

A

TREATISE

ON

MINERALOGY.

BY

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PART II.

CHARACTERS AND DESCRIPTIONS OF SPECIES.

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CLASS I.

## ORDER I. GAS.

## Sp. 1. HYDROGEN.

[G. = 0·069. Odor peculiar.]

## Sp. 2. AMMONIA.

[G. = 0·59. Alkaline. Odor pungent.]

## Sp. 3. CARB-HYDROGEN.

[G. = 0·55. Odor empyreumatic.]

Stagnant pools, bituminous coal beds and brine springs. Fredonia, Chataouque Co., N. Y. Kenawha river, Va.

## Sp. 4. NITROGEN.

[G. = 0·975. Tasteless, odorless, extinguishes flame.]

Mineral wells. Lebanon Springs, N. Y. Bath, Cheltenham and Harrogate, England.

## Sp. 5. ATMOSPHERIC AIR.

[G. = 1·00. Tasteless, odorless, supports flame.]

## Sp. 6. SULPH-HYDROGEN.

[G. = 1·19. Odor of putrid eggs.]

Mineral wells and volcanoes. Sharon, N. Y., and sulphur springs of Virginia.

## Sp. 7. MURIATIC ACID.

[G. = 1·28. Strongly acid, pungent.]

Active volcanoes.

## Sp. 8. CARBONIC ACID.

[G. = 1·50. Acidulous.]

Mineral wells and volcanoes. Saratoga Springs, N. Y. Grotto del Cane, near Naples.

## Sp. 9. SULPHUROUS ACID.

[G. = 2·234. Strongly acid. Odor sulphurous.]

Active volcanoes.

## ORDER II. LIQUID.

## Sp. 1. WATER.

[G.=1.00. Tasteless.]

## Sp. 2. SEA WATER.

[G.=1.026...1.028. Saline.]

Confined portions of sea water, like the Dead Sea, as well as salines, afford a brine of much greater density than the ocean: 350 gallons of sea water, at Nantucket, yield one bushel of salt; while the new wells at Syracuse, N. Y. whose G.=1.104, give the same quantity for about 30 gallons of the brine.

## Sp. 3. SULPHURIC ACID.

[G.=1.85 when concentrated,] but only 1.004 as found at Alabama, Genesee Co., N. Y., though much stronger near volcanoes. New Granada.

## ORDER III. SOLUBLE.

## Section A. DELIQUESCENT.

## Sp. 1. NITROCALCITE, (S.)

[In fibrous or powdery efflorescences. Sharp and bitter. Deliquesces in the air.]

Nitrate of lime.

Limestone caves of Kentucky.

## Sp. 2. NITROMAGNESITE, (S.)

[In efflorescences; very deliquescent. Bitter.]

Nitrate of magnesia.

Limestone caves: found with nitrocalcite.

## Sp. 3. NITRE.

[H.=1.0...1.5. G.=1.9. Saline, cool; xls. striated prisms.]

Diffused through certain rich soils; and in crusts on old masonry and porous rocks, especially the floors of caverns in Ky. and Tenn.

## Sp. 4. SODA NITRE.

[H.=1.5...2.0. G.=2.0...2.2. Saline, cool; xls. rhds.]

In beds, of several feet in thickness over a region 40 leagues in diameter, in the district of Tarapaca, near the northern frontier of Chili; where it occurs mixed with gypsum, common salt, glauber salt, and remains of recent shells.

## Sp. 5. SAL-AMMONIAC.

[H.=1.5. G.=1.52. Saline, pungent.]

In globular masses, stalactitic and mealy crusts.

Near ignited coal seams, (Newcastle) and about volcanoes. (Etna, Vesuvius and Hawaii.)

## Sp. 6. COMMON SALT.

[H.=2.0. G.=2.25. Saline.]

Primary form, cube. Generally massive, coarse granular, fibrous or in crusts. White, yellowish, reddish, and more rarely deep blue.

Sodium 60, chlorine 40, when pure : but commonly mixed with variable quantities of sulphate of lime, chloride of calcium and chloride of magnesium. The red color of common salt is chiefly caused by peroxide of iron.

In beds, associated with gypsum, (Washington Co., Va.) anhydrite, clay and sandstone of various geological periods, though mostly in connection with the new red sandstone; in extensive hills (Cardona, Spain); in efflorescences over sandy plains (S. Francisco and Rio Paraguay); as a sublimation among lavas (Vesuvius); and with sulphur (Sicily and Switzerland).

Sp. 7. SYLVINE.

[H.=2.0. G.=1.9...2.0. Saline and bitterish.]

Chloride of potassium.

In crusts, as a sublimation on lava (Vesuvius), and in the common salt of Hallein.

Sp. 8. MASCAGNINE.

[H.=2.0...2.5. G.=1.7...1.8. Bitter, in crusts on lava.]

Sulphate of ammonia.

Ignited coal beds (Staffordshire) and near volcanoes (Etna, Vesuvius the Lipari Islands).

Section B. EFFLORESCENT.

Sp. 1. CARB-AMMONITE, (S.) Bi Carb-Ammonia.

[H.=1.5. G.=1.45...1.5. Xls. with two brilliant cleavages, giving an angle of  $112^\circ$ . Yellowish white.]

Ammonia, 21, carbonic acid 55.5, water 23.5, *E. F. Teschemacher*.

In guano deposits. Africa and Patagonia.

Sp. 2. NATRON.

[H.=1.0...1.5. G.=1.42. Pungent, alkaline; in xls.]

White, grey or yellow, owing to impurities.

Carbonate of soda.

Soda lakes of Egypt, and various parts of Asia, Africa, and South America.

Sp. 3. THERMONATRITE, *Haid*.

[H.=1.0...1.5. G.=1.5...1.6. In efflorescences.]

This is the effloresced natron above described, and is found at the same localities.

Sp. 4. TRONA.

[H.=2.5. G.=2.11. Alkaline : in yellowish grey xls. and columnar aggregations.]

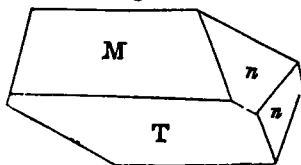
Primary form. Doubly oblique prism.

M : T. =  $103^\circ 15'$ , T : n  $103^\circ 15'$ , n : n =  $132^\circ 30'$ .

Soda 41.22, carbonic acid, 39.0, water 18.8. (99.02.) *Boussingault*.

Near Fezzan in the African desert, and at Zagunilla, Columbia.

Fig. 136.



## Sp. 5. BORAX.

[H.=1.0...1.5. G.=1.71. Sweetish, feebly alkaline.]

Primary form, oblique rhombic prism.

M : M =  $93^{\circ} 30'$ , P : M or M' =  $101^{\circ} 30'$ ,M or M' : h =  $133^{\circ} 20'$ , M : k =  $136^{\circ} 45'$ ,M : e =  $138^{\circ} 12'$ , P : h =  $106^{\circ} 30'$ ,P :  $g^1$  =  $139^{\circ} 15'$ , P :  $g^2$  =  $115^{\circ} 30'$ ,P : e =  $114^{\circ} 28'$ , e :  $g^2$  =  $141^{\circ} 52'$ .

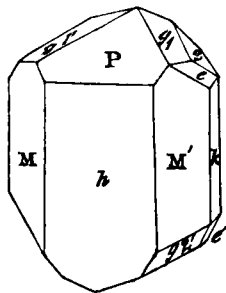
L. resinous. C. white, inclining to grey or green. Translucent.

Biborate of soda.

In clay, on the shores of alpine lakes in Thibet and Nepal, accompanied by common salt. Near Potosi, S. America.

Uses.—In blowpipe experiments, in medicine, glass making, and in purifying and working several of the metals.

Fig. 137.



## Sp. 6. PHOSPHAMMONITE, (S.) Phosphate of Ammonia.

[In crystalline and transparent grains with a single bright cleavage.]

In guano.

## Sp. 7. GLAUBER SALT.

[H.=1.5...2.0. G.=1.4...1.5. In efflorescences. Taste cool, saline and bitter.]

Sulphate of soda.

In quarries, and on old walls : also deposited from hot springs (Carlsbad), and forms crusts on the borders of salt lakes.

Sp. 8. EPSOMITE, *Beud.* Epsom Salt.

[H.=2.25. G.=1.75. Bitter and saline. In acicular xls. and efflorescences.]

Primary form, right rhombic prism. M : M =  $90^{\circ} 30'$ .

Sulphate of magnesia.

Effloresces from many rocks and from artificial walls. On floors and sides of limestone caves in Ky., Tenn. and Indiana.

Sp. 9. COPPERAS. Green Vitriol; Melanterite, *Beud.*

[H.=1.5. G.=1.8...1.9. Taste metallic, astringent. C. green.]

Primary form, oblique rhombic prism.

M : M =  $82^{\circ} 20'$ ,P : M or M' =  $99^{\circ} 20'$ .

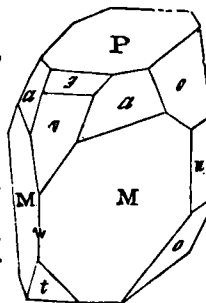
Mostly in stalactitic, reniform masses and crusts.

Sulphate of iron.

Originates chiefly in decomposition of iron-pyrites.

Use.—In dyeing, ink-making and the manufacture of sulphuric acid and prussian blue.

Fig. 138.



Sp. 10. WHITE VITRIOL; Goslarite, *Haid.*

[H.=2.0...2.5. G.=2.0...2.1. Taste astringent, metallic, nauseous. Stalactitic and encrusting. C. white.]

Primary form, right rhombic prism.  $M : M = 90^\circ 42'$ . Xls. lengthened along the prismatic axis.

Sulphate of zinc.

Originates in the decomposition of blende. Goslar in Harz, Fahlun Sweden, Guipuzcoa in Spain.

Use.—Dyeing and medicine.

## Sp. 11. BLUE VITRIOL.

[H.=2.25. G.=2.23. Massive. C. sky-blue.]

Primary form, doubly oblique prism.

$P : M = 127^\circ 30'$ ,  $P : T = 108^\circ$ ,  $M : T = 123^\circ 10'$ ,

$M : r = 126^\circ 40'$ ,

$T : r = 110^\circ 10'$ ,  $r : n = 100^\circ 41'$ ,

$P : r = 103^\circ 27'$ ,  $P : n = 120^\circ 50'$ ,

$i : r = 139^\circ 13'$ ,  $n : k = 109^\circ 38'$ ,

$k : r = 114^\circ 57'$ ,  $s : n = 92^\circ 26'$ ,

$s : r = 139^\circ 43'$ .

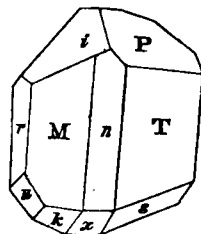
Stalactitic and reniform. Taste astringent and metallic.

Sulphate of copper.

Proceeds from decomposition of copper pyrites.

Hartz, Anglesea, Rio Tinto mine in Spain.

Fig. 139.

Sp. 12. NICKEL VITRIOL, *Hunt.*

[In capillary, interlacing xls. and efflorescences. C. greenish white.

Metallic astringent.]

Hydrated sulphate of nickel. (*Hunt.*)

Wallace mine, Lake Huron.

## Sp. 13. ALUM.

[H.=2.0...2.5. G.=1.7...1.9. In crusts (rarely in 8-drons) fibrous aggregates or efflorescences. Taste sweetish, astringent.]

Primary form, cube.

Sulphate of potassa (soda, ammonia, magnesia, protox. iron or protox. manganese,) ter sulphate of alumina and water.

Effloresces on slates of the coal series, from volcanic and pyritiferous rocks and volcanic solfataras.

Potash alum (sulphuric acid 33.52, alumina 10.80, potassa 9.96, and water 45.66) at Hurler and Campsie, Scotland, in the lias near Whitby in Yorkshire, and in the brown coals of Hessia and the Rhine. Ammonia alum in the brown coal of Tschermig, Bohemia. Soda alum near Mendoza, S. A., near the Solfatara at Naples and in the Island of Milo. Magnesia alum (*Pickeringite*) in silky fibres at Iquique in Peru. Manganese alum at Lagoa Bay in South Africa. Iron alum (feather-alum) from various localities, Scotland, Iceland and Bavaria.

Sp. 14. REUSSIN, *Karsten.*

[Flat six-sided xls. and in acicular, radiating groups. Taste saline and bitter: also in mealy efflorescence.]

C. white.

Sulphate soda 66·04, sulphate magnesia 31·35, chloride calcium 2·19, sulphate lime 0·42. *Reuss*.

Seidlitz and Saldschütz in Bohemia.

Sp. 15. THENARDITE, *Casaseca*.

[H.=2·5. G.=2·6...2·7. Right rhombic prism of 125°.]

Surface of xls. rough. C. white. Translucent. Easily soluble. Taste feebly saline.

Anhydrous sulphate of soda.

Deposited from salt springs (during summer) of Espartinas, near Aranjuez, Spain.

*Use*.—In preparing soda.

Sp. 16. GAYLUSSITE, *Boussingault*.

[H.=2·0...3·0. G.=1·9. Xls. efflorescent prisms, with pitted surfaces. C. white.]

Primary form, oblique rhombic prism. M:M=68° 50', P:M=96° 30'. Partially soluble in water.

Carbonate soda 34·5, carb. lime 33·6, water 30·4, clay 1·5=100. *Boussingault*.

In a bed of clay at the natron lakes of Lagunilla near Merida, Columbia.

Section C. PERSISTENT.

Sp. 1. SASSOLINE, *Jameson*.

[H.=1. G.=1·4...1·5. Loose scales. C. yellowish white. L. pearly. Acidulous, slightly bitter and colorless.]

Xls. are irregular six-sided tables with edges replaced by oblique planes. Cleavage basal, very perfect. Sectile and flexible. Feel unctuous.

Solution in alcohol burns green.

Boracic acid (with water and traces of sulphuric acid, alumina, ammonia, magnesia, soda, potassa and peroxide of iron.)

Volcano in the Lipari Islands, the Andes, S. A.; and dissolved in the hot springs of Sasso and the lagoni of Tuscany (from which in 1845, 2,000,000 lbs. were obtained by evaporating the water.

*Use*.—In the manufacture of borax.

Sp. 2. COPIAPITE, *Haid*.

In foliated, radiated and granular masses. Color yellow, greenish.

Basic sulphate of peroxide of iron; but supposed by Berzelius to be a mixture of several salts.

Copiapito in Coquimbo, Chili.

The mixture of the sulphate of the protox. and perox. iron, with sulphates of copper and zinc (named *misy*) found near Goslar in the Hartz appears to belong to the present species. It occurs as a collection of small crystalline scales of a dull sulphur-yellow color with a vitreous or pearly lustre, which under a lens appear to be rhombic tables with their acute lateral edges truncated. It does not perfectly dissolve in water; but after a while is decomposed, the fluid becoming brownish red and having an acid reaction. It consists of sulphuric acid 42·92, perox. iron 30·06, protox. zinc 2·49, magnesia 2·81, water 21·39, *List*; which is the same composition as that found in copiapite by *H. Rose*, excepting a slight difference in respect to water.