

I. General Law of Nature:—The particles of all bodies are always capable of separation by heat.

Inferences:

1. Solidity may be considered to arise ^{not} from the actual connexion, but from the mutual attraction of the particles of bodies.
2. The particles of all bodies are never in actual contact with each other; because heat is never completely absent.
3. Every body exists either as a solid, or a liquid, or in the form of an elastic aëriform vapour according to the proportion between the mutual attractive force of the particles & their mutually repulsive force arising from heat.

Remark:

It is not easy to comprehend these phenomena unless we deem them the effect of a real & material substance or very subtle fluid insinuating itself between the particles of all bodies: Yet, whether the existence of this fluid be, or be not hypothetical, the phenomena of nature may, by it, be explained very satisfactorily.

II. Caloric ----- is the cause of heat; whatever it may be, it exists; though, like the cause of gravitation, it be itself unknown. It may be considered as the cause of repulsion. Is it also the cause of light? or only a manifestation of it?

Inferences: or how are they connected? It may be accumulated in part, but has a constant tendency to be in equilibrium with bodies & accounts for the size of particles all bodies.

1. Bodies would become liquid at an (indivisible point or degree of the thermometer if there existed no other powers than the attractive & repulsive abovementioned: Water at the moment of losing the form of ice would boil & be transformed into an aëriform fluid.

2. This third power is the pressure of the atmosphere: An additional quantity of caloric being necessary to overcome this pressure; and, to cause the liquid to become aëriform: It is the cause of the permanency of liquids, which would otherwise be dissipated by the caloric which they possess:

Without

Without it aëriform fluids could not be detected, nor restrained from an indefinite expansion or dissipation; and, unless gravity be supposed to affect the particles, without this pressure aëriform fluids could not form an atmosphere. Ether, for example would always exist in an aëriform state ^{in the usual temp. of our air} were it not for this pressure; and, by many experiments, the aëriform state of bodies is a modification dependent on the degree of temperature; and hence 3.I may be esteemed a general principle.

3. Hence the composition of our atmosphere is capable of a very beautiful illumination: It may be conceived to consist of every substance capable of preserving the aëriform state in the common temperature & under the usual pressure which it experiences: Indeed, by the method of either analysis or synthesis, we are able, even at present, to resolve the atmospheric fluid into two others which are aëriform and of directly opposite qualities.
4. Hence, also, the explication of the ventilation occasioned upon our organs by heat: It is caused by the passage of caloric from heated bodies to the ^{height} left, to restore the equilibrium.

III. Free caloric..... is such portion of the cause of heat as is not combined with bodies. a state in which it is never obtained

Inference:

It is not possible, in our system of nature to obtain free or uncombined caloric.

✓ IV. Combined caloric..... is found combined with every substance.

V. Specific caloric --- is the respective quantities of caloric required to raise a number of bodies of the same weight to an equal degree of temperature.

VI. Gas..... expresses generically elastic aëriform fluids.

Inferences.

1. Gas expresses the fullest saturation of any body with caloric.

2. The

2. The different species of gases are naturally to be denominated from the substances with which the caloric is combined to form them, and each such substance is called the base of the gas.

VII. Oxygen ----- is the base of one of the known constituents of the atmosphere (3. II.) & which is highly respirable and assistant in combustion & calcination.

Remarks:

1. One of the general properties of this base is to form acids by its ^{combination} ~~combination~~ with various substances in combustion: Thus oxygen & caloric form oxygen gas, &c. &c. Oxygen gas itself may be decomposed by sulphur, phosphorus, charcoal, metals, &c.
2. In every acid care must be taken to distinguish between the acidifiable base, & the acidifying principle or oxygen.
3. In the new chemical language, — every combination of oxygen with a combustible substance is called oxygenation; also, to oxygenate a substance is to convert it into an acid: There are four degrees of oxygenation expressible in this language.

VIII. Acids ----- is a generic term for the products or results of the combustion or oxygenation of any substance. Acids may have, first, known bases; secondly, unknown bases; for each of which a particular mode of designation is prepared.

Remarks:

1. Bodies convertible into acids are found to be susceptible of four degrees of saturation with oxygen (3. VII); and the properties of the results are found to vary with this susceptibility of the bodies to imbibe oxygen; and

IX. Oxyd ----- signifies any metallic calx or combination of metal, or even any other substance with oxygen in the first or lowest degree, by which they approach the nature of salts and are not converted into acids: The peculiar and permanent colours of the oxyds of the same metal depend upon the degree of oxygenation; and to discriminate them, the name of the metal and the colour of the oxyd are combined; thus the black or red oxyd of iron, &c.

Of the 2nd, 3rd & 4th. degrees of saturation of acids
First ~~is the 2nd degree~~: When the base of the acid is known:

Under-saturation is denoted by adding Ous } to the base; ^(sulphurous acid)
& Complete saturation ----- ic } ^(sulphuric acid)

Secondly, when the base of the acid is not known, there being always an hitherto inseparable portion of oxygen combined with such acids, this natural state corresponds to the 2nd. degree of saturation, & is simply denominated by the known name of the acid; and the

Under-saturated, of this class (or 3rd. degree of saturation) is characterized by adding ic to the name of the acid itself;

& the Complete saturation (or 4th. or highest degree) by writing the term Oxygenated before the name of the acid.

~~Example~~ Thus from muria or sea-salt, we have
the 3rd degree expressed by muriatic acid
& the 4th. degree ----- by oxygenated }
muriatic acid. }

X. Azote ----- is the base of the other constituent of the atmosphere (3. I), ^{chemical} the properties of ~~which~~ ^{this} gas are little known; but, it is ^{found} ~~known~~ to be non-respirable, and non-assistant in combustion & calcination.

Remark:

Azote with caloric forms azotic gas.

XI. Hydrogen ----- is that base, or generative principle of water, which, combined with oxygen, forms water: For, it is now known that, water decomposed yields hydrogen; & hydrogen combined with oxygen, produces water. Hydrogen & caloric form hydrogen gas, or gas whose base is hydrogen. (Page 103)

XII. Carbon — is that simple ^{pure element} ~~simple principle~~ which exists in great plenty in well-made charcoal; and, which enters into chemical combinations, especially with oxygen or the acidifying principle, forming carbonic acid.

XIII. Alloys — denote the results of the combinations of metals with each other.

XIV. Amalgams — are the alloys of mercury with metals.

XV. Sulphurets (hitherto called Pyrites) ^{mark in general} ~~are~~ the combina-
Phosphorets — — — — — tions of metals } Sulphur
Carburets — — — — — with ~~other substances~~ } Phosphorus } uncombined
Charcoal }

Remarks:

~~Sulphurets~~
Thus we have the sulphuret of potash, of ammoniac, &c.

XVI. Sulphurated hydrogen gas } denotes the respective combination of
Phosphorated ————— } combination of sulphur, phosphorus &
Carbonated ————— } charcoal with hydrogen in the state of gas.

Remarks:

1. Sulphurated hydrogen gas smells like rotten-eggs & constitutes the chief properties of several mineral waters.
2. Phosphorated hydrogen gas takes fire when presented to oxygen gas, or even to atmospheric air, & smells like putrid fish

XVII. Alcohol — is an inflammable liquor ^{obtained} ~~produced~~ by distilling the fluid produced by the fermentation ^{which takes place when} of any saccharine matter is mixed with water.

XVIII. Alkalies — are procured, by lixiviation, from the ashes of burnt

XIX. Salifiable principles — are the acids: and the salifiable bases — are Potash, soda, ammoniac, lime, magnesia, barytes & alumine, or argill; also, all the metalline bodies.

Remarks

XX. Neutral salts — are formed by the union of earthy and metallic bodies with acidifiable substances combined with oxygen.

Remarks:

Remarks:

- 1^o Sulphats } Denote all the neutral (sulphuric acid) } ^{i.e. acid} oxygenated
 Phosphats } salts having in their } phosphoric acid } ^{in the 2nd de-}
 &c. } composition the } &c. } gree.

The species are distinguished by the names of the salifiable bases, viz. sulphat of potash, &c.

- 2^o Sulphites } Denote all the neutral (sulphurous acid) } ^{acid} i.e. oxygenated
 Phosphites } salts having in their } phosphorous acid } ^{in the 1st or low-}
 &c. } composition the } &c. } est degree.

Thus we have the sulphite of potash, &c. and

- 3^o Oxygenated muriat of potash } Distinguish all the neutral (}
 nitrat of soda } salts (disting. from the 3rd }
 &c. } degree of oxygenation) in the }
 { oxygenated muriatic acid } with the { potash
 { nitric acid } salifiable { soda
 { &c. } bases { &c.