

solution, or partial solution, takes place. When the undissolved matters have settled, the clear supernatant liquid is decanted carefully into another capsule (or into a test-tube) for further treatment. (See Experiments 7 and 8, in § 6, beyond.)

## § 5.

## BLOWPIPE REACTIONS.

In this section, the leading reactions of the more important elementary bodies and chemical groups are passed rapidly under review. Bodies of exceptional occurrence as mineral components—or such of these, at least, as cannot be properly detected by the blowpipe—are omitted from consideration.\* The other elementary substances are taken in the order shewn in the following index :

I. *Non-metallic Bodies*.—1, Oxygen ; 2, Hydrogen ; 3, Sulphur ; 4, Selenium ; 5, Nitrogen ; 6, Chlorine ; 7, Bromine ; 8, Iodine ; 9, Fluorine ; 10, Phosphorus ; 11, Boron ; 12, Carbon ; 13, Silicon.

II. *Unoxidizable Metals*.—14, Platinum ; 15, Gold ; 16, Silver.

III. *Volatilizable Metals*.—17, Tellurium ; 18, Antimony ; 19, Arsenic ; 20, Osmium ; 21, Mercury ; 22, Bismuth ; 23, Lead ; 24, Thallium ; 25, Cadmium ; 26, Zinc ; 27, Tin.

IV. *Flux-colouring Metals*.—28, Copper ; 29, Nickel ; 30, Cobalt ; 31, Iron ; 32, Tungsten ; 33, Molybdenum ; 34, Manganese ; 35, Chromium ; 36, Vanadium ; 37, Uranium ; 38, Cerium ; 39, Titanium.

V. "*Earth*" *Metals*.—(40, Tantalum ?) ; 41, Aluminium ; 42, Glucinum ; 43, Zirconium ; 44, Yttrium.

\* For full details respecting the blowpipe reactions of inorganic bodies generally, the following works may be especially consulted : 1. The old work by Berzelius, "Die Anwendung des Löthrohrs," etc.; translation of the 4th edition, by J. D. Whitney: Boston, 1845. 2. "Handbuch der Analytischen Chemie," von Heinrich Rose, 6th edition, by R. Finkener: Leipzig, 1871. 3. Plattner's "Probirkunst mit dem Löthrohr," 5th edition, by Richter, 1878. American translation of 4th edition, by H. B. Cornwall: New York, 1875. 4. "Untersuchungen mit dem Löthrohr," by Dr. H. Hartmann: Leipzig, 1862. 5. "Löthrohr-Tabellen," by Dr. J. Hirschwald: Leipzig und Heidelberg, 1875. 6. "Manual of Determinative Mineralogy and Blowpipe Analysis," by George J. Brush: 2nd edition, 1878. 7. "Leitfaden bei qual. und quan. Löthrohr-Untersuchungen," von Bruno Kerl, 2nd edition, Clausthal, 1877. For the determination of minerals, &c., the far-renowned "Tabellen" of Von Kobell (in addition to the work of Prof. Brush, essentially constructed on that of Von Kobell, although with much amplification and addition of new matter) may be especially consulted. The "Anleitung zum Bestimmen der Mineralien," of Dr. Fuchs, is also a very serviceable little book; and some useful tables will be found at the end of E. S. Dana's excellent "Text Book of Mineralogy."