

INSTRUCTIONS.

The successful performance of Chemical Experiments depends mainly on the perfect cleanliness of the Apparatus employed. Before commencing a fresh experiment, be careful to remove all trace of the one you have been engaged upon, by repeatedly washing the test-tube, wine-glass, etc., in clean water, removing any adhering particles, by means of a small brush or piece of stick. It is generally necessary to make a solution of the various Salts, to insure Chemical action between them (in Chemistry the term Salt is applied to any substance which contains an acid and a base). To make a solution, place a small quantity of the Salt named in the test-tube, a clean phial, or water glass, and add to it one or two teaspoonfuls of Distilled Water (this can be purchased very cheap of any chemist, but rain water, or water that has been boiled and allowed to cool, will answer very well for the experiments here given). It will be found convenient to procure a few small phials, and to make solutions of the various Salts before commencing the experiments; but see that the phials are perfectly clean, and to prevent mistakes put a label on each.

EXPERIMENTS.

No. 1. **Mimic Lightning.**—Introduce some of the Lycopodium into one end of the glass tube; if you now hold this end in contact with the flame of a candle and blow through the other end, the Lycopodium will be projected with some force, and becoming ignited in its passage through the flame, will produce a long flash like lightning.

No. 2. **Waterproof Hands.**—Throw a coin or other object into a basin of water, and having well rubbed the hands with Lycopodium, you may remove it from the water without wetting the hands.

No. 3. **Watery Globules.**—Rub the surface of a sheet of paper with Lycopodium, and sprinkle over it a little water. This will not as usual fall flat upon the surface, but will form into little globules, which may, by tilting the paper, be made to run up and down its surface.

No. 4. **The Lead Tree.**—Dissolve half the quantity of Acetate of Lead contained in the box in a wide-mouth phial of distilled water, filter the solution, and suspend in it by means of thread or fine wire passed through the cork two or three pieces of zinc, so as to hang about half-way down; place the bottle where it will not be disturbed, and in a few hours the lead will be reduced in a beautiful tree-like form on the zinc, owing to the Acetic Acid in the Acetate of Lead having a stronger affinity for the zinc than it has for the lead.

No. 5. **Metallic Combustion.**—Hold some zinc turnings in the flame of a candle; they will burn with a beautiful blue flame, and give off a white powder (called "Philosophers' Wool"), which is Oxide of Zinc.

No. 6. **Flash of Light by Galvanism.**—Place a half-crown as high up the cheek as possible, and then place a piece of sheet-zinc on the tongue; if you now let the two metals touch, a bright flash of light will be perceivable across the eye near which the metals are placed.

No. 7. **A Ring suspended by a Burnt Thread.**—Soak sewing-cotton in a strong solution of Alum; when dry attach a light ring to it; if you now set fire to the thread the ring will still remain hanging by it, although the thread is burnt to ashes.

No. 8. **Production of Coal Gas.**—Fill the bowl of a common tobacco-pipe with coal-dust, cover it with sand or clay, and place it in the fire; when hot, a stream of coal gas (carburetted hydrogen) will issue from the stem of the pipe, which if kindled will burn for some time.

No. 9. **To Prepare Litmus Paper.**—Dip some strips of white blotting paper in a solution of litmus, prepared thus:—Dissolve some litmus in a clean phial of cold water, shake it for a few minutes, and allow it to settle, pour off the clean liquid into a saucer, and when the strips have been dipped into it, hang them up to dry and then keep them between leaves of a book.

No. 10. **Tests for Acids.**—Take a piece of blue litmus paper, and dip it into beer, vinegar or any other fermented liquid; it will turn red, thus showing the presence of Acid.

No. 11. **Deflagration.**—Take one part of charcoal and three parts of nitrate of potass and mix them well together, throw this on some live coals, and a brilliant combustion will take place.

No. 12. **Blue Signal Light.**—Mix six parts of the nitrate of potass, two of sulphur, and one of sulphuret of antimony, place it on a piece of tin and apply a lighted match, a beautiful blue light will be the result. This can be seen at a great distance.

No. 13. **Crimson Light.**—Heat a little nitrate of strontia in a small iron ladle or spoon over the gas until it is quite dry, remove it, and allow it to cool, then pour upon it a teaspoonful of methylated spirit, again place the ladle over the gas, and set fire to spirits in the ladle. They will burn with a splendid crimson flame. If the salts in this experiment are dried, they will serve again.

No. 14. **Artificial Thunder.**—Mix together some chlorate of potass and about half as much sulphur, place a little of the powder on the top bar of the grate, in a few minutes it will explode with a loud report.

No. 15. **Crystallization of salts.**—Wash over the surface of the slip of glass, a hot saturated solution of Chloride of Ammonium; the moisture will almost immediately be evaporated, and the salt deposited in a very beautiful radiated crystalline form. If you look at it through a pocket lens or a microscope, its beauties will be greatly enhanced.

No. 16. **Ruby Crystals.**—Proceed as in the above experiment, using Bichromate of potass; instead of the Chloride of Ammonium, and the result will be a beautiful ruby-coloured crystallization.

No. 17. **Test of Alkalies.**—The Alkalies are soda, ammoniac and potash; if red litmus paper be dipped in any solution of the above it will turn blue.

No. 18. **To render Paper Fireproof.**—Soak a piece of paper several times in a strong solution of alum, each time drying it thoroughly before immersing it again, if this prepared paper be held in a flame of a candle it will remain whole.

No. 19. **To Make Red Dye.**—Make a strong solution of logwood and alum by pouring boiling water on them. Articles when dipped in this solution will be dyed red.

No. 20. **Paper Caps.**—Mix equal parts of Chlorate of Potass and Sulphuret of Antimony thoroughly together into a paste of the consistency of cream, with the point of a stick, place drops, about the size of a large shot, in rows on a piece of paper. When they are dry gum another piece of paper on the top, and when this has dried, hold the whole up to the light and cut squares out of it, so as to leave one drop in each; these if struck with a hammer, will denote with a loud noise.

No. 21. **Bombs.**—If Chlorate of Potass and Sulphur are screwed up tightly in a piece of paper, and knocked smartly with a hammer, it will detonate with a loud report.

No. 22. **To Pass an Egg through a Narrow-necked Bottle.**—Place an Egg in some strong vinegar for a few hours, the egg will then become quite soft, now press it gently through the neck of a bottle, and fill up with cold water which contains a little of carbonate of Ammonia, the egg will then regain its proper shape.

No. 23. **Illegible Writing Restored.**—The Solution of Galls above mentioned is exceedingly useful in restoring pale or decayed writing; by brushing over the letters with a feather dipped in it, they will become as fresh as when first written.

No. 24. **Black Sympathetic Ink.**—Procure a clean quill pen, and write with a Solution of Sulphate of Copper; let it dry and it will not be visible; if you now brush it over with the Solution of Galls it will appear of a rich black tint.

No. 25. **Purple Sympathetic Ink.**—Write with a clean quill and a weak Solution of Sulphate of Copper, as in the last experiment; dry it, and the writing will be invisible; but if it be held over the fumes of Ammonia over a bottle of smelling salts, it will appear of a purple colour; by holding the writing before the fire it will again become invisible.

KINGSLEY'S

Chemical Magic

— AND —

Practical Chemistry

(COPYRIGHT).

FOR YOUTH OF BOTH SEXES,
STUDENTS, SCHOOLMASTERS.



This Booklet gives Full Instructions for
performing many Experiments in Chemical
Magic and Practical Chemistry.



GIVEN FREE WITH
KINGSLEY'S CHEMICAL
CABINETS.

No. 26. **Blue Synthetic Ink.**—Write in the same way with a Solution of Sulphate of Iron, and when dry the letters will be invisible; now brush the writing over with a feather dipped in a Solution of Prussiate of Potass, and it will become visible of a beautiful blue colour.

No. 27. **Phantom Drawing.**—Draw upon the surface of a looking-glass some comical figure with a piece of French Chalk. This will be invisible, but if the glass be breathed upon, the figure will appear immediately.

No. 28. **Metallic Combustion.**—Take a piece of zinc, and melt it in an iron spoon, it will soon take fire, and burn with a light bluish flame.

No. 29. **To make Smelling Salts.**—Rub together into a mortar equal parts of powdered carbonate of potass and muriate of ammonia, carbonate of ammonia, smelling salts will be formed with the muriate acid of the muriate of ammonia uniting with the potass, while the carbonate acid of the carbonate of potass will unite with the ammonia.

No. 30. **To Dye Yellow.**—Soak a piece of white linen in a Solution of acetate of lead, and then insert it in a Solution of bichromate of potass, and the linen will be dyed a rich yellow. If a darker yellow be required, add more bichromate of potass.

No. 31. **Writing made to Disappear.**—Write with common Ink upon a piece of paper, dip it in a Solution of Oxalic acid, and the writing will disappear. To restore it dip the paper in a solution of galls.

No. 32. **To take Impressions of Seals and Coins, etc.**—Melt a small quantity of Sulphur in an iron spoon, and then pour it in a tea-cup of warm water, the sulphur will become quite soft like wax, and can be easily pressed into any shape.

No. 33. **The Wonderful Liquor.**—Boil a few chips of logwood in a little water so as to make a red solution; then taking three glasses, and having rinsed out the first with vinegar, and the second with a solution of alum, on pouring out the liquid it will be of a straw colour in the first, of a bluish black in the second, and of a red colour in the third.

No. 34. **To Transform two White Liquids into a Blue.**—Make two separate solutions of carbonate of ammonia and a weak sulphate of copper, mix them well together, and a deep blue will be formed.

No. 35. **To Cover a piece of Steel with a Coating of Copper.**—Immerse the blade of a knife into a solution of sulphate of copper, on taking it out of the solution a film of metallic copper will be seen to adhere to it.

No. 36. **To make Ammonia.**—Ammonia is produced by heating together lime and sal ammoniac. This can be done in a flask or ginger beer bottle, but a glass tube should conduct the ammonia gas into another vessel containing water. The ammonia will be absorbed in the water, and strong liquid ammonia will be formed.

No. 37. **Black from Two Colourless Solutions.**—Put the contents of the box of powdered Galls into a one-ounce phial, half fill it with water and shake it well, then let it stand for twenty-four hours in a warm place, shaking it occasionally; filter it through blotting-paper, and it is ready for use. Label it "Solution of Galls." Put a small quantity of the above solution in a white glass, and into another a weak solution of Sulphate of Iron; mix these two colourless solutions together, and they will instantly become black. Ink is made on this principle.

No. 38. **Spectral Flame.**—Dissolve some transformation powder in spirits of wine, set same alight in a dark room in a saucer, a most ghostly effect will be observed on everyone person present.

No. 39. **Firework Display.**—Mix equal portions, sulphur, saltpetre and charcoal, set alight and you will have a brilliant firework display.

No. 40. **Red Fire.**—Mix one part chlorate of potash, one of iron filings, one sulphur, one charcoal and one nitrate of strontia. Place a small portion on a piece of tin or a plate and light.

Many of the above experiments could be better shown if performed on a larger scale and with the aid of apparatus, which could not be included in this box, and at the price. Those interested in the subject, and who would like to perform a more extended series of experiments, should purchase one of my larger cabinets.