

dissolved in nitric acid, and the lead precipitated with sulphuric acid. After filtering, the bismuth is precipitated by ammonia (see p. 165). Antimony will probably be found in the portion dissolved by  $(\text{NH}_4)_2\text{S}$ , and is recognised by the bright orange colour on reprecipitating it with  $\text{HCl}$ . Its presence is confirmed by the Marsh test.

The analysis of bronze is made in a similar manner, tin remaining as an oxide insoluble in nitric acid. The solution has a blue colour, which is intensified by the addition of ammonia, or gives a brown precipitate with  $\text{H}_2\text{S}$ .

### THIRD GROUP.

This group embraces the metals precipitated from neutral or alkaline solutions by ammoniac sulphide. Cobalt, nickel, iron, manganese, and zinc are precipitated as sulphides; aluminium, chromium, and uranium as oxides.

If the end of a piece of platinum wire be bent into an eye, then dipped in borax, and heated in a lamp or blow-pipe flame, the borax will fuse to a colourless bead. On moistening this bead with any solution of cobalt and heating again, it becomes a beautiful blue. This is very characteristic and delicate test for cobalt. Cobalt solutions give with ammoniac sulphide a black precipitate, insoluble in dilute hydrochloric acid, but easily soluble in aqua regia. Potassic nitrite ( $\text{KNO}_2$ ), followed by acetic acid, produces a yellow crystalline precipitate. Potassic cyanide precipitates the cyanide of cobalt, which dissolves in excess of the precipitant. If this solution is boiled with more potassic cyanide for half an hour, a drop of hydrochloric acid being added, the cobalticyanide of potassium is formed ( $\text{K}_3\text{CycCo}$ ). This solution is not precipitated by acids, nor by boiling with sodic hypochlorite or Labarraque's solution.

Nickel so closely resembles cobalt as to be separated with difficulty from it. Ammoniac sulphide produces a black precipitate, insoluble in dilute hydrochloric acid, soluble in aqua regia. Potassic nitrite with acetic acid gives no precipitate. Potassic cyanide precipitates the cyanide of nickel, which is soluble in excess of precipitant. If hydrochloric acid is added to this solution, the cyanide is precipitated. It is not altered by boiling with  $\text{HCl}$ . When boiled with sodic hypochlorite, it gives a black precipitate. This enables us to separate cobalt and nickel. Great care must be taken, when performing these tests, to avoid inhaling any of the prussic acid so abundantly liberated. On this account, potassic nitrite is to be preferred, if it can be obtained, for detecting nickel in the presence of cobalt.

### PRESERVING GRASSES, FERNS AND FLOWERS.

The following details in the art of preserving flowers, &c., are given by a lady correspondent of the *Farmer*:—Grasses should be gathered early in July, if we desire them to retain their bright hues without the aid of art. Gathered then, tied up in large bunches, and hung away in a dark closet, they come forth at our bidding, fresh and green as when plucked. Now, by brook-side or in shady places, we can find graceful grasses, which will prove additions to our winter bouquets, but they will lose their colouring, and require a dip into "Judson's Green Dye." Dry them again, and they will last for years. Wild oats, feather-grass, and all their various species are very ornamental in winter, and mingled with the everlasting flowers—*Acroclium*, *Xeranthemum*, and the white, yellow, and crimson *Helichrysums*—they vie with their more perishable sisters, whose glories are on the wane. We have just arranged two small vases for the coming winter. The brilliant pink and white *Acrocliums* add much to their beauty. The white *Helichrysums* can be dyed a brilliant purple or scarlet with "Judson's Dyes," and exquisite bouquets can easily be manufactured. These "everlasting" flowers should be gathered as soon as the outer leaves open. Tie them up in bundles as you pick them, and hang up, flowers downwards, to dry. Treated in this way, the stems are straight and more easily used. They can be hung to dry in one's chamber, not requiring a darkened place. Most of these flowers are allowed to remain too long upon the bushes, and their beauty is spoiled. As they become dusty under the frequent sweepings of carpets, we dip them in cold water; their petals close entirely. We dip the grasses also. The running fern is a lovely decoration for walls and pictures. Its flowers add much to its grace and beauty, but it fades quickly, and by Christmas but a faint green remains. Dip them in "Judson's Dye" (following the directions given on the bottle for dyeing ribbons), and you will keep their lovely colour. After they have been thoroughly pressed in heavy books, then dye them, spread on paper to dry in the shade and then press again. Thus treated, they will last for years. Maidenhair, the most graceful of our ferns, soon loses its colour; but dyed, it is an addition to every collection of grasses or ferns.

Parsley fern is very beautiful; its soft, feathery leaves are always sought after. These, if gathered late in the autumn, will retain their colour much better. The male fern, with its stiff stems, if well pressed, looks beautiful. We mingle it with the many-coloured leaves of autumn, or we pin it to the wall-paper, around pictures, or over lace or muslin curtains, and its effects are charming.

The branches of the Sumach, gathered soon after the frost has appeared, or even before, press perfectly, and keep their colours finely. If varnished with map-varnish they never fade. Branches of this tree, interspersed with the ferns, are very ornamental. We have made exceedingly pretty crosses from its leaves, sewing each one separately over the other on a pasteboard cross. Anchors and stars can also be made of its lance-shaped leaves. Thus suspended over engravings or curtains, they are very ornamental, and are easily dusted—an essential in the eyes of a good housewife.

Bunches of dyed mosses are to be purchased of all seedsmen in the cities; we dwellers in villages cannot avail ourselves of them if we would; but we can make them even prettier than those exposed for sale. Gather the mosses, pick out all the *debris*, cleanse from dirt, and dry in the sun; then dip into "Judson's Dye," spread on papers to dry by fire or sunlight. We gathered last year a very finely-fibred moss, dyed it a lovely green, and saved some of the original colour to mingle its brown hues with it. Then we took the "hoops" from an old skirt, tied them together, and on the circlet tied wreaths, which city friends said "surpassed those displayed at the shops."

SAYS the *Journal of the Franklin Institute*:—A project no less gigantic than the piercing of the Rocky Mountains is announced as about to be commenced. The projected tunnel will, if completed, be carried through the Rocky Mountains from a point near Black Hawk, and will come out in the Middle Park. It is said that the project is fully inaugurated, and that its projector is on the ground with ample means and labour at disposal to prosecute the work to completion. The tunnel will be about twelve miles long. Its greatest depth will be 6000ft., at James Park. It will make the Middle Park readily accessible from the eastern part of the territory, will indicate the mineral and geological character of the region, and will not fail to attract attention to the place, as the scene of an engineering enterprise nearly twice as difficult of accomplishment as the famous Mont Cenis Tunnel. It is stated that early next year work will be commenced from Middle Park. Already considerable work has been done. The mountain has been graded down for the face of the tunnel; a flume, 1300ft. long, has been built from the creek, by which a fall of 25ft. is obtained for the purpose of driving an overshot wheel, by means of which the tunnel is to be supplied with air; a strong levee has been built, to prevent the waters in the creek from overflowing and embarrassing the operations in the tunnel. The main advantages to be derived from its construction are stated to be that it will be open up new lodes, and afford a thorough knowledge of the course of mineral veins; that it will afford a means of working the discovered mines cheaply and rapidly and that it will develop the resources of the region by the increased facilities for transportation which its construction will afford.

ALLUDING to the railways of the Maritime Provinces, the *St. John, N. B., News* says 702 miles are in operation. 838 miles are building, and 470 miles are chartered and mainly provided for. Total, 2,010 miles. The Eastern & Maine Central line forms the exclusive outlet of the system to the west. As soon as the St. John bridge is built and the gauge of the European road reduced, a very great increase of traffic will be realized.