No 3

Chemical Exps —

1 — Lead tree —

Dissolve 1 part of acetate of lead in 36 to 40 parts of water: In this immerse a ball or cylinder of lead — Zinc —

2. To distinguish steel from iron — A little dilute nitric acid dropped on a polished piece of steel, allowed to remain a few minutes and then washed off, it leaves a black spot, on iron the spot is whitish grey — being the color of the steel —

3. Nitrat of Copper —
Dissolve Copper filings in Nitric acid of a moderate strength. When the effervescence ceases, boil the acid gently on the copper until a pellicle appears. Decant the solution and evaporate it slowly when a strong pellicle is produced allow it to Chrystallize — Fine blue colour. —

4. Fill a well stopped bottle quite full of liquid Amm[onia] & throw a few copper filings, and immediately stop the bottle, no solution will take place. But if the bottle be left open for some time and then stopt, a solution is effected which is colourless, but turns blue on uncorking the bottle beginning at the surface. If the blue solution has not been too long exposed to the air, and fresh filings be added, on stopping the bottle the colour disappears &c —

5. If a solution of Gold in Nitro-muriatic acid be shaken together with highly rectified Ether or essential oils, the Gold will be precipitated but will be instantly dissolved by the Ether and float on the surface. If the solution be evaporated

The Gold is obtained in a state of absolute purity

— If Gold be precipitated with green sulphate of iron — It is also perfectly pure — This is the best method of procuring Gold for Experiments —

6. Platina — is the only metal which affords a precipitate from its solution by means of Iron:

7. Best flint glass consists of

51.5 — 120 parts of white silicious sand

17.5 — 40 of pearl ash

~~[illegible]~~ red oxide of lead

15.0 — 35 of red. of potash

5.6 — 13 Black oxide of Manganese

10.4 — 25

100

8. Pyrophorus — Equal parts powder of Alum and brown sugar mixed ~~in a crucible~~ over the fire and kept stirring till reduced to dryness — Finely powder in put into a phial coated with clay, with a glass tube open at both ends fitted to the neck. Set the phial in a crucible surrounded with sand, and keep it in the fire till no more gas escapes. Stop the open end of the tube with a bit of clay, to prevent atmospheric air getting in —

— black and very light powder

9. Lime requires about 300 parts of water to dissolve it — Acrimony

10. Water is composed of 85 Oxy and 15 Hydrogen by weight but of 2 of Hydrogen to 1 Oxy by measure. —

11 Water decomposed — Gun barrel Electricity — Galvanism — recomposed by burning Hydr: and Oxy — Gas — Lavoisier Vol 1 page 235 —

12 For making Muriatic Acid if the Sulph: acid be diluted with an equal q:ty by wt of water, a common receiver will be sufficient

13. Fluoric Acid —

1 part powdered fluor of lime in a leaden or tin retort pour on it 2½ parts of Sulphuric acid — Receive of the same mixt containing 1 part of water and apply a gentle heat —

14. Oxy Mur: acid —

1 part of black oxid of Mang: reduced to a gross powder 3 parts of concentrated muriatic acid — Apply a receiver with a little distilled water in it —

then the water has ~~received~~ acquired a yellowish green colour, the Res.^n may be removed & another applied till no more gas is evolved — Woulfe's appar. is the best — Ct Lamp. —

15. Oxymuriate of Potash —

put a strong solution of pot ash, in the receiver of Woulfe's appar. leaving the first empty — the process the same as it last entitled —

16. All the sulphates are insoluble in Alcohol —

17. Nitric Acid —

2 parts of dry coarsely powd Nitre in a retort of which it occupies only $\frac{1}{3}$ or $\frac{1}{4}$ 1 part of sulph.^c acid in small quantities at a time a little water in the retort — a gentle heat —

18 The simple ~~bodies~~ substances at present (1802) known to chemists amount to 42 including light and Caloric 16 of these are found in Veg. the other 26 (excluding light and Caloric) belong exclusively to the

Mineral Kingdom. This a fact that ~~no~~ every simple substance hitherto found in the Mineral Kingdom exists also in the Vegetable Kingdom. On the contrary all the simple substances at present known may be found in the Mineral Kingdom.

19. Alum turns the blue Colour of Vegitables to a red, a proof that it is supersaturated with the acid, hence this and other Sub-Sal Salts are called ~~Sub~~ Supersulphats. When the ~~salts~~ when the alkali is most, the salt turns the blue vegitable inclining green it is then called a Subsulphat.

19 th The lining on Copper is so thin that a piece 9 Inches in diam. and 3 Inches 3 lines in depth when lined acquired an additional weight of only 21 Grains. Pray is there any method of making the coat thicker if none be added a moderate heat melts it and causes it to run off.

20. Boiling point

| | |
|---|---|
| Ether = 90 | when the pressure of the Atmosphere is taken off they boil at 120° Cow. |
| Alcohol = 174 | Thus |
| Water - 212 | Water - 92 |
| Nitric Ac 240 | Alcohol - 56 |
| Sulph: a. 546 | Ether - 20 |
| Phosphorus 554 | |
| Mercury - 600 | |
| Lead and tin 600 | |

21. If a small bit of phosphorus be rubbed in a mortar with iron filings it takes fire almost immediately.

22. If phosphorus be rubbed between two pieces of brown paper it takes fire —

— If written paper be used, the inflam.n is more dispute

23. Phosp.s fire bottles. —

1. Put into a small thin phial heated, introduce a few grains of phosp.s, let it stand loosely stopped a few minutes. Add small quantity of phosphorus & let the phial be shaken —

2. Heat a quantity of phosphorus and lime together in a loosely stopped phial for about half an hour

3. Unite one part of sulphur with eight parts of phosp.s — A small quantity taken from the bottle with a match and rubbed on a cork, the match is instantly fired —

24 The simplest way of obtaining Cobalt in its metallic state is to reduce it from smalt, by fusing 1 part of smalt with 6 of soda. — P — n

25 A set of beautiful experiments on combustion by Robert.

See Repy: of Arts 1st April 1803

— Vat: and instead of being poured on the ox: m: Pot ash a little is taken up with a glass tube —

26. Mr. Powell has discovered that a mixture of oxymuriatic and arsenic forms a dangerous fulminating powder

— This mixture lead in a brass jaws at one end to a brass of Gun powder, if fired at the jaws by the former goes off instantaneously the latter takes a considerable

21. New Lute by C. Daisy Professor of chemistry —

— Take white and yolks of two eggs, and half their weight of

powder carbonate of ~~lime~~ lime or of quicklime well slaked in air — but well up — spread on a cloth and apply it as a lute — lute is very elastic — bezels may be made and turned in the lathe —

22. Fill a ~~florence~~ flask half full of boiling water cork it tight — the water cannot boil — pour cold water on the upper part of the flask, and the boiling commences — pour boiling water and the boiling ceases —

23. Put the right hand into a basin of hot water, and the left into very cold water. Then put both into water moderately warm; the right will feel cold, the left warm. —

24. Expose a sheet of white paper to the direct rays of the sun for a few minutes. Draw it quickly into a dark room, where the experimenter should be for a few minutes before, the paper will appear very luminous — — hand also

25. If a piece of white wood dipped with phosphorus be written, be held near the fire the letters will take fire and the paper will be burnt. —

26. The solution of phosphorus in ether, thrown on boiling water exhibits a pleasing appearance, the heat inflames the phosphorus —

27. To ascertain the quantity of lime which is contained in marl. Put a hundred parts of the marl into dilute muriatic acid; all the lime dissolved is lime — N.B. A marl to be useful as a manure must contain 35 to 40 p. cent of lime

28. To obtain pure magnesia from its sol: sulphat of magnesia add add an alkali — mag: precipitate

29. Prussic turns red by bitumen from the clays being coloured with iron ore —

30. In silvering convex and concave mirrors where pressure cannot be used, apply an amalgam of 2 parts mercury — 1 of tin 1 of lead and one of bismuth —

31. To brown ~~jewelling~~ pieces wash the barrels with a solution of sulphat of copper in water.

32. Cavallo's receipt in ~~the~~ his last work, for electrical cement is 5 parts Rosin 4 bees wax and 2 of powdered red ochre. N.B. For this country (India) a little more rosin will be necessary.

33. Mr. Watkinson's Amalgam. 3 oz of Zinc 2 of tin and 1½ pound of Mercury. Melt the Zinc and tin together and pour them on the mercury placed either in a mortar or in a thick wooden box shaken within side, and the box well shaken. For this state it should be preserved. When it is to be applied let a small quantity be finely powdered, and sifted through a piece of fine muslin. Take a very small quantity of hog's lard just enough to make the amalgam and mix well with the other ingredients.

34 Zeblenburgh's composition for ~~this~~ his Electrophorus of 9 by 7 feet was 40 parts Resin,

4 parts bees wax and 1 part of lamp black —

35. If a slender piece of phosphorus is kept up in fragments of fine cotton will inflame spontaneously whilst a thicker piece will not —

36. A large lump of zinc may be melted in atmospheric air without inflaming whilst a small one thin shaving will burn rapidly long before it is heated to the temperature of fusion —

37. An amount may be given to death by the evaporation of Ether

38. W. Williamson's Cement for Galv: troughs is composed of 4 oz of yellow wax 8 oz: Resin and about an oz of fine brick dust. —

39. Adam's Amalgam (1792) Mercury 5 Zinc 1 melted together with a small quantity of bees wax —

40. Baron Riemsay's amalgam 2 Mer 1 Zinc 1 Tin — either in this state or mixed with a little grease

41. 7 parts Bismuth 5 Lead 3 Tin form a compound which melts in boiling water (Chapital —