not yet begun to push, but if you examine one you will certainly see that the edges of the shield are thickened by the process of granulation, which is designated the formation of a "callus." This is a necessary preliminary to the formation of roots, and you may always pot cuttings and eyes of all kinds as soon as the callus is formed, without waiting for roots; indeed, if the potting could always be done at this stage, it would be better than afterwards, for as there would be no roots to injure, there would be none of that double tax put upon the cuttings which happens when in the potting the tender roots get bruised or broken. Some people handle newly rooted cuttings as they would handle a birch broom; and no wonder if they are found among the correspondents who ask if we can tell them why their plants died a week after they were potted off. In case all this is Greek, or Timbuctoo, or unknown tongue to any body who has got a lot of eyes from rose trees in the progress of making plants, I can give you an infallible rule for the right time to pot them off—a rule which cannot be misunderstood, and which can be told in a word. Pot them as soon as the leaves begin to wither, and when you see the eyes pushing into growth. The perishing of the leaf is, when the matter is properly managed, the best sign you can have that your labour has not been in vain. It is the same with cuttings—the shedding of the old leaves is a sign you may pot them, for they intend to grow; if they intend to die, probably the old leaves would hold on tight to the last.—*Lilbert's Gardeners' Magazine.*

* There are a few exceptions, but it is not well to mention them here.